TOWN OF WAYLAND - TOWN CLERK'S OFFICE
NOTICE OF MEETINGS OF TOWN BOARDS/COMMITTEES/COMMISSIONS

Posted in accordance with the provisions of the Open Meeting Law

NAME OF BOARD/COMM:	Conservation Commission
FILED BY:	Linda Hansen, Conservation Administrator
DATE OF MEETING:	Wednesday, March 3, 2021
TIME OF MEETING:	6:30PM
PLACE OF RECORDING:	Wayland Town Building (Council on Aging) – 41 Cochituate Rd.

NOTE: Notices and agendas are to be posted at least 48 hours in advance of the meetings excluding Saturdays, Sundays, and legal holidays.

***In compliance with the revised Open Meeting Law requirements, we will live stream the meeting via Zoom as well as WayCAM. The Zoom meeting can be entered using the following link: https://zoom.us/j/95997239054?pwd=Mkhqd3Q0RlJ3Mm9mbU8rd0p2c0FFUT09**

Password: 465156

The meeting may be viewed live on the WayCam Government Channel (Comcast 9, Verizon 38).

Public Comment will be received either through Zoom or by phone at 508-358-6812 for this meeting. The phone number will be active during the public comment portion of the meeting. Thank you in advance for your patience; we intend to address all calls that come in during the Public Comment period.**

In addition to being live streamed, WayCam will record the meeting and this recording will be made available to the public as soon after the meeting as is practicable. No in-person attendance of members of the public will be permitted, but every effort will be made to ensure that the public can adequately access the proceedings.

****To make a public comment via Zoom, perform a virtual "hand raise". The meeting moderator will contact you via a chat message to acknowledge your request and will inform the chair of your request to comment. Instructions for performing a virtual "hand raise" can be found at https://support.zoom.us/hc/en-us/articles/205566129-Raising-your-hand-In-a-webinar**

Proposed Meeting Agenda – Wednesday, March 3, 2021

Items without a specific time noted may be taken out of order at any time during the meeting.

1. **Approve Consultant fees (not to exceed $4,000) for guidance on vernal pool related issues from Wetland filing fee account**
2. **Public Hearings/Public Meetings**
    a. **6:30PM – 6 Springhill Road DEP File # 322-XXX – Continued Public Hearing, Notice of Intent** filed pursuant to the Wetland Protection Act (310 CMR 10.0) and a Chapter 194 application filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw, submitted by Hanbeeth Kim for the installation of the a 12 x 16 foot shed in the rear yard at 6 Springhill Road in Wayland, MA. The proposed work is within the 100-foot wetland buffer zone. Property is shown on Assessor's Map 24, Parcel 043.

b. **6:35PM – 16 Linn Lane D-969 – Public Meeting,** Request for Determination filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw Chapter 194 and the Wetlands Protection Act, submitted by Robert McInturff for the replacement of a failed septic system at 16 Linn Lane in Wayland, MA. Property is shown on Assessor's Map 49 Parcel 17.
c. **6:45PM – 23 Alpine Road D-970 – Public Meeting,** Request for Determination of Applicability filed pursuant to the Wetlands Protection Act and a Chapter 194 application filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw, submitted by James Seaborg for the removal of an existing dwelling and the construction of a single family dwelling with associated site work at 23 Alpine Road. Property is shown on Assessor's Map 06, Parcel 02.
d. **7:00PM - Loker Conservation and Recreation Area, 412 Commonwealth Road DEP File #322-953 – Public Meeting,** Notice of Intent filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw Chapter 194 and the Wetlands Protection Act, submitted by Louise Miller, for the installation of synthetic turf field, sport field lighting, parking lot, stormwater drainage system, parking lot and pedestrian lighting, emergency vehicle access drive, and pedestrian walkways at Loker Conservation and Recreation Area, 412 Commonwealth Road, Wayland, MA. Property is shown on Assessor's Map 49 Parcel 064B.
e. **7:45PM – 24 School Street DEP File # 322-965 – Public Hearing,** Notice of Intent filed pursuant to the Wetlands Protection Act, submitted by Chris D'Antonio for the construction of twelve new townhouses, driveway and parking areas, subsurface sewage disposal system, stormwater management system, and supporting utilities at 24 School Street in Wayland, MA. Property is shown on Assessor's Map 52, Parcel 189. Specific items for discussion:
    i. **Presentation by applicant regarding any new material since previous hearing**
    ii. **Select a peer reviewer for the MODFLOW modeling analysis**

3. **Stormwater and Land Disturbance Permit Applications**
    a. 68 Plain Road – SMLD-71, Construction of a new single family house, work includes demolition of the existing structure, a new driveway, septic system, drainage system, landscaping, utility connections, and related site work.
    b. 105 Plain Road – SMLD-72, Proposed Conservation Cluster Subdivision to create two lots. Lot 1 would contain and preserve the existing historic home. Lot 2 would contain 4 proposed dwelling units plus open space. Work would also include a common driveway, utilities, stormwater management, septic system, and miscellaneous site work.
4. **Other:**
    a. RSC Community Grant Bobolink Sign Review
    b. Consider reintroduction of Bobwhite at Sedgemeadow?
    c. RSC Riverfest 2021, should the Commission host an event?
    d. Placement of a memorial tree or bench for John Hynes and Roger Backman
5. **Public Comment**
6. **Approve Minutes:**
    a. 02.10.2021
7. **Adjournment**

TOWN OF WAYLAND - TOWN CLERK'S OFFICE
NOTICE OF MEETINGS OF TOWN BOARDS/COMMITTEES/COMMISSIONS

Posted in accordance with the provisions of the Open Meeting Law

The next **Scheduled** Conservation Commission Meeting is tentatively scheduled for March 24, 2021.

NOTE: Per changes to the Open Meeting Law, notice of any meeting of a public body shall include "A listing of topics that the chair reasonably anticipates will be discussed at the meeting". AG's Office guidelines state that the list of topics shall have sufficient specificity to reasonably advise the public of the issue to be discussed.

Wayland Wetlands and Water Resources Bylaw, Chapter 194 Application

1. Applicant:

James Seaborg			jimmyseaborg@gmail.com
Name (PLEASE PRINT)			Email Address (if applicable)
26 Alpine RD	Wayland	MA	01778
Mailing Address	City/Town	State	Zip Code
508-572-2825			
Phone Number			Fax Number (if applicable)

2. Representative:

Firm/Business Name			Contact Name
Mailing Address	City/Town	State	Zip Code
Phone Number			Fax Number (if applicable)

3. Property Owner(s)

James Seaborg			jimmyseaborg@gmail.com
Property Owner (PLEASE PRINT)			Email Address (if applicable)
26 Alpine RD	Wayland	MA	01778
Address	City/Town	State	Zip Code
508-572-2825			
Phone Number			Fax Number (if applicable)

4. Type of Application

[X] Request for a Determination of Applicability (RDA)
[ ] Abbreviated NOI
[ ] Notice of Resource Area Delineation
[ ] After the Fact Amendment (AFA)
[ ] Amendment to Order of Conditions
[ ] Notice of Intent (NOI)
[ ] Extension of O.O.C.
[ ] Certificate of Compliance
[ ] After the Fact Filing (AFF)

5. Project

23 Alpine RD	06	02
Location Address	Assessors Map(s)	Parcel(s)

Project Description (PLEASE PRINT): The proposed development includes the removal and replacement of existing trees as indicated on site plan, existing dwelling and decks and the construction of a new single family dwelling along with all associated site work. The only proposed work inside the buffer zone is tree removal, hand pulling invasive plants, and the installation of a native plant rain garden and lawn area.

6. Title/Date of Plan(s) Site Plan for 23 Alpine RD 12/2/20, Wetlands Resource Area Evaluation 10/18/18, Stormwater Report 12/2/20

7. Bylaw Application Fee: $ _____

8. Application filed pursuant to MGL Chapter 131, Section 40 [x] Yes [ ] No

9. Signature of Applicant _____ Date _____

Signature of Property Owner _____ Date _____

(NOTE: This application shall be signed by the property owner as well as the applicant. Signature of the property owner on this application shall be deemed permission granted to the Conservation Commission and their agents to go upon the subject property.)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Wayland
City/Town

WPA Form 1- Request for Determination of Applicability

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

A. General Information

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

1. Applicant:

James Seaborg	jimmyseaborg@gmail.com	
Name	E-Mail Address	
26 Alpine RD		
Mailing Address		
Wayland	MA	01778
City/Town	State	Zip Code
508-572-2825		
Phone Number	Fax Number (if applicable)	

2. Representative (if any):

Firm		
Contact Name	E-Mail Address	
Mailing Address		
City/Town	State	Zip Code
Phone Number	Fax Number (if applicable)	

B. Determinations

1. I request the Conservation Commission make the following determination(s). Check any that apply:

☒ a. whether the **area** depicted on plan(s) and/or map(s) referenced below is an area subject to jurisdiction of the Wetlands Protection Act.

☒ b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced below are accurately delineated.

☒ c. whether the **work** depicted on plan(s) referenced below is subject to the Wetlands Protection Act.

☒ d. whether the area and/or work depicted on plan(s) referenced below is subject to the jurisdiction of any **municipal wetlands ordinance** or **bylaw** of:

Town of Wayland
Name of Municipality

☐ e. whether the following **scope of alternatives** is adequate for work in the Riverfront Area as depicted on referenced plan(s).

C. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

23 Alpine RD	Wayland
Street Address	City/Town
06	02
Assessors Map/Plat Number	Parcel/Lot Number

b. Area Description (use additional paper, if necessary):

Please see attached Narrative and Wetland Resource Area Evaluation

c. Plan and/or Map Reference(s):

Site Plan by Cyprus Design Inc	12/2/20
Title	Date
Wetland Resource Area Evaluation by Oxbow Associates	10/18/18
Title	Date
Proposed Planting Plan	1/15/21
Title	Date

2. a. Work Description (use additional paper and/or provide plan(s) of work, if necessary):

The proposed development includes the removal of the existing trees as depicted on site plan, existing dwelling & decks and the construction of a new single family dwelling along with all associated site work such as subsurface sewage disposal system, driveway, landscaping, grading, drainage improvements and utilities. Efforts were made to create a site plan that would minimize disturbance to the resource area. The septic system location is proposed in the front corner of the property, as far as possible from the resource area. However, this pushes the location of the house closer to the buffer zone and in close proximity to potentially hazardous trees. 20 trees are proposed for removal and replacement (15 inside the buffer zone and 5 outside). A native plant rain garden is proposed to mitigate stormwater runoff from the new structure. A turf area is proposed inside the buffer zone and will go no closer than 50' to the resource area. A 35-40' wide native plant bed will demarcate the transition of lawn area to resource area and will restrict future access to the resource area. All invasive plants on the property will be removed (hand pulled inside buffer zone).

C. Project Description (cont.)

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

The proposed rain garden bioretention area will be a significant improvement to stormwater runoff. There is currently no stormwater treatment on the property and the runoff from the existing dwelling and driveway travels through a pile of urban fill that includes old car parts, plastics, and glass. The rain garden will be a significant improvement by treating the stormwater before reaching the resource area. The removal of all invasive plants throughout the property will allow native species to thrive. The 35-40' planted bed will offer further protection of the resource area by restricting access. Over 50 different species of native trees, shrubs and perennials will create habitat and enhance wildlife diversity.

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- ☐ Single family house on a lot recorded on or before 8/1/96
- ☐ Single family house on a lot recorded after 8/1/96
- ☐ Expansion of an existing structure on a lot recorded after 8/1/96
- ☐ Project, other than a single family house or public project, where the applicant owned the lot before 8/7/96
- ☐ New agriculture or aquaculture project
- ☐ Public project where funds were appropriated prior to 8/7/96
- ☐ Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- ☐ Residential subdivision; institutional, industrial, or commercial project
- ☐ Municipal project
- ☐ District, county, state, or federal government project
- ☐ Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

Name and address of the property owner:

James Seaborg
Name

26 Alpine RD
Mailing Address

Wayland
City/Town

MA
State

01778
Zip Code

Signatures:

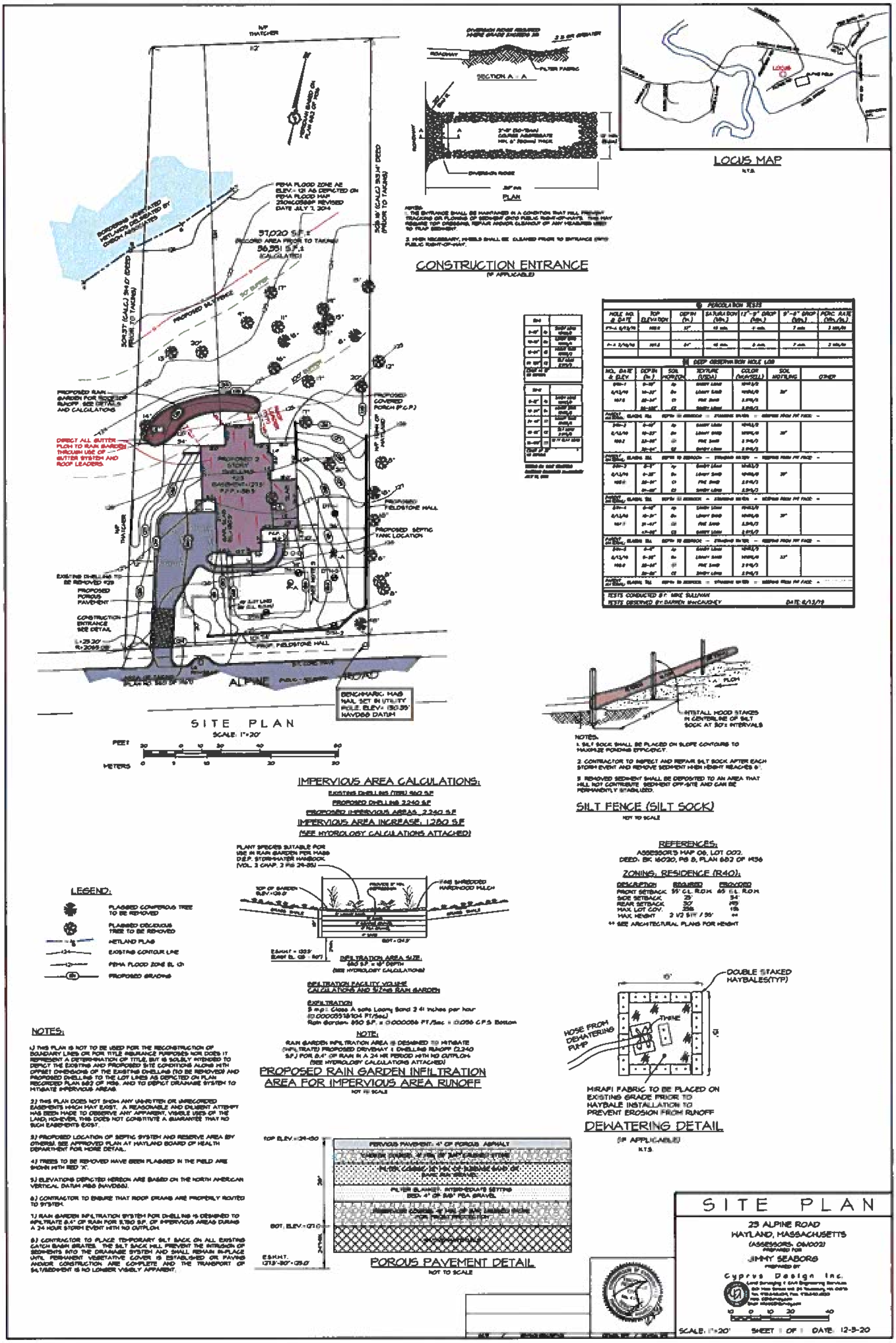
I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Signature of Applicant

Date

Signature of Representative (if any)

Date


SITE PLAN
SCALE: 1"=20'
FEET
METERS
LOCUS MAP
N.T.S.
CONSTRUCTION ENTRANCE
(IF APPLICABLE)
SECTION A - A
PLAN
ALPINE ROAD
BENCHMARK: MAG NAIL SET IN UTILITY POLE. ELEV= 130.55' NAVD88 DATUM
LEGEND:
NOTES:
IMPERVIOUS AREA CALCULATIONS:
IMPERVIOUS AREA INCREASE: 1280 S.F.
(SEE HYDROLOGY CALCULATIONS ATTACHED)
PROPOSED RAIN GARDEN INFILTRATION AREA FOR IMPERVIOUS AREA RUNOFF
NOT TO SCALE
POROUS PAVEMENT DETAIL
NOT TO SCALE
2. CONTRACTOR TO INSPECT AND REPAIR SILT SOCK AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN HEIGHT REACHES 6".
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
SILT FENCE (SILT SOCK)
NOT TO SCALE
REFERENCES:
ASSESSOR'S MAP 06, LOT 002.
DEED: BK 16020, PG 8, PLAN 663 OF 1956
ZONING: RESIDENCE (R40):
FRONT SETBACK
SIDE SETBACK
REAR SETBACK
MAX LOT COV.
MAX HEIGHT
** SEE ARCHITECTURAL PLANS FOR HEIGHT
DOUBLE STAKED HAYBALES(TYP)
HOSE FROM DEWATERING PUMP
MIRAFI FABRIC TO BE PLACED ON EXISTING GRADE PRIOR TO HAYBALE INSTALLATION TO PREVENT EROSION FROM RUNOFF
DEWATERING DETAIL
(IF APPLICABLE)
SITE PLAN
23 ALPINE ROAD
HAYLAND, MASSACHUSETTS
(ASSESSORS: 06/002)
JIMMY SEABORG
Cyprus Design Inc.
SCALE: 1"=20'
SHEET 1 OF 1
DATE: 12-3-20

23 Alpine Road
Wayland, MA

Table of Contents

PROJECT NARRATIVE

Existing Conditions

The subject property is currently developed with an existing single family dwelling, decks & driveway and is bound by Alpine Road to the south, bordering vegetated wetlands to the north, residential property to the west, and vacant town owned land to the east. A bordering vegetated wetland and FEMA flood zone are present on the northern portion of the property as depicted on attached site plan and figures. The property is shown as parcel 2 on Wayland Assessors map 06. Existing conditions detail and topography as shown on the site plan was obtained by CDI during a field instrument survey of the property. The existing site slopes from a high elevation of 129 at front of property at Alpine Road to a low elevation of 121 at the northern portion of the property at the Bordering Vegetated Wetland (BVW) / FEMA flood zone AE. The existing site currently has no drainage controls to aid in storm water treatment or recharge of impervious areas prior to runoff entering abutting properties and existing resource area.

A portion of the site is located within FEMA flood zone (elevation 121) according to Flood Insurance Rate Map (FIRM) for the Town of Wayland Massachusetts, FEMA Map No. 25017c0388f, and is attached as Figure 2. Elevation datum is based on NAVD 88 datum which is same datum as FEMA maps.

Proposed Conditions

The proposed development includes the removal of the existing trees as depicted on site plan, existing dwelling & decks and the construction of a new single family dwelling along with all associated site work such as subsurface sewage disposal system, driveway, landscaping, grading, drainage improvements and utilities. The project has been designed to minimize impacts to the resource area, beginning with the siting of the new septic system. The existing cesspool is located near the 100' BVW buffer zone and below the high groundwater mark and is in need of replacement. If the new septic system were located in the same area in or near the buffer zone, it would require up to 6' of mounding in order to raise the leach field above the high groundwater mark. This option would be considerably more detrimental to the resource area due to the close proximity and significant amounts of fill that would be required to raise the grade.

The alternative solution was to locate the new septic system in the front of the property, as far from the resource area as possible. By locating the septic system in the front we are able to avoid significant mounding and construction activity inside the buffer zone. This was a top priority of the site design.

One consequence of putting the septic system in the front is that it pushes the footprint of the proposed house closer to the resource area. The original design had the rear of the house 10' inside of the buffer zone. After consulting the septic engineer, it was learned that the house could be located 10' closer to the septic system if there was no basement in the front of the house. A slab foundation is now proposed for the front of the house, which allows the entire footprint of the home to be outside of the buffer zone. Again, we

were able to avoid construction activity being proposed inside the buffer zone.

With the new house now proposed farther towards the back of the property, there are several trees within striking distance. Some of these trees are in poor health and could pose a safety threat to the new home. 15 trees inside of the buffer zone are proposed for replacement. 5 trees outside of the buffer zone are proposed for replacement. It was decided that proposing tree removal and replacement is less detrimental than proposing the construction of a house or a septic system inside the buffer zone. A proposed lawn in this area will extend no closer than 50' to the resource area.

The proposed scope of work for this project offers several improvements that will help protect and enhance the resource area. A native plant rain garden will filter stormwater and provide excellent habitat for wildlife. A porous driveway will minimize the impervious surface area. The removal of buckthorn, bittersweet, honeysuckle, Norway maple and garlic mustard will allow native plants to flourish (all invasives will be hand pulled inside of the buffer zone). A large 35-40' wide densely planted native bed will deter people from entering the resource area, dropping lawn clippings, brush, etc. The proposed planting plan consists of over 50 different native trees, shrubs, and perennials that will create great wildlife habitat.

Drainage:
As mentioned above the proposed development will include improvements to the drainage on the property. The improvements include the use of porous pavement & a bio retention area (Rain Garden) for new dwelling rooftop runoff. The Raingarden is designed to mitigate storm water runoff from 2,240 s.f of rooftop with zero outflow from rain garden during a 8.4" of rain in 24 hours as shown on attached site plan, details and hydrology calculations.

Erosion / Silt Controls
Prior to the commencement of site work, a silt fence will extend along the northerly portion of the proposed site work to prevent the intrusion of sediment to the bordering vegetated wetlands. During construction of the dwelling, if dewatering of the excavation is necessary, a dewatering pump will be installed. The water will be discharged to mirafi fabric encompassed by a 15-foot by 15-foot area of hay bales to prevent erosion as shown in detail on attached site plan.

Site Grading
The existing grades will be maintained to the maximum extent feasible to minimize environmental disturbance and site costs related to excavation but is based on multiple control factors such as estimated seasonal high water table and subsurface sewage disposal system elevations. Proposed site elevations will maintain same flow patterns as existing conditions (slopes from south to north) from high elevation of 133 over the proposed septic system in front yard to a low elevation at the BVW of 121. See attached site plan for detailed existing and proposed site grading.

Stormwater Report

Standard 1: No New Untreated Discharges

N/A- There are no new untreated stormwater discharges from the site.

Standard 2: Peak Rate Attenuation

The project will offset the additional impervious area through the use of porous pavement for driveway and a raingarden which has been sized to collect and fully infiltrate a impervious area of 2,240 s.f. which is entire new rooftop runoff, walkway, and patio (site impervious increase from pre-conditions to post-conditions is 1,280 s.f.) during a 100yr storm / 8.4"of rain in a 24 hour period with zero outflow see attached details & hydrology calculations.

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater more than that required by Standard 3. Recharge has been provided through a 529 c.f. raingarden.
Required: 2,240 S.F. (Impervious Areas-Rooftop) x .60" (Hydraulic Soils Group A) = 112 c.f.
Provided: 529 c.f. (Rain Garden)

Standard 4: Stormwater Water Quality

As outlined above the existing conditions currently has no drainage controls for the site. The proposed project will provide an improvement of the existing water quality using grass swales and 529 c.f. raingarden which provides a standard TSS removal of 80%. The storage bed has been designed to hold a water quality volume of more than 1" over the surface area.
Required: 2,240 S.F. (Impervious Areas-Rooftop) x .1" (as required by D.E.P. Stormwater Management Guidelines) = 187 c.f.
Provided: Rain Gardens: 529 c.f.

Standard 5: Land Uses With Higher pollutant Loads

N/A - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

N/A - The proposed use does not discharge to a critical area.

Standard 7: Redevelopment

N/A - The project would not qualify as a redevelopment

Standard 8: Construction Period Controls

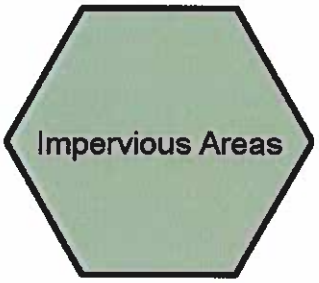
Construction period erosion and sedimentation controls have been provided on the design plans.

Standard 9: Operation and Maintenance Plan

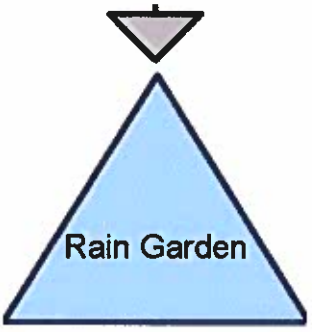
New permanent BMP's include the use of porous pavement and raingarden for rooftop runoff. The required O&M procedures have been included on the site plans and outlined below.

Standard 10: Illicit Discharges

Based upon site observations made by Cyprus Design Inc., no illicit discharges have been observed on the site. All proposed sewerage flow shall be discharged to the proposed subsurface sewerage disposal system.



Impervious areas (ho se)



Rain Garden

Routing Diagram for drainage-rain garden
Prepared by Cyprus Design Inc, Printed 11/17/2020

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond Rain Garden: Rain Garden Peak Elev=125.86' Storage=529 cf Inflow=0.37 cfs 1,401 cf
Outflow=0.04 cfs 1,400 cf

Summary for Pond Rain Garden: Rain Garden

Inflow Area= 2,240 sf,100.00% Impervious, Inflow Depth> 7.51"
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 1,401 cf
Outflow = 0.04 cfs @ 11.35 hrs, Volume= 1,400 cf, Atten= 90%, Lag= 0.0 min
Primary = 0.04 cfs @ 11.35 hrs, Volume= 1,400 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 125.86' @ 13.05 hrs Surf.Area= 650 sf Storage= 529 cf

Plug-Flow detention time= 110.3 min calculated for 1,395 cf (100% of inflow)
Center-of-Mass det. time= 109.4 min (845.2 - 735.8)

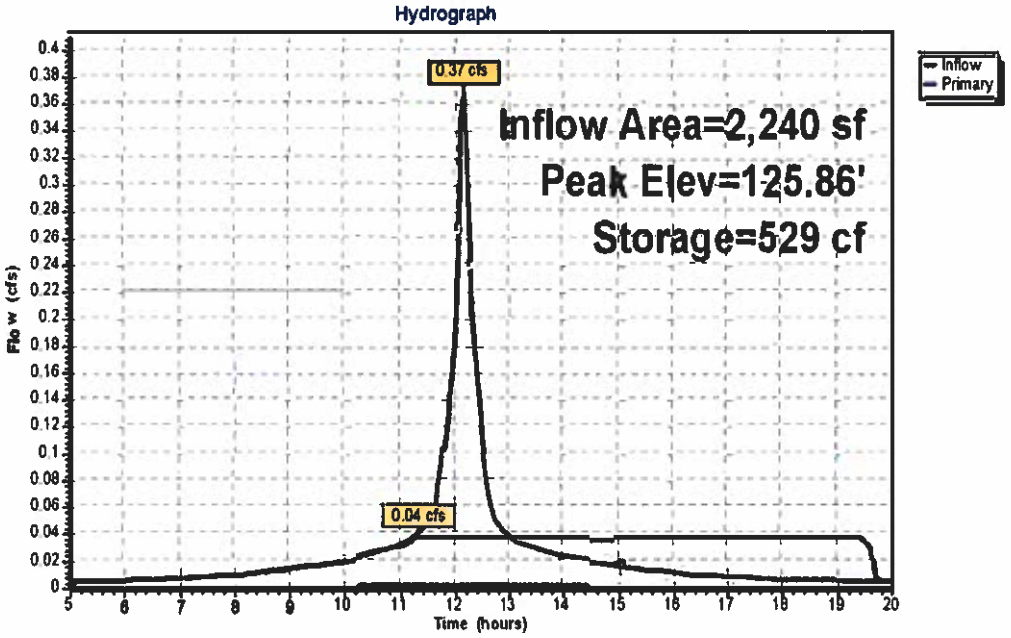
Volume	Invert	Avail.Storage	Storage Description
#1	124.50'	585 cf	**Custom Stage Data (Prismatic)Listed** below (Recalc) 975 cf Overall x 60.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.50	650	0	0
126.00	650	975	975

Device	Routing	Invert	Outlet Devices
#1	Primary	124.50'	**0.04 cfs Exfiltration when above 124.50'**

Primary OutFlow Max=0.04 cfs @ 11.35 hrs HW=124.52' (Free Discharge)
't..1=Exfiltration (Exfiltration Controls 0.04 cfs)

Pond Rain Garden: Rain Garden



Stormwater BMP Operation/Maintenance Manual & Pollution Prevention

For

23 Alpine Road

Located in

Wayland, MA

Prepared by:

Cyprus Design, Inc.
978-640-1019

November 17, 2020

PROJECT DESCRIPTION:

Existing Conditions

The subject property is currently developed with an existing single family dwelling, decks & driveway and is bound by Alpine Road to the south, bordering vegetated wetlands to the north, residential property to the west, and vacant town owned land to the east. A bordering vegetated wetland and FEMA flood zone are present on the northern portion of the property as depicted on attached site plan and figures. The property is shown as parcel 2 on Wayland Assessors map 06. Existing conditions detail and topography as shown on the site plan was obtained by CDI during a field instrument survey of the property. The existing site slopes from a high elevation of 129 at front of property at Alpine Road to a low elevation of 121 at the northern portion of the property at the Bordering Vegetated Wetland (BVW) / FEMA flood zone AE. The existing site currently has no drainage controls to aid in storm water treatment or recharge of impervious areas prior to runoff entering abutting properties and existing resource area.

A portion of the site is located within FEMA flood zone (elevation 121) according to Flood Insurance Rate Map (FIRM) for the Town of Wayland Massachusetts, FEMA Map No. 25017c0388f, and is attached as Figure 2. Elevation datum is based on NAVD 88 datum which is same datum as FEMA maps.

Proposed Conditions

The proposed development includes the removal of the existing trees as depicted on site plan, existing dwelling & decks and the construction of a new single family dwelling along with all associated site work such as subsurface sewage disposal system, driveway, landscaping, grading, drainage improvements and utilities.

The BVW has been delineated by Oxbow Environmental. No work is proposed within the 100' buffer zone to the BVW except for the removal of trees as outlined on site plan. A Request for Determination of Applicability (RDA) application will be prepared and submitted to the Wayland Conservation Commission for review and approval prior to any construction activities.

Soils:

Deep hole observation soil tests & percolation tests were performed on site by Mike Sullivan on 8-13-19 & Dave Schofield on 7-18-18 and observed by Darren MacCaughey and are shown on the attached site plan. Soil testing resulted in a fine to medium sand (hydrologic group A) which is a soil that has high infiltration properties. Estimated Seasonal High Water Table was found at 30" below existing grade on average.

Drainage:

As mentioned above the proposed development will include improvements to the drainage on the property. The improvements include the use of porous pavement & a bio

retention area (Rain Garden) for new dwelling rooftop runoff. The Raingarden is design to mitigate storm water runoff from 2,240 s.f of rooftop with zero outflow from rain garden during a 8.4" of rain in 24 hours as shown on attached site plan, details and hydrology calculations.

Erosion / Silt Controls

Prior to the commencement of site work, a silt fence will extend along the northerly portion of the proposed site work to prevent the intrusion of sediment to the bordering vegetated wetlands. During construction of the dwelling, if dewatering of the excavation is necessary, a dewatering pump will be installed. The water will be discharged to mirafi fabric encompassed by a 15-foot by 15-foot area of hay bales to prevent erosion as shown in detail on attached site plan.

Site Grading

The existing grades will be maintained to the maximum extent feasible to minimize environmental disturbance and site costs related to excavation but is based on multiple control factors such as estimated seasonal high water table and subsurface sewage disposal system elevations. Proposed site elevations will maintain same flow patterns as existing conditions (slopes from south to north) from high elevation of 133 over the proposed septic system in front yard to a low elevation at the BVW of 121. See attached site plan for detailed existing and proposed site grading.

Temporary storm inlet protection filter fabric will be placed around all catch basin inlets. The filter fabric will prevent the intrusion of sediments into the drainage system and shall remain in-place until permanent vegetative cover is established or paving and/or construction are complete and the transport of silt/sediment is no longer visibly apparent.

If applicable, the surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary Seeding
b. Temporary Mulching
c. Permanent Seeding
d. Placement of Sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

Operation and Maintenance

This Operation and Maintenance Manual has been prepared to conform to the Department of Environmental Protection's Stormwater Management guidelines and more specifically follows the format of Stormwater Management Standards Operation and Maintenance Plans (Standard 9).

1. Stormwater Management System(s) Owner(s)

The stormwater management plan includes the use of porous pavement for driveway and a rain garden to mitigate stormwater runoff from dwelling rooftop. Maintenance responsibilities of the porous pavement and rain garden will be the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

2. The Party or Parties Responsible for Operation and Maintenance

Once constructed, approved, and accepted by the Town of Wayland, the porous pavement for driveway and a rain garden to mitigate stormwater runoff from dwelling rooftop located on the subject parcel will be maintained by the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

Schedule for Maintenance and Inspection

During Construction

During construction, erosion control measures shall be implemented in accordance with the design plan approved by the Town of Wayland to eliminate silt intrusion to drainage systems prior to paving and the stabilization of vegetated cover in landscaped areas. During this period, it shall be the responsibility of the owner's representatives (contractor) to maintain erosion control measures. These measures include ensuring silt sock is in-place, filter fabric or silt sack is present on catch basin grates and that these are effectively preventing silt and/or sediment from entering the catch basins. The owner or owner's representative shall be responsible for inspecting the silt sack / sock on a weekly basis. If silt sock or filter fabric needs to be replaced, the owner or owner's representative shall replace the silt sock / filter fabric as soon as is practical or no later than the next workday.

Upon Completion of Development and Town of Wayland Approval

Once the construction is complete to the satisfaction of the Town of Wayland, inspection and maintenance of all of the subject parcel structures (porous pavement, roof leaders, rain garden, grass swale) will be the responsibility of the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

Rain Garden Maintenance:

Although Rain Gardens are considered Low maintenance gardens they should be maintained and inspected on a consistent schedule basis to ensure proper functioning as outlined below.

Key Points:

- Inspect gardens during the growing season, and at the end of the growing season, after large storm events, and during weather extremes

- The maintenance of rain gardens consist of tasks to be completed on a weekly basis and other tasks as they are needed seasonally.

Weekly Maintenance:

- *Watering* plants regularly, particularly during dry periods of the first growing season. A general guideline is to supply plants about one inch of water per week during the first growing season. After the first growing season the plants will need to be watered only during severe dry periods.
- *Weeding* will be required more often in the first two seasons. You will need to weed less and less as the plants grow and surpass the weeds, so that by the third year you will only need to weed several times a year. The weeding will need to be performed based on weekly visual inspection of Garden.

Annual Maintenance:

- *Mulching* will need to be added every spring to maintain a three inch layer on rain garden. Triple shredded hardwood mulch with no dye is preferred.

- *Pruning* will need to be performed each spring to remove dead vegetation, deadhead flowers, tattered or unwieldy plants. This will encourage dense new growth and improve the gardens filtering capacity. Stems and seed heads can be left on the plants for winter interest, wildlife cover and food for birds.

- *Replanting* may need to occur depending on the plant material that is dead and/ or not thriving. Consider planting a different species that will be more successful for your particular garden.

- *Sediment Removal* may be required if it accumulates, particularly if it collects from a road or driveway. This is a sign of success, however occasionally you will need to use a flat shovel to remove any excess sediment, leaves, or debris which may constrict infiltration properties. If there is ponding in the garden it indicates rain garden is not infiltrating and will need to be repaired through digging multiple holes 12" deep throughout the garden and replace the restrictive soil with a coarse sand that will promote infiltration.

Porous Pavement Maintenance:

Regular inspection and maintenance is critical to the effective operation of porous pavement. Routine preventative cleaning is more effective than corrective cleaning. Visual inspections are an integral part of system maintenance. This includes monitoring pavement to ensure water drainage, debris accumulation, and surface deterioration.

- *Visual Inspections* are required on a continuous basis which will include checking for standing water on surface after a rain event. If this occurs than cleaning of porous pavement is required immediately through power washing the clogged areas with mid pressure setting typically less than 500 psi at an angle of 30 degrees or less, if this does not unclog problem areas than pavement vacuuming is required. Any leaves and debris present should be cleared using a power/leave blower to clean effected areas.
- Below is a maintenance schedule and description of activity required in a checklist format to ensure long term functioning of porous pavement;

CHECKLIST FOR INSPECTION OF POROUS PAVEMENTS

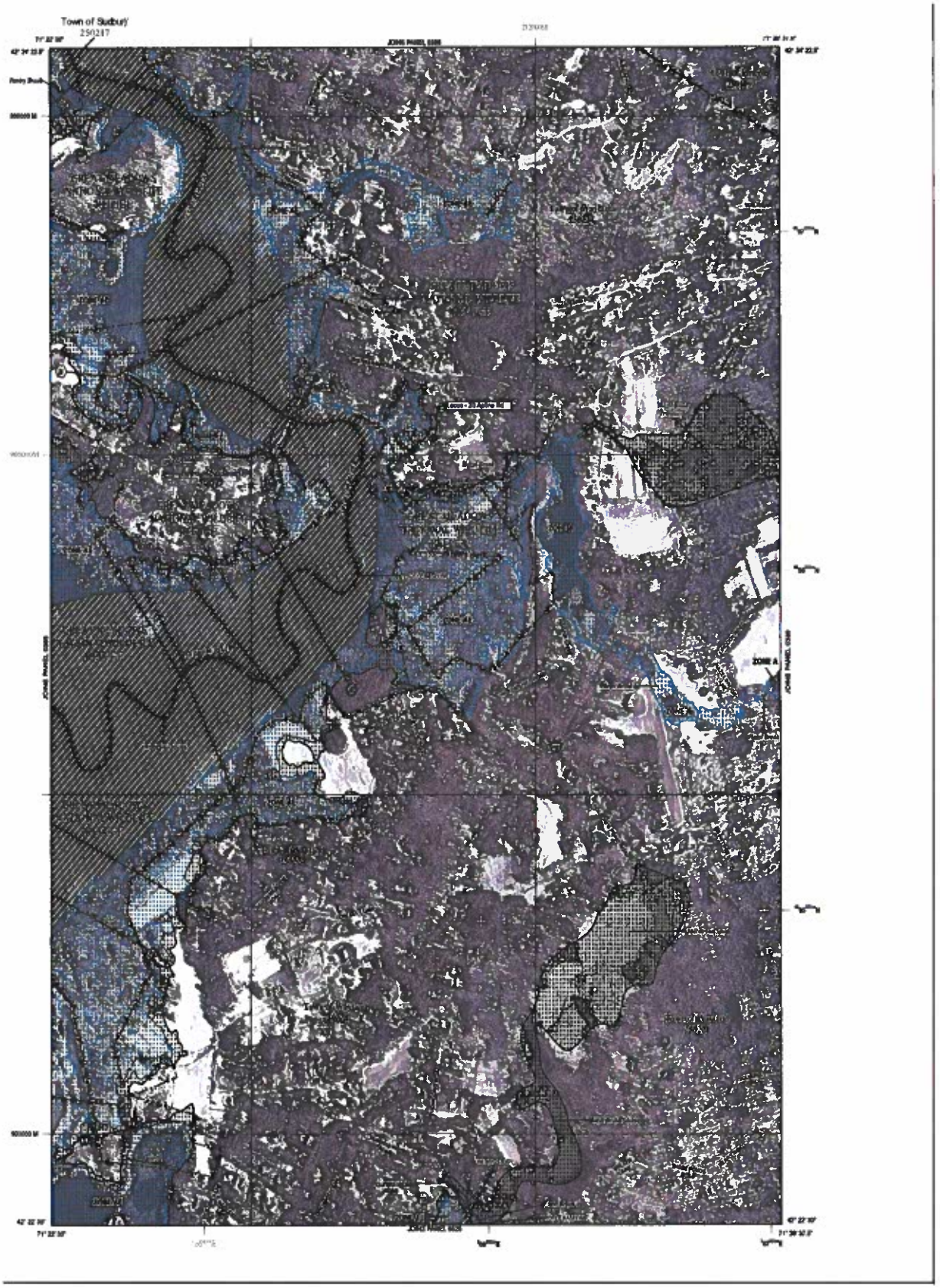
Location: Inspector:

Date: Time: Site Conditions:

Date Since Last Rain Event:

Inspection Items	Satisfactory (S)or Unsatisfactory(I.JI)		Comments/Corrective Action
1. Salt / Deicing			
Use salt only for ice management	S	Lli	
Piles of accumulated salt removed in spring	S	U	
Debris Cleanup (2-4 times a year minimum, Spring & Fall)			
ean porous pavement to remove sediment and organic debris the pavement surface via vacuum street sweeper.	S	Lli	
Adjacent non porous pavement vacuumed	S	U	
Clean catch basins (if available)	S	U	
3. Controlling Run-On (2-4 times a year)			
Adjacent vegetated areas show no signs of erosion and run-on to porous pavement	S	U	
4. Outlet/ Catch Basin Inspection (if available) {2 times a year, After large storm events)			
No evidence of blockage	S	U	
Good condition, no need for cleaning/repair	S	U	
5. Poorly Drained Pavement (2-4 times a year)			
Pavement has been pressure washed and vacuumed	S	U	
6. Pavement Condition (2-4 times a year minimum, Spring & Fall)			
No evidence of deterioration	S	U	
No cuts from utilities visible	S	U	
No evidence of improper design load applied	S	U	
7. Signage / Stockpiling (As Needed)			
Proper signage posted indicating usage for traffic load	S	UI	
No stockpiling of materials and no seal coating	S	U	

Corrective Action Needed	Due Date
1.	
2.	
3.	



SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

OTHER AREAS

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

MAP REPOSITORIES

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

SCALE 1" = 500'

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0388F

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

PANEL 388 OF 650

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LINCOLN, TOWN OF	250186	0388	F
SUDBURY, TOWN OF	250217	0388	F
WAYLAND, TOWN OF	250234	0388	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
25017C0388F
MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

OXBOW ASSOCIATES, INC.
Wetlands Delineation and Permitting • Wildlife Studies • Herpetology • Vernal Pool Ecology

October 18, 2018

Jimmy Seaborg
26 Alpine Road
Wayland, MA

Re: Wetland Resource Area Evaluation
23 Alpine Road
Wayland, MA

Dear Mr. Seaborg:

In response to your request, Oxbow Associates, Inc. (OA: specifically, S. Smyers) reviewed the above referenced site with specific regard to the extent of wetland resource areas on October 3, 2018. This evaluation was conducted in accordance with standard methodology for delineating vegetated wetlands under the Massachusetts Wetlands Protection Act (MGL Ch. 131, §40, "the Act"), its regulations (310 CMR 10.00), and the Town of Wayland Wetlands and Water Resources Bylaw (Chapter 194; "the Bylaw") and its implementing Regulations.

The subject property is located east of the Sudbury River, south of Sherman Bridge Road, and north of Alpine Road. The site contains a single-family house in disrepair with two decks, a paved driveway, and partly overgrown yard. In the northwestern corner of the parcel there is a mixed deciduous forest with a wetland contained within this forested area.

OA delineated the wetland with blue plastic flags labeled OA-A1 to OA-A8 based upon the extent of the wetland plant community, hydric soil, and topography. Upon exploring deeper in the wetland, OA found small intermittent channels, possibly old drainage ditches functioning as Banks (310 CMR 10.54) along the stream. Vegetation within the wetland includes: red maple (*Acer rubrum*), elm (*Ulmus* sp.), swamp white oak (*Quercus bicolor*), high bush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), glossy buckthorn (*Frangula alnus*), clearweed (*Boehmeria cylindrica*), jewelweed (*Impatiens glandulifera*), cinnamon fern (*Osmunda regalis*), royal fern (*O. regalis*), and skunk cabbage (*Symplocarpus foetidus*). Vegetation in the adjacent upland includes eastern white pine (*Pinus strobus*), Norway maple (*A. platanoides*), black cherry (*Prunus serotina*), weeping willow (*Salix babylonica*), glossy buckthorn, honeysuckle (*Lonicera* sp.), and sensitive fern.

Although there are some wetland plants in patches within the upland (sensitive fern, jewelweed, weeping willow), OA evaluated the soil profile along the wetland boundary to confirm the accuracy of the boundary. One soil profile was documented in detail approximately 4 feet from flag OA-4: A = 0-6", 2.5Y 3/2 fsl; Bw1 = 6-20", 2.5Y 4/4 sl; Bw2 = 20-30", 2.5 Y 5/4 sl. The Bw1 horizon too "bright" to be considered a hydric soil.

Regulatory implications and Recommendations

OA believes that this wetland contains features meeting the regulatory criteria for Bordering Vegetated Wetland (BVW: 310 CMR 10.55). There is a dominant wetland plant community, hydric soils and indicators of persistent hydrology. The BVW effectively exerts a 100-foot jurisdictional Buffer Zone under the Act and the Bylaw. The Bylaw has more stringent

P.O. Box 971 • Acton, Massachusetts 01720-0971
Telephone: 978.929.9058 • E-mail: butler@oxbowassociates.com

performance standards, prohibiting any disturbance within fifteen (15) horizontal feet of areas adjacent to wetlands, in most cases, and thirty (30) horizontal feet for any new construction.

Additionally, the property also contains Bordering Land Subject to Flooding (Floodplain; 310 CMR 10.57) at elevation 121-feet. Any fill deposited into FEMA Floodplain requires a 1:1 ratio of compensatory flood storage, of equal volume (calculated to the square-foot), at the same elevation.

We understand the proposed project includes the replacement of the house and associated septic system. We recommend that the final site plan include the property lines, wetland boundary, 15-, 30- and 100-foot buffer zone to the wetland, closest point of work to the wetland, topography, 100-year FEMA Flood elevation, proposed limit of work, proposed grading, septic system, landscaping details, and an erosion control barrier.

According to the Massachusetts Natural Heritage and Endangered Species Program, Estimated Habitats of Rare Wildlife and Certified Vernal Pools (MassGIS 2017), there is no mapped habitat for state listed wildlife species or certified vernal pools on, or adjacent to the Site. However, an area of the emergent marsh located east of the retaining wall is designated as a "Potential Vernal Pool."

The edge of the wetland is our professional opinion and the Wayland Conservation Commission must confirm the limits of the resource areas before the legal boundaries are established. Any activity proposed within any of the field-delineated wetland boundaries is subject to review by the local Conservation Commission, the Department of Environmental Protection (DEP), and possibly section 404 of the Clean Water Act (regulated by the Army Corps of Engineers). Any activity proposed within 100 feet of the boundary would also be subject to review by the Wayland Conservation Commission and DEP.

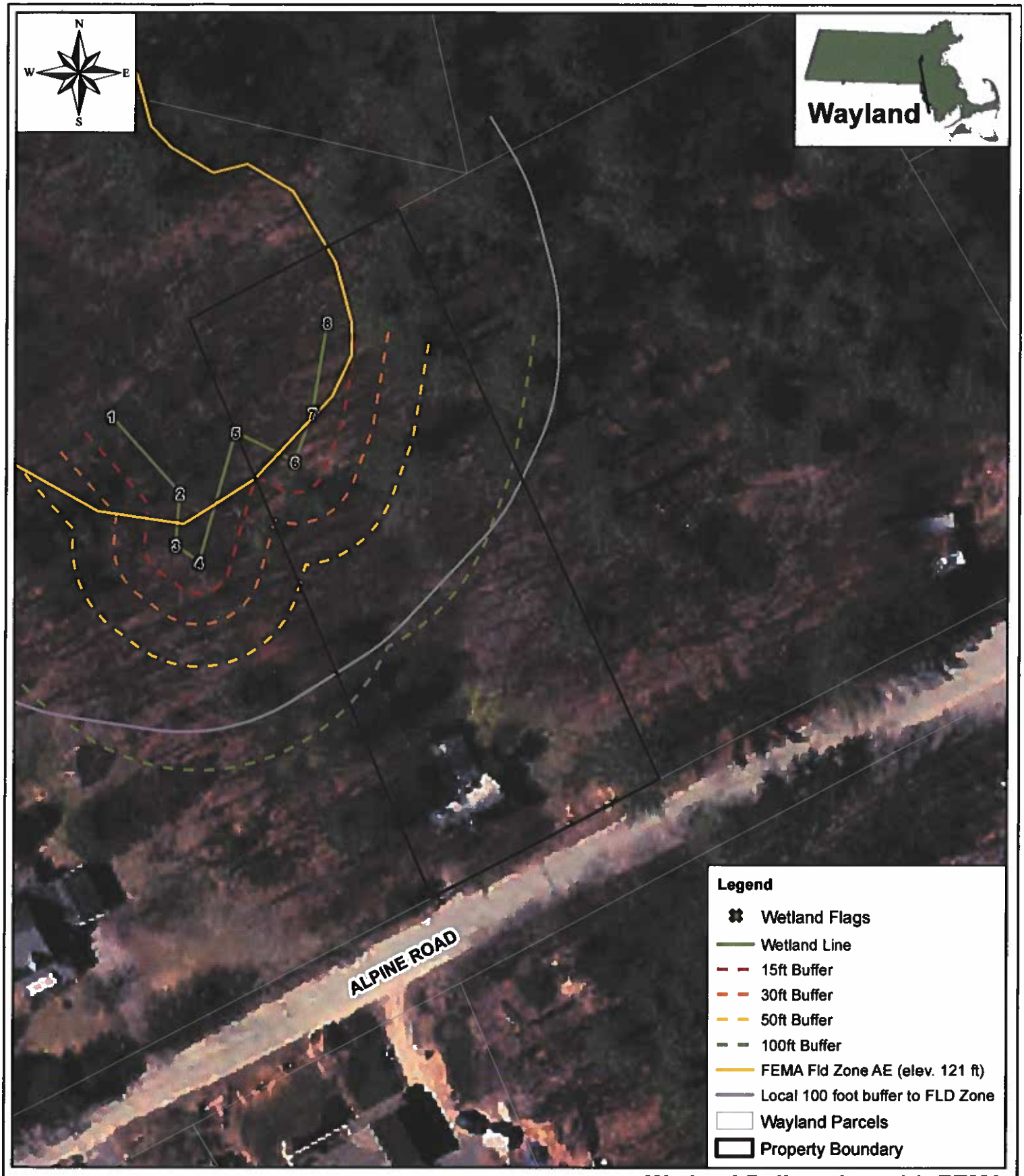
If you have any questions, please contact me at 978-929-9058.

Sincerely,

Scott Smyers

Scott D. Smyers, MS, PWS
Senior Scientist

encs.



Oxbow Associates, Inc.
Wetlands Delineation and Permitting
Wildlife Studies • Herpetology
Vernal Pool Ecology
P.O. BOX 971
ACTON, MASSACHUSETTS 01720
PHONE: (978) 929-0058
FAX: (978) 635-1882
WEB: www.oxbowassociates.com

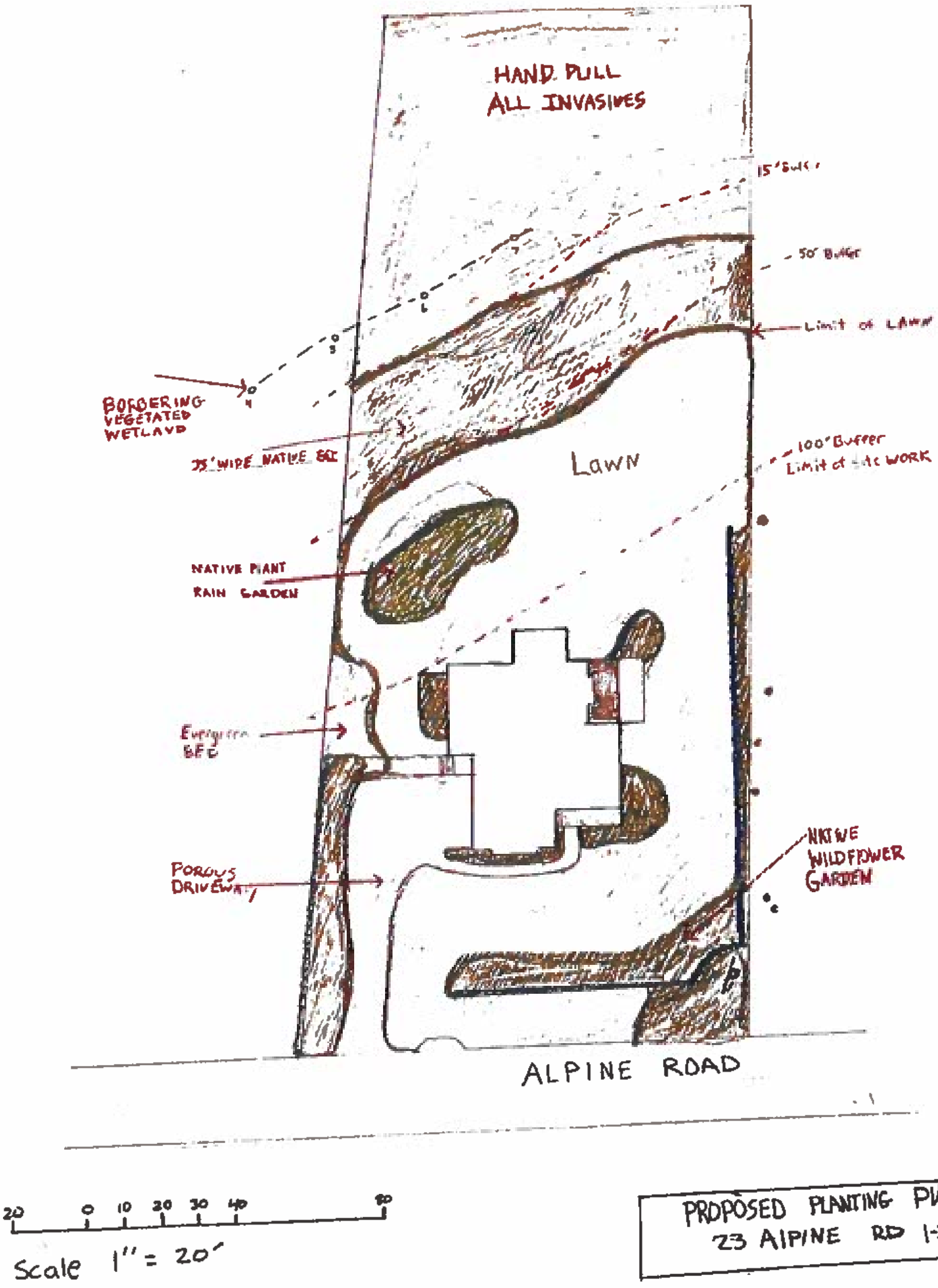
1:720

1 inch = 60 feet

0 60 120
Feet

Wetland Delineation with FEMA 2013 Orthophotograph
23 Alpine Road
Wayland, MA

October 12, 2018

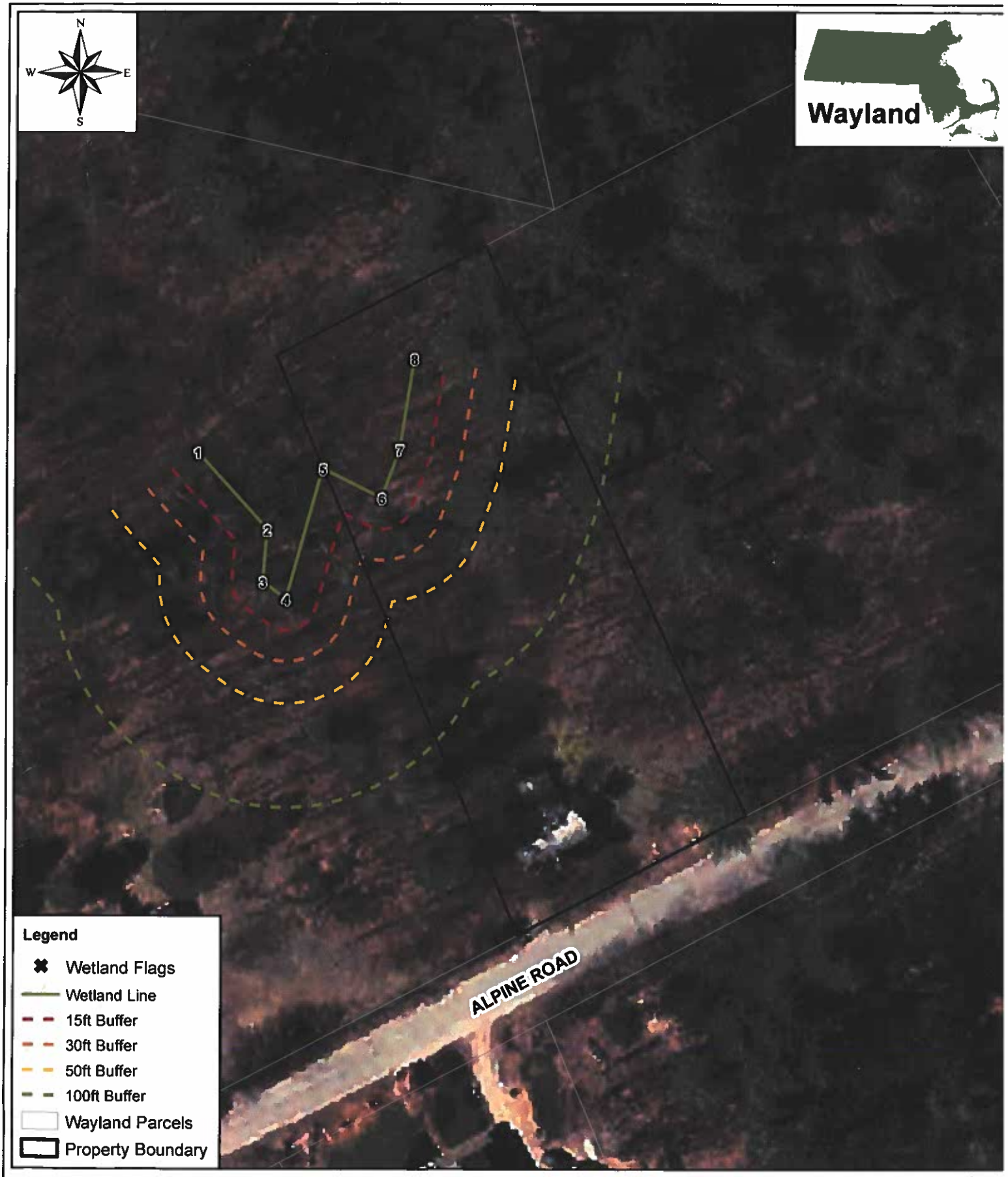


PROPOSED PLANTING PLAN
23 ALPINE RD 1-20-21

Replacement Tree and Shrub Schedule

	DBH of Tree to be Removed	Replacement Trees and Shrubs: Deciduous 2.5" dbh	Evergreen 5-6'	Shrub/Tree [illegible]	Shrubs 3'
	Inside Buffer Zone				
1	14"	[illegible]			
2	[illegible]	[illegible]			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	9"		2		
6	[illegible]		[illegible]		
7	11"		2		
8	16"			[illegible]	
9	[illegible]			[illegible]	
10	17"			[illegible]	
11	15"			[illegible]	
12	[illegible]				[illegible]
13	[illegible]				[illegible]
14	[illegible]				[illegible]
	Outside Buffer Zone				
1	[illegible]			[illegible]	
2	17"			[illegible]	
3	[illegible]			[illegible]	
4	[illegible]			[illegible]	
5	24"				11
6	[illegible]			2	
	Total New Plantings	14	7	[illegible]	[illegible]

Replacement Trees and Shrubs
Abies concolor - Concolor fir
Acer rubrum - Red maple
Acer saccharum - Sugar maple
Aesculus parviflora -Bottlebrush buckeye
Amelanchier spp. – Shadbush
Betula nigra – River birch
Ceanothus americanus – New Jersey tea
Cercis canadensis – Eastern redbud
Fothergilla gardenii, *F. major* – Fothergilla
Hamamelis virginiana –Common witch hazel
Hydrangea quercifolia – Oakleaf hydrangea
Ilex glabra – Inkberry
Juniperus virginiana – Eastern red cedar
Kalmia latifolia – Mt. Laurel
Cornus amomum – Silky dogwood
Cornus racemosa – Grey dogwood
Fothergilla major, *F. gardenii* – Fothergilla
Ilex verticillata – Winterberry
Sambucus canadensis – Elderberry
Vaccinium corymbosum – Highbush Blueberry
Viburnum cassinoides – Northern Wild Raisin
Viburnum dentatum – Arrow-wood
*Pinus rigida** – Pitch Pine
Thuja occidentalis – Eastern Arborvitae



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1:720

1 inch = 60 feet

0 60 120
Feet

Wetland Delineation
2013 Orthophotograph
23 Alpine Road
Wayland, MA

October 11, 2018

LTRHD v Sep 2010

Town of Wayland

41 COCHITUATE ROAD
WAYLAND MASSACHUSETTS 01778
www.wayland.ma.us TEL. 508-358-3788

OFFICE STAFF
Bruce Morgan MAA, Director of Assessing
Matthew Lanefski, MAA, Assistant Assessor
Mary-Ann Wohlfarth, Sr. Admin. Coordinator

Certification of Abutters

Date of request 1/25/21

Please plan your submission accordingly. The Assessors' office has 10 business days to certify an abutters list Per MGL Ch. 66, S.10

Address to be certified 26 Alpine Rd Parcel ID 06-002 (Map/Lot)

Owner's Name (PLEASE PRINT) James Seaborg

Owner's Mailing Address Same

Name of Applicant (PLEASE PRINT) Same Telephone: _____

26 Alpine Rd Wayland MA 01778
Mailing Address of Applicant City/Town State Zip

Signature of Applicant _____

Reason for List (check one) ☐Conservation ☐Health ☐Planning ☐Zoning ☐Board of Selectmen

****Please check with the Board/Commission for their guidelines regarding the number of feet required for notification. Each Board/Commission has its own regulations for their abutters listing. There's no fee for certification, however the list/s of abutters must be provided by the person or company requesting certification.**

For use by Assessors

This is to certify that at the time of the last assessment for taxation made by the Town of Wayland, the names and addresses are the assessed owners to these parcels.

Certified By: _____ Date: 1/26/21

CC: ☑ Conservation ☐Health ☐Planning ☐ Zoning ☐ Board of Selectmen

Abuttersrequestform.doc

100 foot Abutters List Report

Wayland, MA
January 25, 2021

Subject Property:

Parcel Number:	06-002	Mailing Address:	SEABORG JAMES W III TRUSTEE 23 ALPINE ROAD TRUST
CAMA Number:	06-002		26 ALPINE RD
Property Address:	23 ALPINE RD		WAYLAND, MA 01778

Abutters:

Parcel Number:	06-001	Mailing Address:	THATCHER SUZANNE L
CAMA Number:	06-001		27 ALPINE RD
Property Address:	27 ALPINE RD		WAYLAND, MA 01778
Parcel Number:	06-004	Mailing Address:	SEABORG JAMES W III & HEIDI S TRUSTEES 26 ALPINE ROAD TRUST
CAMA Number:	06-004		26 ALPINE RD
Property Address:	26 ALPINE RD		WAYLAND, MA 01778
Parcel Number:	06-013	Mailing Address:	WILLIAMS, DAVID WILLIAMS, NICOLE B
CAMA Number:	06-013		40 SHERMAN'S BRIDGE RD
Property Address:	40 SHERMAN'S BRIDGE RD		WAYLAND, MA 01778
Parcel Number:	06-014	Mailing Address:	POSEY ARTHUR R FLEMING JEAN C
CAMA Number:	06-014		44 SHERMAN BRIDGE RD
Property Address:	44 SHERMAN'S BRIDGE RD		WAYLAND, MA 01778
Parcel Number:	07-019	Mailing Address:	TOWN OF WAYLAND SCHOOL DEPT
CAMA Number:	07-019		41 COCHITUATE ROAD
Property Address:	15-16 ALPINE RD		WAYLAND, MA 01778
Parcel Number:	94-001	Mailing Address:	COMMONWEALTH OF MASS -- MWRA
CAMA Number:	94-001		100 FIRST AVE CHARLESTOWN NAVY YARD
Property Address:	ACROSS TOWN		BOSTON, MA 02129

TOWN OF WAYLAND
Conservation Commission
41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

RECEIVED
FEB 11 2021
WAYLAND CONSERVATION COMMISSION

CHAPTER 194 Submittal Requirements

Upon submittal of any Bylaw application the applicant(s), property owner (if different), and their representative(s) must sign this checklist.

☐ Original and one copy of the MA Wetlands Protection Act ("WPA") application and Chapter 194 Bylaw application, including owner(s) signature, the applicant(s) signature, site plan(s), narrative, etc. *

NOTE: If a WPA Application is not filed, a copy of either a statement as to not applicable (limited generally to buffer zone or bordering land subject to flooding) or a valid Order of Resource Area Determination (ORAD) must be provided with copies.

☐ A separate check for all applicable Wetlands Act fees.

☐ A separate check for all applicable Chapter 194 Bylaw fees.

☐ A list of the 100' Abutters, certified by the Assessors Office.

☐ Evidence of Board of Health receipt of application or approval for all applications with septic work or home renovations.

*A copy of all documents submitted should be provided electronically to conservation@wayland.ma.us

Project Summary

☐ A narrative statement describing all of the activities proposed. If work is omitted from the narrative it may not be permitted.

☐ A narrative summary description of the types of resource areas on or near the site. Omission of resource areas is a basis for denial of the project as being incomplete.

☐ A narrative discussion how the project has been designed to minimize impacts to resource areas and how any mitigation has been proposed to better protect or enhance the resource areas during and after construction.

The Conservation Commission will evaluate the application based on the scope of the project and the potential impacts on the resource area (e.g. a wetland, pond, vernal pool, riverfront area, etc.) The Commission's priorities for project assessment are avoidance, minimization, and mitigation of impacts to resource area/s in that order. If mitigation is proposed, the Commission will require a 1:1.5 ratio of replication for impacts to wetlands and for buffer zones. The narrative should clearly address these priorities.

☐ A narrative discussion that presents justification, based on factors of technical or economic feasibility, why alternatives that might minimize or completely avoid adverse impact to the Riverfront Area, Floodplain, the Buffer Zone, and/or any other resource area are not being proposed. At a minimum there must be discussion of the alternative for no alteration.

The following items are required for Site Plans submitted with a Bylaw application; however, if the Applicant considers that the information is not relevant to the scope or scale of the proposed project, a Waiver(s) of requirements must be requested at the time of filing the application with the Conservation Commission.

TOWN OF WAYLAND
Conservation Commission
41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

Site Plan Minimum Requirements

The following shall be included on the Site Plan:

- ☐ Stamp of a Professional Engineer (P.E.) and/or a Professional Land Surveyor (P.L.S.) depending upon proximity to lot lines or project complexity.

  OR

- ☐ Stamp of a Registered Sanitarian (R.S.) is acceptable for designs of septic systems handling less than 2,000 gallons per day, with incidental site work.

- ☐ Grade elevations based on National Geodetic Vertical Datum (NGVD). Grade contours in the area of work shall be provided with at least 1-foot intervals.

- ☐ Plan Scale: 1 inch = 10 feet or 1 inch = 20 feet.

- ☐ Wetlands flagging with letters and/or numbers as defined in the field.

- ☐ Date that wetlands flagging was done and name of the wetland delineator (if GIS was used to wetlands, then include the GIS source.)

- ☐ Site Plans must clearly show existing conditions and proposed conditions, utilities, impervious surfaces, limit of lawn, trees greater than 6 inches in diameter proposed for removal, significant land features such as rock outcroppings, all Resource Areas (differentiate each) including Buffer Zone. *Note: It may be more comprehensible to submit two plans: an existing conditions plan and a proposed conditions plan.*

- ☐ Site plans must detail the permanent demarcation of the limit of lawn with minimum 30' offset from resource area for new construction, and minimum average 15' offset for existing dwellings.

- ☐ Locations and identifiers for all test pit locations.

- ☐ A cross-section of grading and profile for proposed septic systems.

- ☐ Locations for temporary stockpiles or storage of soils or demolition debris during construction.

- ☐ Access route for construction equipment and construction entrance location details.

- ☐ Location of erosion control barrier(s).

- ☐ Detail for installation of erosion control barrier(s).

- ☐ Location for refueling of equipment. (Outside buffer zone strongly preferred)

- ☐ Locations designated for snow storage, if necessary.

- ☐ Pre/Post-Construction Lot Coverage Summary for areas within by-law jurisdiction: a) Total lot area; b) total impervious area **(Note: impervious areas shall include, but are not limited to, roofs, decks, walks, and driveways)**; c) total landscaped/lawn area; and d) total area altered during construction (including temporary impacts).

TOWN OF WAYLAND
Conservation Commission
41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

Drainage Requirements

The Commission seeks to protect water quality of surface waters and groundwater, and to limit any increase in the rate or quantity of runoff of storm water from the property.

☐ For projects adding less than or equal to 500 square feet of impervious area, a narrative description of specific measures used to provide for infiltration of runoff equivalent to runoff this additional impervious area. Those measures must be clearly depicted on the Site Plan as a specification.

OR

☐ For projects adding more than 500 square feet of impervious area,

- ☐ A narrative discussion of the methods and all assumptions used in the drainage calculations
- ☐ A plan showing drainage catchment areas
- ☐ Supporting calculations (i.e. HydroCAD) stamped by a P.E.
- ☐ Summary tables presenting Pre/Post Construction Storm Water Runoff Rates and Volumes for a 1-inch storm event, a 10-year, and a 100-year storm events. Note: Rainfall of at least 8 inches in 24 hours must be used for 100-year storm event.
- ☐ Compliance with DEP's Stormwater Management Standards.

☐ Narrative description of structural and non-structural best management practice (BMP) (See "Definitions), controls for storm water management for the project **during construction phases and for long term site management**:

- ☐ Evaluation of BMP selection and factors of site suitability including: soils, drainage area, depth to water table, depth to bedrock, slopes and proximity to wells and foundations
- ☐ Discussion of construction phasing
- ☐ Relevant site characterization data for design
- ☐ Water quality calculations for total suspended solids (TSS) removal
- ☐ Calculated storm water recharge rate
- ☐ Calculated peak discharge rate

☐ Maintenance requirements and site inspections templates for BMPs must be specified. Operation and Maintenance (O&M) plans for Stormwater shall be submitted with the application describing short-term BMPs (during construction) and long-term BMPs (post-construction) for management of the drainage structures, roadway and/or parking lot (as applicable) including but not limited to sweeping; catch basin cleaning; snow storage and erosion controls, such as hay bales or sediment fences. The drainage components (Best Management Practice – BMP) shall be as described using terminology in the most recent version of the DEP Storm water Technical Handbook, March 1997. A Plan for protecting the post-construction BMPs during construction shall be include in the O&M Plan.

☐ Aquifer Protection District – If the project is within this area, a narrative description of how the project complies with aquifer protection requirements.

☐ Aquifer Protection District – If the project is within this area, a narrative description of how the project complies with aquifer protection requirements.

Page 3

TOWN OF WAYLAND
Conservation Commission
41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

Soils Information

☐ Septic Systems or Drainage BMPs (where applicable) - Clear statement of how many test pits or borings were conducted for the project planning and engineering evaluations and what number and types of analytical methods may have been applied for soils characterization including visual evaluation, percolation tests, field screening, and laboratory analyses.

☐ Septic Systems and/or applicable drainage BMP - Copies of all soil data including boring and/or test pit logs.

☐ Wetland field data forms that document observations made during the wetland delineation including soil or test pit logs.

Waivers

In the event that Applicant considers certain required information to be, in their opinion, not relevant to the scope or scale of the proposed project Applicant may request a Waiver of the requirements with this application to the Conservation Commission. Indicate all provisions requested for Waiver below designating the specific paragraph number/letter designation.

Site Plan Minimum Requirement Waiver(s) ☑ None ☐ List _____

Drainage Requirement Waiver(s) ☐ None ☐ List _____

Soils Information Waiver(s) ☑ None ☐ List _____

If applicable, attach a statement for justification of the requested waivers.

In the event that any requested Waiver is not granted by the Commission or the application is otherwise found to be deficient in providing required information the hearing may at the discretion of the Commission either be closed and denied for the lack of information or continued for a specific timeframe approved by the Commission for the Applicant to submit the required information.

The Commission has authorized its Administrator to review projects and to not accept project applications under the Bylaw that have apparent deficiencies to meeting the above requirements. Notwithstanding that authority, acceptance of an application by the Administrator does not represent a decision that the application is fully complete. Deficiencies identified by the Administrator will be report to the applicant and the Commission during the hearing.

The property owner, as well as the applicant and/or representative (if different from owner) must sign this checklist and all other applicable applications. The property owner, by signing this checklist and the applications, acknowledges that the Commission and Staff may enter the property to inspect the premises as part of the assessment of the application.

James Seaboy
Property Owner's Name (Print)

Property Owner's Signature

1-20-21
Date

I certify under penalty of law that this document and all its attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

James Seaboy
Applicant's Name (Print)

Applicant's Signature

1-20-21
Date

Wayland Wetlands and Water Resources Bylaw, Chapter 194 Application

1. Applicant:

James Seaborg			jimmyseaborg@gmail.com
Name (PLEASE PRINT)			Email Address (if applicable)
26 Alpine RD	Wayland	MA	01778
Mailing Address	City/Town	State	Zip Code
508-572-2825			
Phone Number			Fax Number (if applicable)

2. Representative:

Firm/Business Name			Contact Name
Mailing Address	City/Town	State	Zip Code
Phone Number			Fax Number (if applicable)

3. Property Owner(s)

James Seaborg			jimmyseaborg@gmail.com
Property Owner (PLEASE PRINT)			Email Address (if applicable)
26 Alpine RD	Wayland	MA	01778
Address	City/Town	State	Zip Code
508-572-2825			
Phone Number			Fax Number (if applicable)

4. Type of Application

[X] Request for a Determination of Applicability (RDA)
[ ] Abbreviated NOI
[ ] Notice of Resource Area Delineation
[ ] After the Fact Amendment (AFA)
[ ] Amendment to Order of Conditions
[ ] Notice of Intent (NOI)
[ ] Extension of O.O.C.
[ ] Certificate of Compliance
[ ] After the Fact Filing (AFF)

5. Project

23 Alpine RD	06	02
Location Address	Assessors Map(s)	Parcel(s)

Project Description (PLEASE PRINT): The proposed development includes the removal and replacement of existing trees as indicated on site plan, existing dwelling and decks and the construction of a new single family dwelling along with all associated site work. The only proposed work inside the buffer zone is tree removal, hand pulling invasive plants, and the installation of a native plant rain garden and lawn area.

6. Title/Date of Plan(s) Site Plan for 23 Alpine RD 12/2/20, Wetlands Resource Area Evaluation 10/18/18, Stormwater Report 12/2/20

7. Bylaw Application Fee: $ _____

8. Application filed pursuant to MGL Chapter 131, Section 40 [x] Yes [ ] No

9. Signature of Applicant _____ Date 1-20-21

Signature of Property Owner _____ Date 1-20-21

(NOTE: This application shall be signed by the property owner as well as the applicant. Signature of the property owner on this application shall be deemed permission granted to the Conservation Commission and their agents to go upon the subject property.)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Wayland
City/Town

WPA Form 1- Request for Determination of Applicability

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

A. General Information

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

1. Applicant:

James Seaborg — Name
jimmyseaborg@gmail.com — E-Mail Address
26 Alpine RD — Mailing Address
Wayland — City/Town
MA — State
01778 — Zip Code
508-572-2825 — Phone Number
Fax Number (if applicable)

2. Representative (if any):

Firm
Contact Name
E-Mail Address
Mailing Address
City/Town
State
Zip Code
Phone Number
Fax Number (if applicable)

B. Determinations

1. I request the _____ make the following determination(s). Check any that apply:
Conservation Commission

☒ a. whether the **area** depicted on plan(s) and/or map(s) referenced below is an area subject to jurisdiction of the Wetlands Protection Act.

☒ b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced below are accurately delineated.

☒ c. whether the **work** depicted on plan(s) referenced below is subject to the Wetlands Protection Act.

☒ d. whether the area and/or work depicted on plan(s) referenced below is subject to the jurisdiction of any **municipal wetlands ordinance** or **bylaw** of:

Town of Wayland
Name of Municipality

☐ e. whether the following **scope of alternatives** is adequate for work in the Riverfront Area as depicted on referenced plan(s).

C. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

23 Alpine RD	Wayland
Street Address	City/Town
06	02
Assessors Map/Plat Number	Parcel/Lot Number

b. Area Description (use additional paper, if necessary):

Please see attached Narrative and Wetland Resource Area Evaluation

c. Plan and/or Map Reference(s):

Site Plan by Cyprus Design Inc	12/2/20
Title	Date
Wetland Resource Area Evaluation by Oxbow Associates	10/18/18
Title	Date
Proposed Planting Plan	1/15/21
Title	Date

2. a. Work Description (use additional paper and/or provide plan(s) of work, if necessary):

The proposed development includes the removal of the existing trees as depicted on site plan, existing dwelling & decks and the construction of a new single family dwelling along with all associated site work such as subsurface sewage disposal system, driveway, landscaping, grading, drainage improvements and utilities. Efforts were made to create a site plan that would minimize disturbance to the resource area. The septic system location is proposed in the front corner of the property, as far as possible from the resource area. However, this pushes the location of the house closer to the buffer zone and in close proximity to potentially hazardous trees. 20 trees are proposed for removal and replacement (15 inside the buffer zone and 5 outside). A native plant rain garden is proposed to mitigate stormwater runoff from the new structure. A turf area is proposed inside the buffer zone and will go no closer than 50' to the resource area. A 35-40' wide native plant bed will demarcate the transition of lawn area to resource area and will restrict future access to the resource area. All invasive plants on the property will be removed (hand pulled inside buffer zone).

C. Project Description (cont.)

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

The proposed rain garden bioretention area will be a significant improvement to stormwater runoff. There is currently no stormwater treatment on the property and the runoff from the existing dwelling and driveway travels through a pile of urban fill that includes old car parts, plastics, and glass. The rain garden will be a significant improvement by treating the stormwater before reaching the resource area. The removal of all invasive plants throughout the property will allow native species to thrive. The 35-40' planted bed will offer further protection of the resource area by restricting access. Over 50 different species of native trees, shrubs and perennials will create habitat and enhance wildlife diversity.

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- ☐ Single family house on a lot recorded on or before 8/1/96
- ☐ Single family house on a lot recorded after 8/1/96
- ☐ Expansion of an existing structure on a lot recorded after 8/1/96
- ☐ Project, other than a single family house or public project, where the applicant owned the lot before 8/7/96
- ☐ New agriculture or aquaculture project
- ☐ Public project where funds were appropriated prior to 8/7/96
- ☐ Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- ☐ Residential subdivision; institutional, industrial, or commercial project
- ☐ Municipal project
- ☐ District, county, state, or federal government project
- ☐ Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

Name and address of the property owner:

James Seaborg
Name

26 Alpine RD
Mailing Address

Wayland
City/Town

MA
State

01778
Zip Code

Signatures:

I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Signature of Applicant

1-20-21
Date

Signature of Representative (if any)

Date

Stormwater Report
23 Alpine Road
Wayland, MA

Table of Contents

PROJECT NARRATIVE

Existing Conditions

The subject property is currently developed with an existing single family dwelling, decks & driveway and is bound by Alpine Road to the south, bordering vegetated wetlands to the north, residential property to the west, and vacant town owned land to the east. A bordering vegetated wetland and FEMA flood zone are present on the northern portion of the property as depicted on attached site plan and figures. The property is shown as parcel 2 on Wayland Assessors map 06. Existing conditions detail and topography as shown on the site plan was obtained by CDI during a field instrument survey of the property. The existing site slopes from a high elevation of 129 at front of property at Alpine Road to a low elevation of 121 at the northern portion of the property at the Bordering Vegetated Wetland (BVW) / FEMA flood zone AE. The existing site currently has no drainage controls to aid in storm water treatment or recharge of impervious areas prior to runoff entering abutting properties and existing resource area.

A portion of the site is located within FEMA flood zone (elevation 121) according to Flood Insurance Rate Map (FIRM) for the Town of Wayland Massachusetts, FEMA Map No. 25017c0388f, and is attached as Figure 2. Elevation datum is based on NAVD 88 datum which is same datum as FEMA maps.

Proposed Conditions

The proposed development includes the removal of the existing trees as depicted on site plan, existing dwelling & decks and the construction of a new single family dwelling along with all associated site work such as subsurface sewage disposal system, driveway, landscaping, grading, drainage improvements and utilities. The project has been designed to minimize impacts to the resource area, beginning with the siting of the new septic system. The existing cesspool is located near the 100' BVW buffer zone and below the high groundwater mark and is in need of replacement. If the new septic system were located in the same area in or near the buffer zone, it would require up to 6' of mounding in order to raise the leach field above the high groundwater mark. This option would be considerably more detrimental to the resource area due to the close proximity and significant amounts of fill that would be required to raise the grade.

The alternative solution was to locate the new septic system in the front of the property, as far from the resource area as possible. By locating the septic system in the front we are able to avoid significant mounding and construction activity inside the buffer zone. This was a top priority of the site design.

One consequence of putting the septic system in the front is that it pushes the footprint of the proposed house closer to the resource area. The original design had the rear of the house 10' inside of the buffer zone. After consulting the septic engineer, it was learned that the house could be located 10' closer to the septic system if there was no basement in the front of the house. A slab foundation is now proposed for the front of the house, which allows the entire footprint of the home to be outside of the buffer zone. Again, we

were able to avoid construction activity being proposed inside the buffer zone.

With the new house now proposed farther towards the back of the property, there are several trees within striking distance. Some of these trees are in poor health and could pose a safety threat to the new home. 15 trees inside of the buffer zone are proposed for replacement. 5 trees outside of the buffer zone are proposed for replacement. It was decided that proposing tree removal and replacement is less detrimental than proposing the construction of a house or a septic system inside the buffer zone. A proposed lawn in this area will extend no closer than 50' to the resource area.

The proposed scope of work for this project offers several improvements that will help protect and enhance the resource area. A native plant rain garden will filter stormwater and provide excellent habitat for wildlife. A porous driveway will minimize the impervious surface area. The removal of buckthorn, bittersweet, honeysuckle, Norway maple and garlic mustard will allow native plants to flourish (all invasives will be hand pulled inside of the buffer zone). A large 35-40' wide densely planted native bed will deter people from entering the resource area, dropping lawn clippings, brush, etc. The proposed planting plan consists of over 50 different native trees, shrubs, and perennials that will create great wildlife habitat.

Drainage:
As mentioned above the proposed development will include improvements to the drainage on the property. The improvements include the use of porous pavement & a bio retention area (Rain Garden) for new dwelling rooftop runoff. The Raingarden is designed to mitigate storm water runoff from 2,240 s.f of rooftop with zero outflow from rain garden during a 8.4" of rain in 24 hours as shown on attached site plan, details and hydrology calculations.

Erosion / Silt Controls
Prior to the commencement of site work, a silt fence will extend along the northerly portion of the proposed site work to prevent the intrusion of sediment to the bordering vegetated wetlands. During construction of the dwelling, if dewatering of the excavation is necessary, a dewatering pump will be installed. The water will be discharged to mirafi fabric encompassed by a 15-foot by 15-foot area of hay bales to prevent erosion as shown in detail on attached site plan.

Site Grading
The existing grades will be maintained to the maximum extent feasible to minimize environmental disturbance and site costs related to excavation but is based on multiple control factors such as estimated seasonal high water table and subsurface sewage disposal system elevations. Proposed site elevations will maintain same flow patterns as existing conditions (slopes from south to north) from high elevation of 133 over the proposed septic system in front yard to a low elevation at the BVW of 121. See attached site plan for detailed existing and proposed site grading.

Stormwater Report

Standard 1: No New Untreated Discharges

N/A- There are no new untreated stormwater discharges from the site.

Standard 2: Peak Rate Attenuation

The project will offset the additional impervious area through the use of porous pavement for driveway and a raingarden which has been sized to collect and fully infiltrate a impervious area of 2,240 s.f. which is entire new rooftop runoff, walkway, and patio (site impervious increase from pre-conditions to post-conditions is 1,280 s.f.) during a 100yr storm / 8.4"of rain in a 24 hour period with zero outflow see attached details & hydrology calculations.

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater more than that required by Standard 3. Recharge has been provided through a 529 c.f. raingarden.
Required: 2,240 S.F. (Impervious Areas-Rooftop) x .60" (Hydraulic Soils Group A) = 112 c.f.
Provided: 529 c.f. (Rain Garden)

Standard 4: Stormwater Water Quality

As outlined above the existing conditions currently has no drainage controls for the site. The proposed project will provide an improvement of the existing water quality using grass swales and 529 c.f. raingarden which provides a standard TSS removal of 80%. The storage bed has been designed to hold a water quality volume of more than 1" over the surface area.
Required: 2,240 S.F. (Impervious Areas-Rooftop) x .1" (as required by D.E.P. Stormwater Management Guidelines) = 187 c.f.
Provided: Rain Gardens: 529 c.f.

Standard 5: Land Uses With Higher pollutant Loads

N/A - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

N/A - The proposed use does not discharge to a critical area.

Standard 7: Redevelopment

N/A - The project would not qualify as a redevelopment

Standard 8: Construction Period Controls

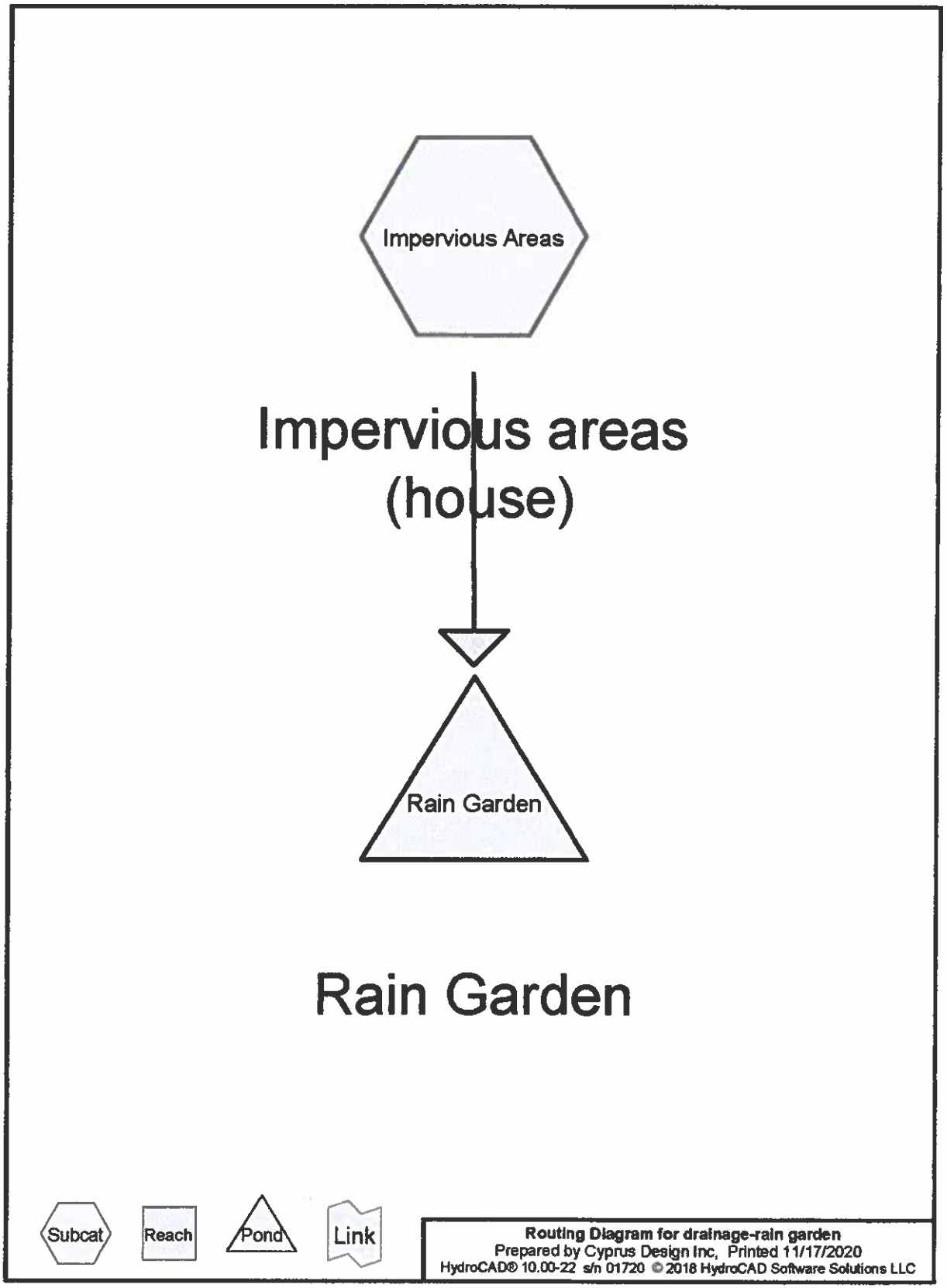
Construction period erosion and sedimentation controls have been provided on the design plans.

Standard 9: Operation and Maintenance Plan

New permanent BMP's include the use of porous pavement and raingarden for rooftop runoff. The required O&M procedures have been included on the site plans and outlined below.

Standard 10: Illicit Discharges

Based upon site observations made by Cyprus Design Inc., no illicit discharges have been observed on the site. All proposed sewerage flow shall be discharged to the proposed subsurface sewerage disposal system.


Impervious Areas
Impervious areas (house)
Rain Garden
Rain Garden
Subcat
Reach
Pond
Link
Routing Diagram for drainage-rain garden
Prepared by Cyprus Design Inc, Printed 11/17/2020
HydroCAD® 10.00-22 s/n 01720 © 2018 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond Rain Garden: Rain Garden Peak Elev=125.86' Storage=529 cf Inflow=0.37 cfs 1,401 cf
Outflow=0.04 cfs 1,400 cf

Summary for Pond Rain Garden: Rain Garden

Inflow Area = 2,240 sf,100.00% Impervious, Inflow Depth > 7.51"
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 1,401 cf
Outflow = 0.04 cfs @ 11.35 hrs, Volume= 1,400 cf, Atten= 90%, Lag= 0.0 min
Primary = 0.04 cfs @ 11.35 hrs, Volume= 1,400 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 125.86' @ 13.05 hrs Surf.Area= 650 sf Storage= 529 cf

Plug-Flow detention time= 110.3 min calculated for 1,395 cf (100% of inflow)
Center-of-Mass det. time= 109.4 min (845.2 - 735.8)

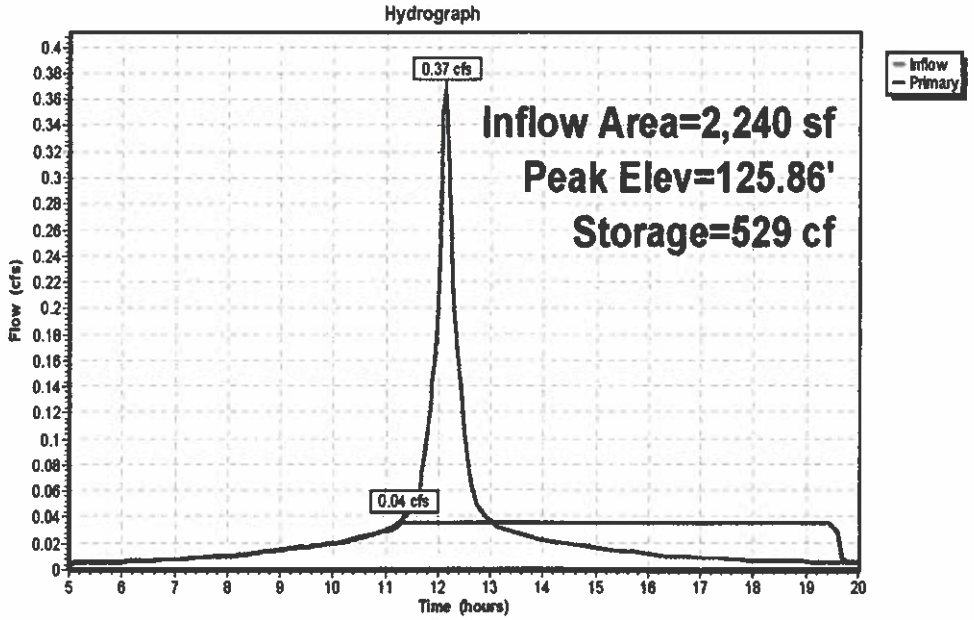
Volume	Invert	Avail.Storage	Storage Description
#1	124.50'	585 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 975 cf Overall x 60.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.50	650	0	0
126.00	650	975	975

Device	Routing	Invert	Outlet Devices
#1	Primary	124.50'	**0.04 cfs Exfiltration when above 124.50'**

Primary OutFlow Max=0.04 cfs @ 11.35 hrs HW=124.52' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond Rain Garden: Rain Garden



Stormwater BMP Operation/Maintenance Manual & Pollution Prevention

For

23 Alpine Road

Located in

Wayland, MA

Prepared by:

Cyprus Design, Inc.
978-640-1019

November 17, 2020

1. Stormwater Management System(s) Owner(s)

The stormwater management plan includes the use of porous pavement for driveway and a rain garden to mitigate stormwater runoff from dwelling rooftop. Maintenance responsibilities of the porous pavement and rain garden will be the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

2. The Party or Parties Responsible for Operation and Maintenance

Once constructed, approved, and accepted by the Town of Wayland, the porous pavement for driveway and a rain garden to mitigate stormwater runoff from dwelling rooftop located on the subject parcel will be maintained by the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

Schedule for Maintenance and Inspection

During Construction

During construction, erosion control measures shall be implemented in accordance with the design plan approved by the Town of Wayland to eliminate silt intrusion to drainage systems prior to paving and the stabilization of vegetated cover in landscaped areas. During this period, it shall be the responsibility of the owner's representatives (contractor) to maintain erosion control measures. These measures include ensuring silt sock is in-place, filter fabric or silt sack is present on catch basin grates and that these are effectively preventing silt and/or sediment from entering the catch basins. The owner or owner's representative shall be responsible for inspecting the silt sack / sock on a weekly basis. If silt sock or filter fabric needs to be replaced, the owner or owner's representative shall replace the silt sock / filter fabric as soon as is practical or no later than the next workday.

Upon Completion of Development and Town of Wayland Approval

Once the construction is complete to the satisfaction of the Town of Wayland, inspection and maintenance of all of the subject parcel structures (porous pavement, roof leaders, rain garden, grass swale) will be the responsibility of the record owner of the property which is recorded at the Middlesex South Registry of Deeds.

Rain Garden Maintenance:

Although Rain Gardens are considered Low maintenance gardens they should be maintained and inspected on a consistent schedule basis to ensure proper functioning as outlined below.

Key Points:

- Inspect gardens during the growing season, and at the end of the growing season, after large storm events, and during weather extremes

- The maintenance of rain gardens consist of tasks to be completed on a weekly basis and other tasks as they are needed seasonally.

Weekly Maintenance:

- *Watering* plants regularly, particularly during dry periods of the first growing season. A general guideline is to supply plants about one inch of water per week during the first growing season. After the first growing season the plants will need to be watered only during severe dry periods.
- *Weeding* will be required more often in the first two seasons. You will need to weed less and less as the plants grow and surpass the weeds, so that by the third year you will only need to weed several times a year. The weeding will need to be performed based on weekly visual inspection of Garden.

Annual Maintenance:

- *Mulching* will need to be added every spring to maintain a three inch layer on rain garden. Triple shredded hardwood mulch with no dye is preferred.

- *Pruning* will need to be performed each spring to remove dead vegetation, deadhead flowers, tattered or unwieldy plants. This will encourage dense new growth and improve the gardens filtering capacity. Stems and seed heads can be left on the plants for winter interest, wildlife cover and food for birds.

- *Replanting* may need to occur depending on the plant material that is dead and/ or not thriving. Consider planting a different species that will be more successful for your particular garden.

- *Sediment Removal* may be required if it accumulates, particularly if it collects from a road or driveway. This is a sign of success, however occasionally you will need to use a flat shovel to remove any excess sediment, leaves, or debris which may constrict infiltration properties. If there is ponding in the garden it indicates rain garden is not infiltrating and will need to be repaired through digging multiple holes 12" deep throughout the garden and replace the restrictive soil with a coarse sand that will promote infiltration.

Porous Pavement Maintenance:

Regular inspection and maintenance is critical to the effective operation of porous pavement. Routine preventative cleaning is more effective than corrective cleaning. Visual inspections are an integral part of system maintenance. This includes monitoring pavement to ensure water drainage, debris accumulation, and surface deterioration.

- *Visual Inspections* are required on a continuous basis which will include checking for standing water on surface after a rain event. If this occurs than cleaning of porous pavement is required immediately through power washing the clogged areas with mid pressure setting typically less than 500 psi at an angle of 30 degrees or less, if this does not unclog problem areas than pavement vacuuming is required. Any leaves and debris present should be cleared using a power/leave blower to clean effected areas.
- Below is a maintenance schedule and description of activity required in a checklist format to ensure long term functioning of porous pavement;

CHECKLIST FOR INSPECTION OF POROUS PAVEMENTS

Location: Inspector:
Date: Time: Site Conditions:
Date Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1. Salt / Deicing			
Use salt only for ice management	S	U	
Piles of accumulated salt removed in spring	S	U	
2. Debris Cleanup (2-4 times a year minimum, Spring & Fall)			
Clean porous pavement to remove sediment and organic debris on the pavement surface via vacuum street sweeper.	S	U	
Adjacent non porous pavement vacuumed	S	U	
Clean catch basins (if available)	S	U	
3. Controlling Run-On (2-4 times a year)			
Adjacent vegetated areas show no signs of erosion and run-on to porous pavement	S	U	
4. Outlet / Catch Basin Inspection (if available) (2 times a year, After large storm events)			
No evidence of blockage	S	U	
Good condition, no need for cleaning/repair	S	U	
5. Poorly Drained Pavement (2-4 times a year)			
Pavement has been pressure washed and vacuumed	S	U	
6. Pavement Condition (2-4 times a year minimum, Spring & Fall)			
No evidence of deterioration	S	U	
No cuts from utilities visible	S	U	
No evidence of improper design load applied	S	U	
7. Signage / Stockpiling (As Needed)			
Proper signage posted indicating usage for traffic load	S	U	
No stockpiling of materials and no seal coating	S	U	

Permit Number: _____ Date Issued: _____

BOARD OF HEALTH
WAYLAND, MASSACHUSETTS

DISPOSAL WORKS CONSTRUCTION PERMIT

Permission is hereby granted to a current Town of Wayland licensed subsurface sewage disposal system installer, on behalf of the property owner(s): JAMES SEABORG

To locate and ☒ Construct, ☐ Alter, or ☐ Repair an individual sewage disposal system at:
#23 ALPINE ROAD

No construction or use of the system, which is the subject matter of this permit, shall be commenced until all permits which may be required by the laws of the Town of Wayland, and the Commonwealth of Massachusetts shall have been secured by the applicant, including a Certificate of Compliance.

Conditions (if applicable): Compliance w/ Local Conservation Bylaws, Ch. 193 & Ch. 194 as applicable

The aforesaid individual sewage disposal system shall comply in all respects with the provisions of Title 5 of the State Environmental Code and the Regulations of the Town of Wayland.

It is understood that the system must be constructed by a person or firm holding a Disposal Works Installers Permit in the Town of Wayland.

This permit shall expire three (3) years from the date shown below unless the construction permitted hereby shall have begun prior thereto.

Date 2/6/2020 James R. McCaughey
BOARD OF HEALTH/AGENT

NOTE: FINAL GRADING MUST BE COMPLETED & INSPECTED/CONFIRMED IN ORDER TO OBTAIN A CERTIFICATE OF COMPLIANCE

****

No liability is incurred by the Town of Wayland or its Agent by reason of any approval of a wastewater disposal or treatment system. Approval by the Town is based on plans and specifications supplied by the applicant. No guarantee is intended or implied by reason of any approval given by the Wayland Board of Health or its Agent.

Prior to any construction of a septic system, the location and elevation of the top of the foundation shall be located by a Registered Land Surveyor or Registered Professional Engineer and shall be submitted to the Board of Health on a plan bearing the seal and signature of the Registered Land Surveyor or Registered Professional Engineer.

Prior to issuance of a certificate of compliance, the installer shall submit to the Board of Health, a sketch showing dimensions from the building corners to the septic tank opening and distribution box and leaching area. The designer shall submit a certified as-built plan, as required by Title 5.

Prior to issuance of a certificate of compliance, the installer shall submit to the Board of Health, a sketch showing dimensions from the building corners to the septic tank opening and distribution box and leaching area. The designer shall submit a certified as-built plan, as required by Title 5.

Permit and Approved Plans Received By: _____ Date: _____

k # 137 Date: 7/15/19
k # _____ Date: _____

Permit No. _____
Soil Test App # 2019 1314 1317
DWC App # 2020 00023

BOARD OF HEALTH
WAYLAND, MASSACHUSETTS

APPLICATION FOR DISPOSAL WORKS CONSTRUCTION PERMIT

ication Fee: 400.- PRIOR TO SOIL TESTS $ 600.- AT PLAN SUBMITTAL

ription of construction, repairs, or alterations: ☐ Individual component(s) ☑ Complete System

UPGRADE SYSTEM - ADD BDRM

lication is hereby made for a permit to locate and: ☑ Construct, ☐ Alter, or ☐ Repair
ndividual sewage disposal system as shown in the plans submitted for the following property at:

o/Parcel# 06/002 Lot size .85 AC sq. ft.

ation of Property 23 ALPINE RD 23 ALPINE RD TRUST Lot# _____

me of Owner JAMES SEABORG Telephone# (508) 572-2825

dress of Owner 26 ALPINE ROAD

me of Applicant JAMES SEABORG Telephone# (508) 572-2825

dress of Applicant 26 ALPINE ROAD

pe of Building SING. FAM. No. of Bedrooms (if dwelling) 3 BR (330/49)

isting Flow (gpd) _____ Proposed Flow (gpd) _____ (gpd)

other than a dwelling, estimated flow _____

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BOARD OF HEALTH

e undersigned acknowledges that he/she must, before commencing construction or use of the system, which is
e subject matter of this application, secure any and all other permits which may be required by the laws of the
wn of Wayland and the Commonwealth of Massachusetts, including, wherever applicable, a building permit,
y variances or special permits from the ZBA, any Planning Board approvals, or Order of Conditions from the
nservation Commission, as well as a Certificate of Compliance from the Board of Health upon completion.
is also acknowledged that the system must be installed by a person or firm having a permit to install such
stems in the Town of Wayland.

pplicant should be aware of his/her obligation to notify the Wayland Conservation Commission of any activity
sociated with soil testing which may occur within the 100-foot buffer zone.

oil Test Date 8/13/19 + 7/18/18 Designer's Name SULLIVAN, CONNORS & ASSOC., INC.
Address 121 BOSTON POST RD.
SUDBURY, MA 01776
Phone (978) 443-9566 Applicant Date 7/10/19

MEMORANDUM

TO:	Mr. Paul Brinkman, P.E., Town Engineer, Wayland Department of Public Works
FROM:	Laura Nolan and Polly Crocker, Kleinfelder
DATE:	February 18, 2021
SUBJECT:	Loker Turf Field Stormwater Management Assessment for Phosphorus Removal

A portion of the Town of Wayland resides in the Charles River watershed and is thus subject to the total maximum daily load (TMDL) for phosphorus (P) assigned to the watershed. As part of their Municipal Small Municipal Separate Stormwater Sewer System (MS4) Permit, Wayland is required to achieve a 42 percent reduction in P loading, which equates to 19 kilograms per year (kg/yr). A proposed development to construct the Loker Turf Field Project is within the portion of Wayland in the Charles River watershed, providing an opportunity to reduce P loading.

This memorandum documents the expected P removal of the proposed stormwater best management practices (BMPs) of the Loker Turf Field Project. In addition, Kleinfelder assessed the proposed project for enhanced P removal opportunities via additional stormwater management strategies. Results presented herein represent estimates and further analysis would be required to verify P removal as part of the design process.

1 ESTIMATED PHOSPHORUS REMOVAL OF PROPOSED DEVELOPMENT

The proposed project design (see References, Section 4) includes two BMPs to enhance stormwater management including subsurface infiltration chambers under the parking lot and a turf field with 12-15 inch aggregate sub-base. Preliminary soil analysis suggests native A soils and therefore all facilities are designed to infiltrate. Kleinfelder estimated P removal potential for the BMPs using the methodology outlined in Appendix F of the MS4 Permit. Generally, this approach involved calculating the P load from proposed land uses draining to the BMP[1] and the P load reduction from the BMP[2]. All P loading and reduction rates represent average annual estimates.

For the infiltrating turf field, the land use is designated as pervious area with class A soils. P removal rates for porous pavement are used as a proxy for the infiltrating turf field. For the subsurface chambers in the parking lot, the land use of the impervious drainage area is designated as highway. A subsurface infiltration BMP is used for P reduction rates. As presented in Table 1, the proposed BMPs are estimated to remove roughly 0.3 kg/yr of P, or 2% of Wayland's required 19 kg/yr P reduction per the Charles River Watershed TMDL for P.

[1] *MS4 Permit Appendix F Attachment 3, Table 3-1*
[2] *MS4 Permit Appendix F, Attachment 3*

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Table 1. Estimated P Removal Summary

	Value	Unit	Source
Infiltrating Turf Field			
Turf field P load rate	0.03 (0.01)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Developed Land Pervious (DevPERV) - Hydro Soil Group A land use)
Porous pavement P load reduction	62	%	MS4 Permit, App F-A3, table 3-22 (assumes 12 inch filter course depth based on CD 5/L7.04)
Estimated drainage area	1.8	ac	Dimensions from construction drawings, sheet L4.01
Estimated P removal	*0.02*	*kg/yr*	
Parking Lot Infiltration Chambers			
Parking lot P load rate	1.34 (0.61)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use; directly connected impervious cover)
Subsurface chamber P load reduction	100	%	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use)
Estimated drainage area	0.5	ac	Stormwater Report, App E
Estimated P removal	*0.29*	*kg/yr*	
TOTAL ESTIMATED P REMOVAL	**0.31**	**kg/yr**	

Although the infiltrating turf field BMP is very large, it provides minimal P reduction because it is managing stormwater from a land use type with very low P loading rates. However, this BMP will infiltrate large volumes of stormwater, reducing stormwater volumes and flows to the existing stormwater system thereby improving conditions downstream. The stormwater chambers under the parking lot offer the largest P removal potential as they will treat stormwater from the impervious parking lot, which has high P loading rates. Based on the plan drawings and stormwater report, the impervious area associated with the parking lot is classified as directly connected impervious cover. Managing more stormwater from impervious surfaces will offer more P reduction benefits and get Wayland closer to compliance with the TMDL requirements. Additional P removal opportunities at this project site are discussed in Section 2.

2 ADDITIONAL PHOSPHORUS REMOVAL OPPORTUNITIES

Kleinfelder assessed the project site for additional opportunities to remove P with a goal of managing more runoff from impervious surfaces with high P loading rates. Each proposed opportunity and its estimated P removal rates are detailed further below.

Alternative 1 – Parking Lot Bioretention

Alternative 1 would include managing stormwater from the roughly 1,300 square feet (0.03 acres) of the parking lot that is not currently designed to drain to the subsurface chambers by converting

one of the greened islands in the parking lot to a bioretention planter with curb cuts to allow stormwater to flow in (Figure 1). This alternative would provide an additional 0.02 kg/yr of P removal (see Table 2).

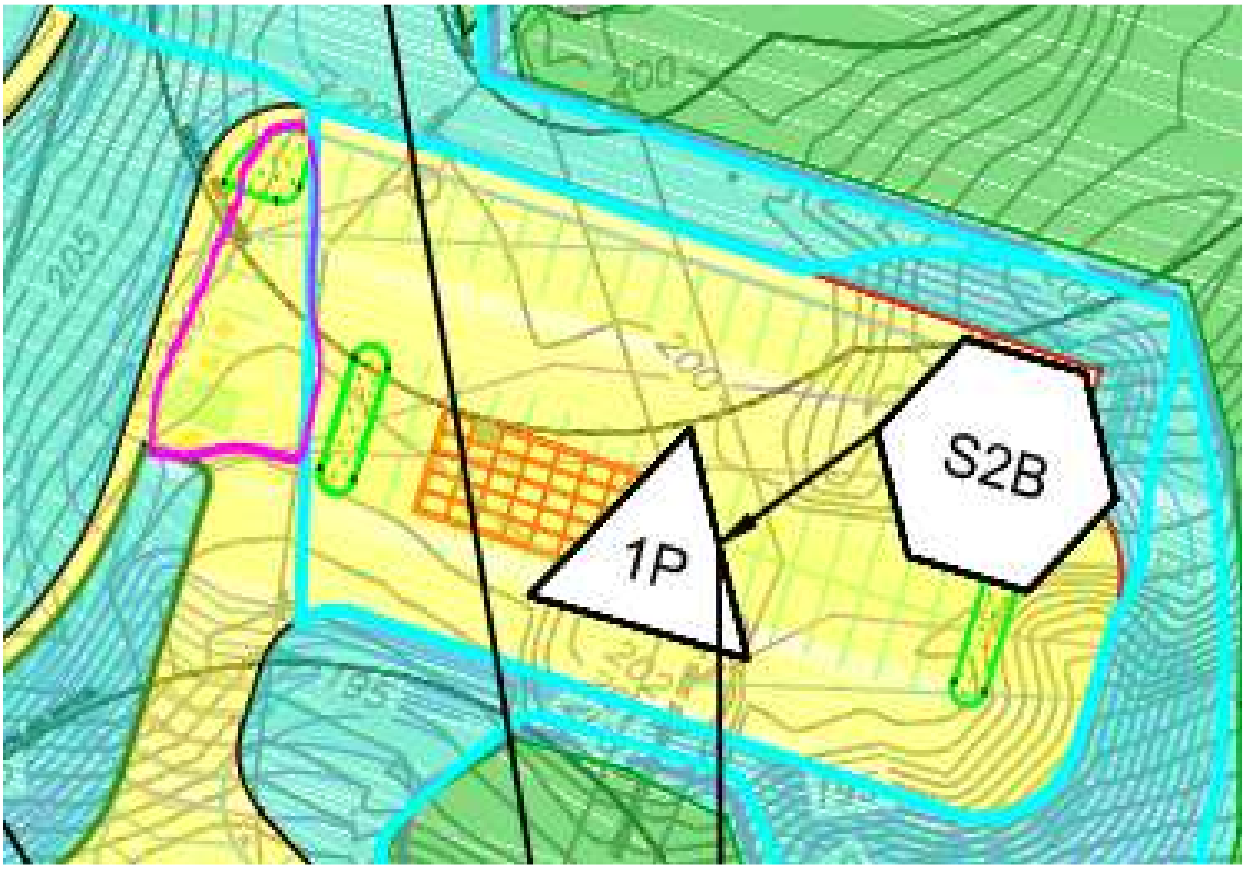

Figure 1. Alternative 1 drainage area (highlighted in pink) could be graded so that water would flow into the green island nearest the subsurface infiltration chambers.

Table 2. Alternative 1 Estimated P Removal Summary

	Value	Unit	Source
Parking lot P load rate	1.34 (0.61)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use)
Bioretention planter P load reduction	100	%	MS4 Permit, App F-A3, table 3-10 (assumes 1.5 in BMP capacity)
Estimated drainage area	0.03	ac	Estimated from construction drawing measurements (sheet L4.02)
TOTAL ESTIMATED P REMOVAL	**0.02**	**kg/yr**	

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Alternatively, the parking lot could be redesigned to allow this portion of impervious cover to drain to the proposed subsurface chamber that is designed for the rest of the parking area. The P load reduction would be the same for either option.

Alternative 2A – Access Road Water Quality Swale

Alternative 2A would include managing stormwater from the access road leading from Commonwealth Road to the proposed parking lot with water quality swales on each side of the road or one side of the road, depending on final grading and design goals (Figure 2). This alternative would provide an additional 0.01 kg/yr of P removal (see Table 3).

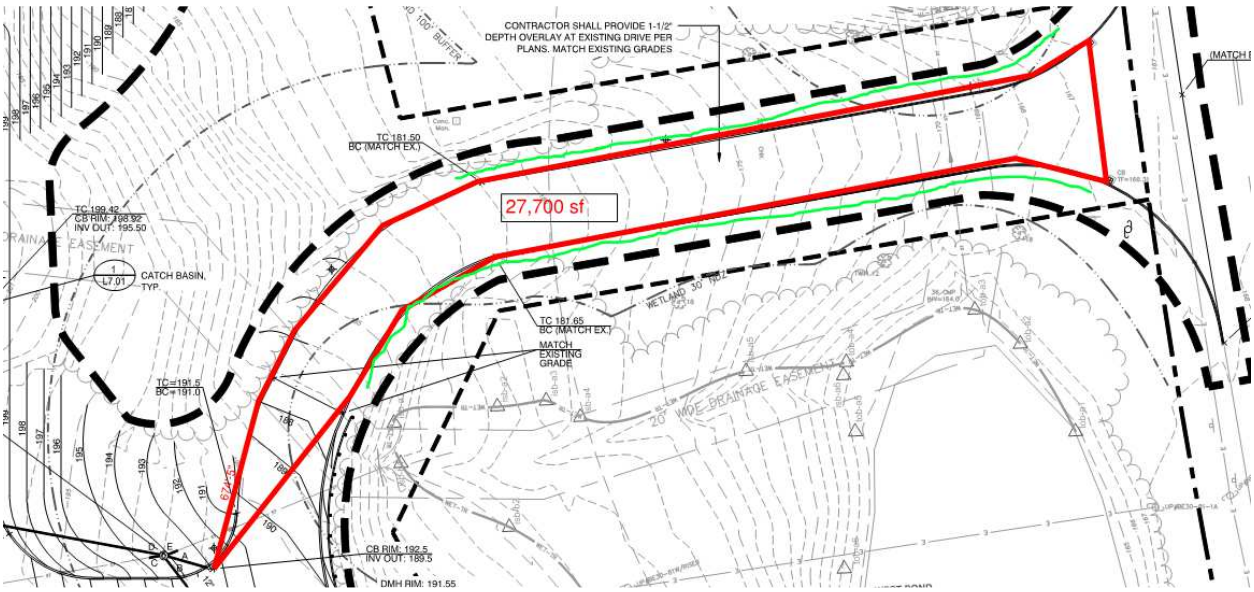

Figure 2. Alternative 2A drainage area (highlighted in red) could be graded so that runoff would flow into a water quality swale on each side of the road or to one side of the road for treatment before reaching the stormwater collection system.

Table 3. Alternative 2A Estimated P Removal Summary

	Value	Unit	Source
Access road P load rate	1.34 (0.61)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use)
Swale P load reduction	29	%	MS4 Permit, App F-A3, table 3-10 (assumes 1.5in BMP capacity)
Estimated drainage area	0.6	ac	Estimated from construction drawing measurements, sheet L5.02
TOTAL ESTIMATED P REMOVAL	**0.1**	**kg/yr**	

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Alternative 2B – Access road grass swales and rain gardens

Alternative 2B would include managing stormwater from the access road leading from Commonwealth Road to the proposed parking lot by constructing grass swales to drain to rain gardens for treatment before ultimately flowing to the existing stormwater collection system (Figure 3, Figure 4). This alternative would provide an additional 0.4 kg/yr of P removal (see Table 4) offering better P removal than Alternative 2A. However, high groundwater was noted in the soil investigation, which may prohibit infiltrative rain gardens; further soil testing would be required prior to final design.

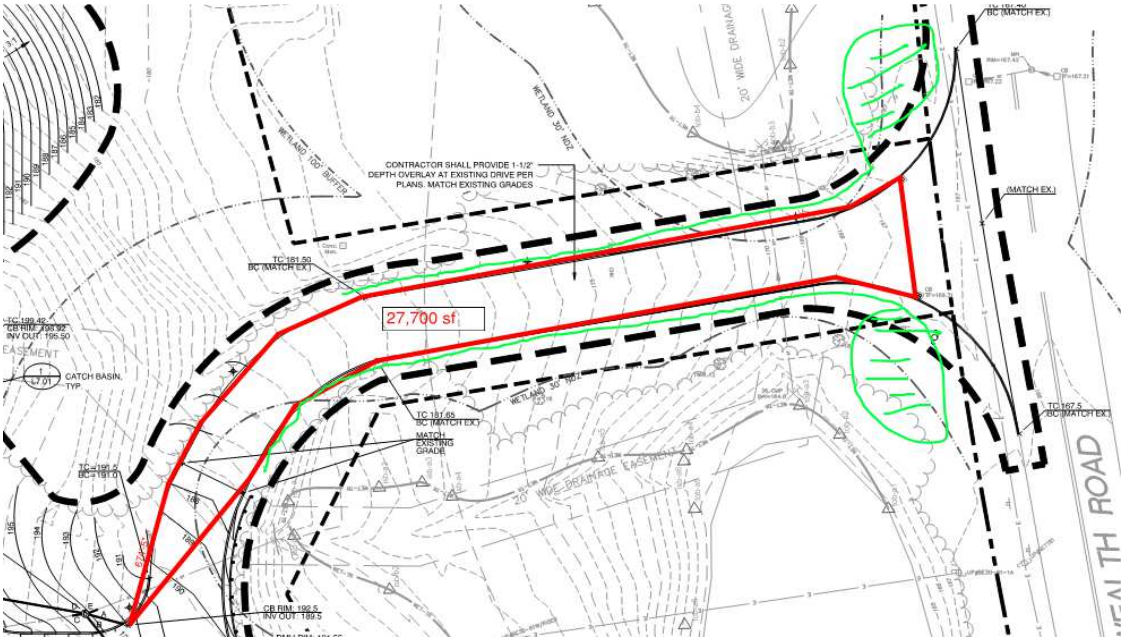

Figure 3. Alternative 2B drainage area (highlighted in red) would flow to a grass swale on each side of the road which would flow to a rain garden for treatment before reaching the existing stormwater collection system.

Figure 4. a) Eastern rain garden potential footprint and b) Western rain garden potential footprint.

Table 4. Alternative 2B P Removal Summary

	Value	Unit	Source
Access road P load rate	1.34 (0.61)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use)
Bioretention P load reduction	100	%	MS4 Permit, App F-A3, table 3-10 (assumes 1.5in BMP capacity)
Estimated drainage area	0.6	ac	Estimated from construction drawing measurements, sheet L5.02
TOTAL ESTIMATED P REMOVAL	**0.4**	**kg/yr**	

Alternative 2C – Access road & Commonwealth Road grass swales and rain gardens
Alternative 2C would include managing stormwater from the access road and Commonwealth Road (surface flow and/or catch basin flow) for the area shown in Figure 5. This alternative would direct runoff to rain gardens for treatment before ultimately flowing to the existing stormwater collection system. Modifications to the stormwater system would be required to redirect surface flow from a portion of Commonwealth Road to/from the proposed rain gardens. This alternative would provide an additional 0.7 kg/yr of P removal (see Table 5). It should be noted that high groundwater was noted in the soil investigation, which could prohibit infiltrative rain gardens; further soil testing would be required prior to final design.

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Figure 5. Alternative 2C drainage area from access road and Commonwealth Road (existing catch basins are circled in red)

Table 5. Alternative 2C P Removal Summary

	Value	Unit	Source
Access road & Commonwealth Road P load rate	1.34 (0.61)	lbs/ac/yr (kg/ac/yr)	MS4 Permit, App F-A1, Table 1-2 (assumes Highway land use)
Bioretention P load reduction	100	%	MS4 Permit, App F-A3, table 3-10 (assumes 1.5 in BMP capacity)
Estimated drainage area	1.2	ac	Estimated from Google Earth measurements
TOTAL ESTIMATED P REMOVAL	**0.7**	**kg/yr**	

The alternatives identified herein represent a potential improvement in P removal, allowing the Town to incrementally work toward their required P load reduction of 19 kg/yr. Alternative 1 may be combined with any of the Alternative 2 options for improved P removal. As shown in Table 6, Alternative 2C would provide the greatest P removal but could also require more complicated design and construction than the other alternatives. Each of these alternatives should be further examined for feasibility through the design process.

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Table 6. Combined Alternative P Removal Summary

BMP	BMP P removal (kg/yr)	Combined P Removal (kg/yr)*	Percent of Required P Reduction**
Project as Designed	0.31	-	1.63%
Alternative 1	0.02	0.33	1.73%
Alternative 2A	0.11	0.42	2.22%
Alternative 2B	0.39	0.70	3.66%
Alternative 2C	0.70	1.01	5.31%

*P reduction when alternative BMP performance is combined with the performance of the project as designed

**19 kg/yr required P reduction

3 OTHER MS4 PERMIT COMPLIANCE OPPORTUNITIES

This project provides several excellent opportunities for community outreach, education and stewardship that align with Minimum Control Measures (MCM) 1 of the MS4 Permit. Vegetated systems such as rain gardens and swales offer community planting opportunities. Educational signage describing the purpose and benefits of the stormwater management elements of the project would be seen by the many visitors to the new facilities. Wayland Middle School is a 20-minute walk, which could be used as an outdoor classroom. Adding more visible stormwater management infrastructure would greatly enhance the long-term community benefits of this project while reducing P and improving water quality.

4 REFERENCES

Construction Drawings – Bid Set (2/28/2019):
https://www.wayland.ma.us/sites/g/files/vyhlif4016/f/pages/19-1054_loker_bid_plans_02_28_2019.pdf

Stormwater Report (9/10/2018):
https://www.wayland.ma.us/sites/g/files/vyhlif4016/f/uploads/_20180910_wayland_loker_sw_report-combined.pdf

Soil Assessment (4/4/18):
https://www.wayland.ma.us/sites/g/files/vyhlif4016/f/pages/loker_assessment_areas_memo_04.04.18_-_final2_0.pdfv

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TOWN OF WAYLAND

41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

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WAYLAND CONSERVATION COMMISSION

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw

A. General Information

1. Project Location

68 Plain Road — a. Street Address
Wayland — b. City/Town
01778 — c. Zip code
Map 24 / parcel 127 — d. Parcel/ Lot Number

2. Applicant:

Terra Holdings, LLC — a. First Name
b. Last Name
215 Boston Post Road — c. Street Address
Sudbury — d. City
MA — e. State
01776 — f. Zip Code
978-443-6918 — g. Work/ Cell Phone #
gberg@nashdevelopment.com — h. Email Address

3. Property Owner (required if different from applicant):

Same as applicant — a. First Name
b. Last Name
c. Street Address
d.City
e. State
f. Zip Code
g. Work/ Cell Phone #
h. Email Address

4. Representative (if any):

Vito — a. First Name
Colonna — b. Last Name

Check # 30805

Sullivan Connors & Associates

c. Company

121 Boston Post Road

c. Street Address

Sudbury, MA 01776 — d.City — 508-393-9727

e. State — f. Zip Code — g. Work/ Cell Phone #

vc@csei.net

h. Email Address

5a. Project Type Checklist (check all that applies):

1. [X] Creation of new or increasing existing impervious surface of 500 sq. ft. or more.

   Impervious Surface: Is any material or structure on or above the ground that prevents water infiltration to the underlying soils. Impervious surface includes without limitation roads, paved parking lots, sidewalks, stone patios, decking, and rooftops.

2. [X] Alteration and/or land disturbance of at least 5,000 sq. ft. or 10% of the parcel; whichever is less.

   Alteration and/or land disturbance as defined in Chapter 193 Bylaw.

5b. General Project Description:

The proposed project includes construction of a new single family house. The work will also include demolition of the existing structure, a new driveway, septic system, drainage system, landscaping, utility connections, and related site work.

See project narrative for additional details.

B. Additional Information

By submitting an application for coverage under the Stormwater Management and Land Disturbance Permit, the Applicant agrees to the following:

1. At a minimum, the proposed project complies with the performance standards of the most recent version of the Massachusetts Stormwater Management Handbook including but not limited to:

   a. Employing environmentally sensitive site design
   b. Evaluation of Low Impact Development practices
   c. Incorporation of source controls of contaminants and employing BMPs to minimize stormwater pollution
   d. Sizing of water quality volume of BMPs are based on 1-inch of runoff
   e. Methodology for hydrologic analyses (if necessary) is based on TR-55/TR-20 methodology
   f. Designing redevelopment of existing sites must provide a net improvement to stormwater conditions at the site.

2. The activity shall not increase either the rate or volume of stormwater runoff leaving the site, nor shall it alter stormwater flow to any adjoining properties, public ways, or any wetland resource areas, unless otherwise permitted based on improvements over existing conditions.

Please check all that apply to this project:

- [X] Roof drains emptying into dry wells/recharge basins
- [ ] Grassed swales constructed
- [ ] Porous pavement installed; _____ sq. ft.
- [ ] Water quality swale
- [ ] Rain barrels/cisterns for irrigation
- [X] Other methods (please list/describe): Rain Garden

3. The Applicant shall provide and maintain Erosion and Sedimentation controls as necessary until the site is permanently stabilized. BMP's selected for erosion controls shall be chosen to minimize site disturbance from erosion control installation. As soon as the site is stabilized, such measures shall be removed.

   Please check all that apply to this project:

   - [X] Sediment filter fence ~~with either hay bales or straw wattles~~
   - [ ] Mulch filled fabric sock
   - [X] Construction entrance
   - [X] Temporary vegetative cover – mulch, netting
   - [X] Permanent vegetative cover – hydro seeding, seeding, sodding
   - [ ] Slope stabilization
   - [ ] Retaining Walls
   - [ ] Slope drains
   - [ ] Other methods (please list/describe): _____

4. The Applicant shall ensure that the site and stormwater management systems are perpetually inspected and maintained to function as designed.

   Please check all that apply to this project:

   - [X] Visual inspections by contractor
   - [X] Visual inspections by homeowner
   - [X] Operation and Maintenance Plan
   - [ ] Maintenance contract for stormwater components
   - [ ] Other methods (please list/describe): _____

5. Other Jurisdiction

- [ ] Massachusetts Wetlands Protection Act (310 CMR 10.00) and it's implementing Regulations
- [ ] Wayland's Wetlands and Water Resource Protection Bylaw – Chapter 194

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw

- ☐ Subdivision Approval
- ☒ Board of Health Permit
- ☐ Special Permit or Site Plan Review
- ☒ Building Permit

C. Fees

Applicants must submit a $100 application fee.

D. Signatures and Submittal Requirements

I certify that I have reviewed the design standards above and the information contained herein, including all attachments, is true, accurate, and complete to the best of my knowledge. Further, I grant the Wayland Conservation Commission and its authorized Agents permission to enter the property to review this application and make inspections before, during and after construction. **I have included a check for the application fee of $100.**

Daryl Nash member — Signature of Applicant TERRA HOLDINGS LLC — Date 2/4/2021

Signature of Property Owner (if different) — Date

Sullivan Connors — Signature of Representative (if any) — Date 2/11/21

For Conservation Commission:
Two copies of the completed Stormwater Management and Land Disturbance Bylaw (Chapter 193), including plans and documents, and the bylaw fee payment, to the Conservation Commission by mail or hand delivery.

TOWN OF WAYLAND

41 COCHITUATE ROAD

WAYLAND, MASSACHUSETTS 01778

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw Checklist

Submittal Requirements:

The applicant shall file eight copies of the completed application package to the Conservation Commission for a Stormwater Management and Land Disturbance Permit. The application package shall include:

[X] Application form with original signatures of all owners and representatives.

Two copies of the completed application form

Two copies of 11x17 size site plans

One copy of a full size site plan.

All documents emailed to nthomson@wayland.ma.us

[X] Number and size (dbh) of proposed trees to be removed. Replanting will be based on Replacement Tree and Shrub Schedule.

[X] Locus map showing location of the property.

[X] Any and all applications fees ($100 transmittal fee)

[X] Stormwater Management and Land Disturbance Plan (per the Massachusetts Stormwater Management Regulations and Massachusetts Stormwater Management handbook as applicable for the scope of the project.)

[X] Supporting Stormwater Management Report and engineering calculations (per the Massachusetts Stormwater Management Regulations and Massachusetts Stormwater Management handbook as applicable for the scope of the project.) The report must contain a narrative describing the project and how the project will comply with the Wayland Stormwater Management and Land Disturbance Bylaw. List any requested waivers and the reasons the standards cannot be met.

N/A [-] Stormwater Pollution Preventative Plan (SWPPP) if coverage is required under the U.S. EPA Construction General Permit, Multi-Sector Permit or an individual permit under the NPDES Phase II requirements.

[X] Long-term Pollution Prevention Plan

[X] Erosion and Sediment Control Plan

[X] Stormwater System Operation and Maintenance Plan

The property owner, as well as the applicant and/or representative (if different from owner) must sign this checklist and all other applicable applications. The property owner, by signing this checklist and the applications, acknowledges that the Commission and Staff may enter the property to inspect the premises as part of the assessment of the application.

member — 2/4/2021

Signature of Property Owner TERRA HOLDINGS, LLC — Date

I certify under penalty of law that this document and all its attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

member — 2/4/2021

Signature of Applicant TERRA HOLDINGS LLC — Date

Stormwater Management Documentation

68 Plain Road
Wayland, Massachusetts

February 10, 2020

Prepared by: Sullivan Connors & Associates, Inc.
121 Boston Post Road, Sudbury, MA

The purpose of this analysis is to summarize the design calculations, and design a stormwater management system in accordance with the requirements of the Town of Wayland Stormwater Bylaw (Chapter 193).

Existing Conditions

The subject site consists of a 1.6 acre parcel of land at 68 Plain Road. The site is currently developed as a single family house with a paved driveway off Plain Road. The areas surrounding the house are a mix of lawn and landscapes areas. The rear approximate third of the parcel is overrun with invasive vines (bittersweet). The topography of the site is very flat, but generally sloping away from the house either to the rear north east corner of the property or to the front southwest corner of the property. Wetlands were recently delineated and survey located during the septic repair of the abutting property. The 100 foot buffer zone to those wetlands is located just offsite to the northeast.

The current existing conditions include 3,995 square feet of impervious surfaces. There are no existing drainage systems on-site. All site runoff flows via sheet flow offsite.

Soil test was performed on-site as part of the septic system requirements. Soils were found to consist of highly permeable medium to coarse sand with no evidence of groundwater to greater than 10 feet below the ground surface. This is consistent with the NRCS soil mapping, which classifies the site soils as "Haven" highly permeable sand/gravel with a hydrologic soil group designation of "A."

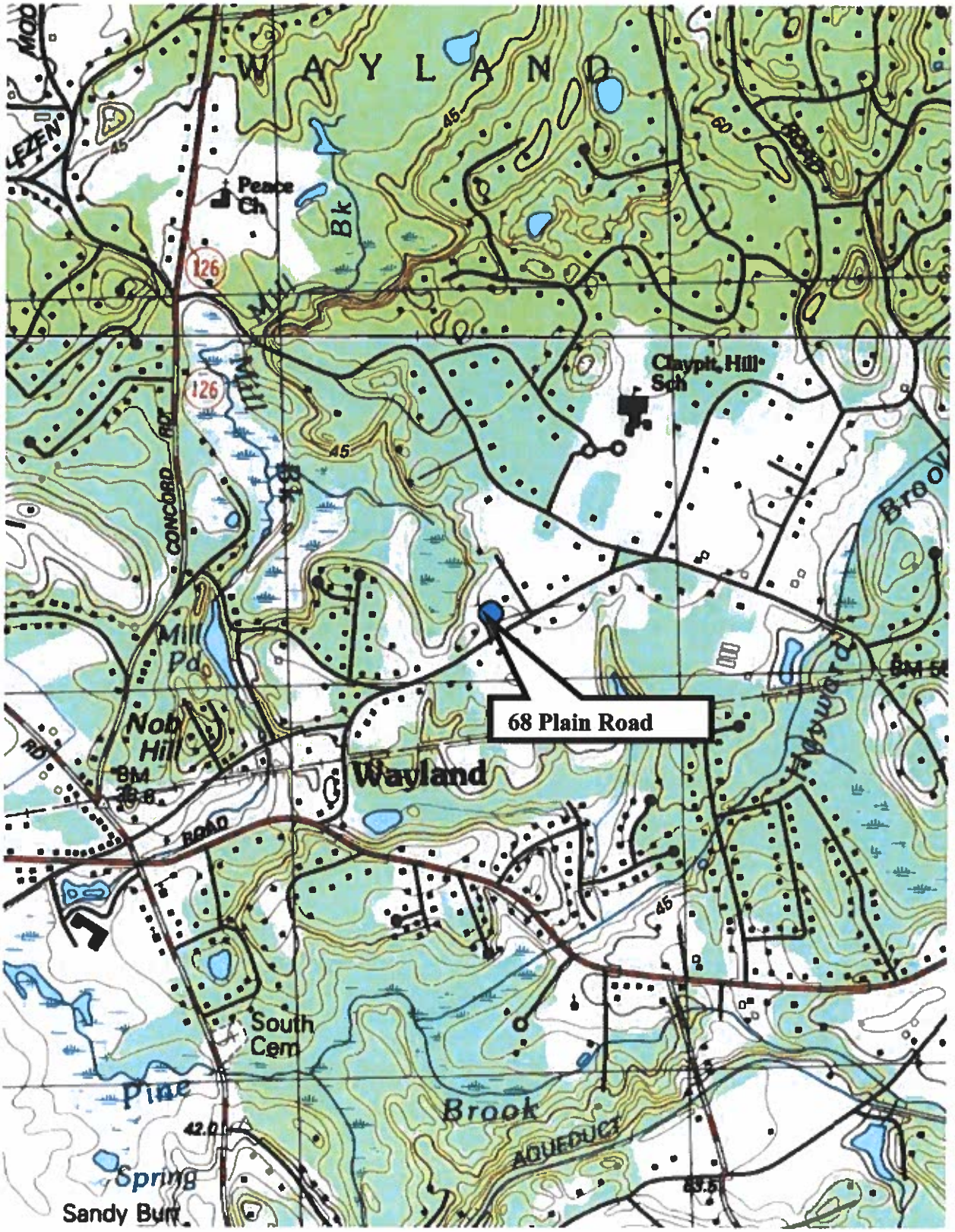
Project Description

The proposed project includes demolition of the existing structure and construction of a new single family house. This will include a new driveway, septic system, stormwater management system, underground utilities, and related site work.

The overall post development impervious area would total 9,825 square feet, or an increase of 5,830 square feet. In order to mitigate this increase, a drywell has been proposed to collect the entire roof area of 2,860 square feet and a rain garden has been proposed to collect the driveway areas near Plain Road. Both of these systems have been designed to infiltrate the 100 year storm event (8.2 inches). The overall plan will result in a net decrease in the rate of runoff leaving the property. These two BMP's were selected based upon the highly permeable soil conditions and relatively flat topography. The work has also included the removal of 20 site trees. A majority of these trees are either damaged or dying in the front yard or overtaken by invasive vines in the rear yard.

During construction, temporary BMP's will be provided to mitigate temporary impacts including perimeter erosion barriers and a stabilized construction entrance. Due to the flat topography and soil conditions, sedimentation and erosion during construction would be at a lower risk.

USGS LOCUS MAP



68 Plain Road

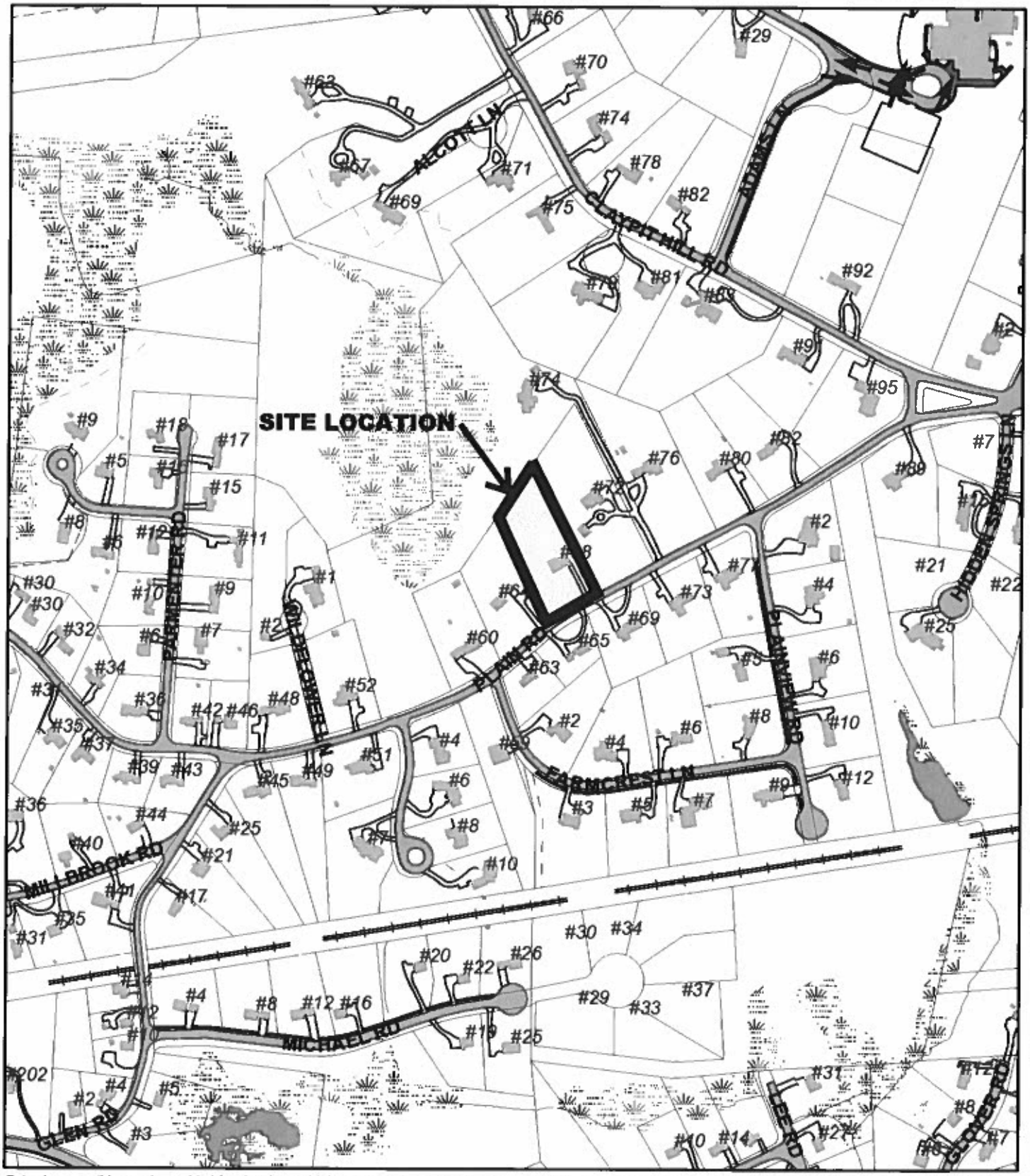
Wayland, MA

1 inch = 400 Feet

0 400 800 1200

February 10, 2021

CAI Technologies
Precision Mapping Geospatial Solutions



Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

MA D.E.P. STORMWATER STANDARD SUMMARY

Standard 1: No New Untreated Discharges

N/A - There are no new untreated point source stormwater discharges from the site. All roof runoff would be fully infiltrated and contained on-site. Remaining site runoff including the driveway would remain disconnected allowing sheet flow and/or treatment through a rain garden.

Standard 2: Peak Rate Attenuation

The project will balance the pre-and post-development rate of runoff. The drainage calculations have been performed utilizing HydroCAD. The model results have been attached for review. The increased impervious area has been mitigated with a large drywell. The storm intensities have been based upon the most recent NOAA Atlas 14 data.

A summary of the rates of runoff are listed below.

Front Property Area

Storm Event	Peak Rate of Runoff Existing (Proposed)
2-year (3.3 inches)	0.0 cfs (0.0 cfs)
10-year (5.2 inches)	0.1 cfs (0.1 cfs)
100-year (8.2 inches)	0.8 cfs (0.6 cfs)

Rear Property Area

Storm Event	Peak Rate of Runoff Existing (Proposed)
2-year (3.3 inches)	0.0 cfs (0.0 cfs)
10-year (5.2 inches)	0.0 cfs (0.0 cfs)
100-year (8.2 inches)	0.3 cfs (0.3 cfs)

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater in excess of that required by Standard 3. Recharge has been provided through two drywells.

Required Recharge Volume:

Increase in Impervious Area = 5,830 S.F.
On-site Hydrologic Soil Group = A (0.60"/impervious area)
Recharge Volume = 5,830 S.F. x 0.6 / 12 = 292 cubic feet

Proposed Recharge Volume = Roof Drywell = 579 c.f.
Rain Garden = 272 c.f.
Total = 851 c.f.

Draw Down Calculations – 72 hours maximum allowed

Proposed Drywell
= Volume / (Saturated Hydraulic Conductivity x Bottom Area)
Drywell = 579 cubic feet / (8.27 in/hr x 276 sq. ft. / 12 in/ft) = 3 hours
Rain Garden = 272 cubic feet / (8.27 in/hr x 250 sq. ft. / 12 in/ft) = 2 hours

Standard 4: Water Quality

Proposed roof top has been infiltrated through the use of a drywell sized for the 100 year storm event. Roof areas are considered "clean' not requiring pre-treatment prior to infiltration.

The remainder of the site has been considered a partial redevelopment. The Lower portion of the driveway has been collected through a Rain Garden sized to removal 90% Total Suspended Solids and infiltrate the 100 year storm event. The remaining driveway would match the existing conditions with disconnected sheet flow over pervious areas. This flow naturally infiltrates in the low area along the property line.

Rain Garden Sizing:

Tributary Impervious Area = 1,415 S.F.
Water Quality Volume = 1-inch x impervious area
Required WQ Volume = 1,415 S.F. x 1 / 12 = 118 cubic feet
Proposed WQ Volume = 272 cubic feet

Standard 5: Land Uses With Higher pollutant Loads

N/A - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

N/A – The proposed project is not located within any mapped Critical Areas.

Standard 7: Redevelopment

The project would qualify as a partial redevelopment.

Standard 8: Construction Period Controls

Construction period erosion and sedimentation controls have been provided on the proposed plans.

Standard 9: Operation and Maintenance Plan

The required O&M procedures have been included with this report.

Standard 10: Illicit Discharges

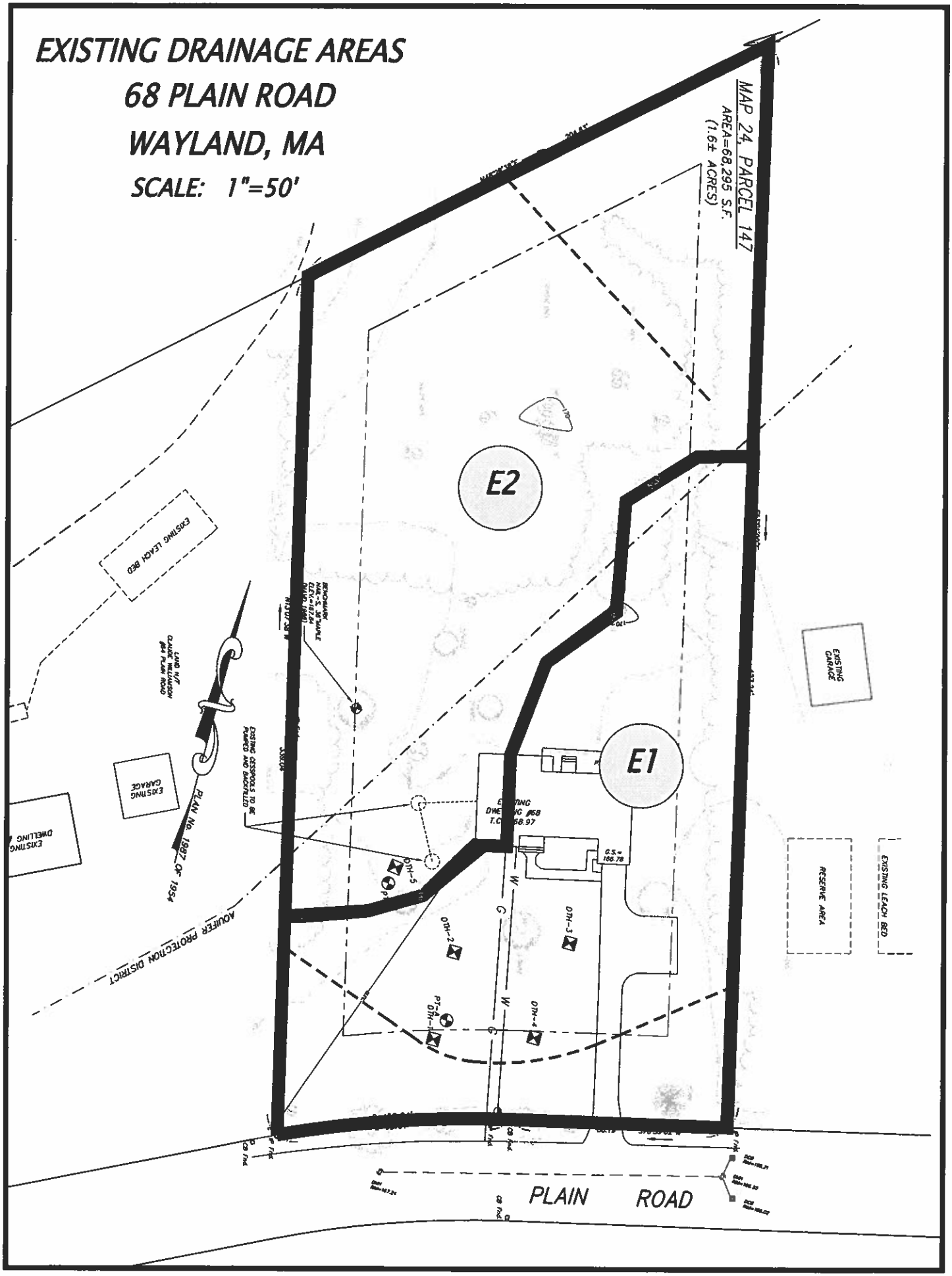
Based upon site observations made by Sullivan Connors and Associates, no illicit discharges have been observed on the site. All proposed sewerage flow shall be discharged to the proposed subsurface sewerage disposal system.

Prepared by:

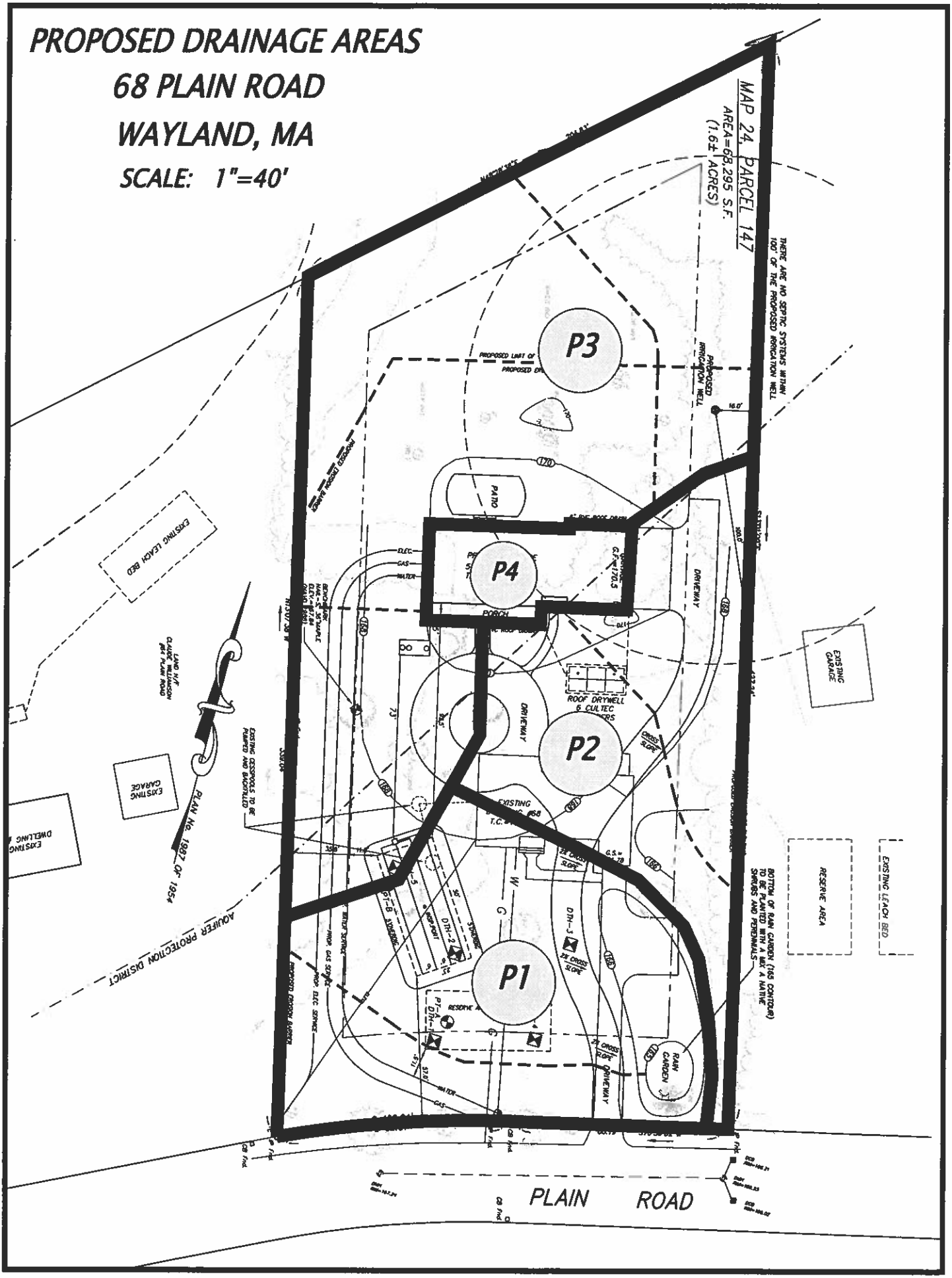
Sullivan Connors & Associated, Inc.
121 Boston Post Road
Sudbury, MA 01776

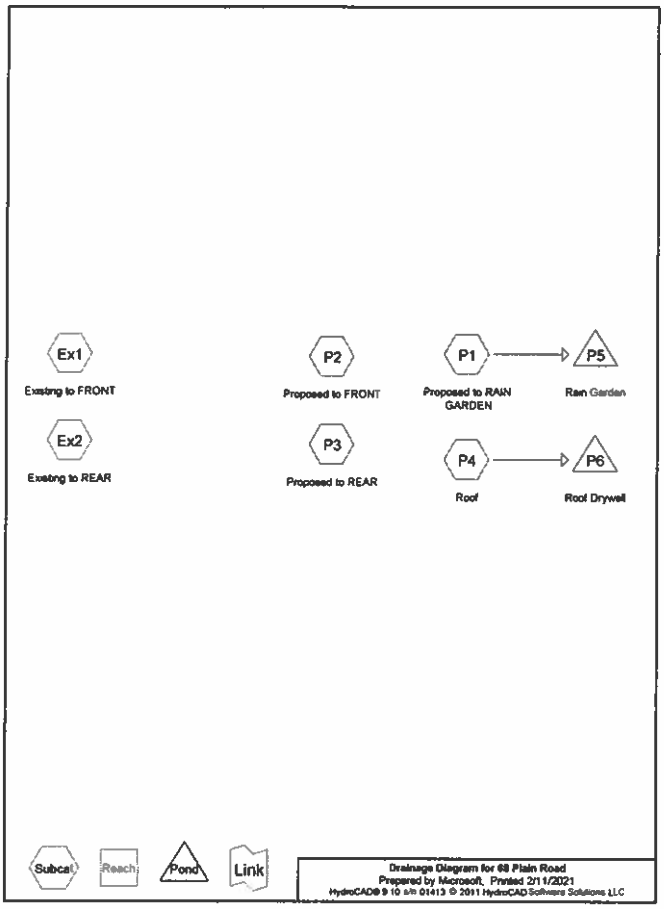
2-10-21

EXISTING DRAINAGE AREAS
68 PLAIN ROAD
WAYLAND, MA
SCALE: 1"=50'



PROPOSED DRAINAGE AREAS
68 PLAIN ROAD
WAYLAND, MA
SCALE: 1"=40'





Summary for Subcatchment Ex1: Existing to FRONT

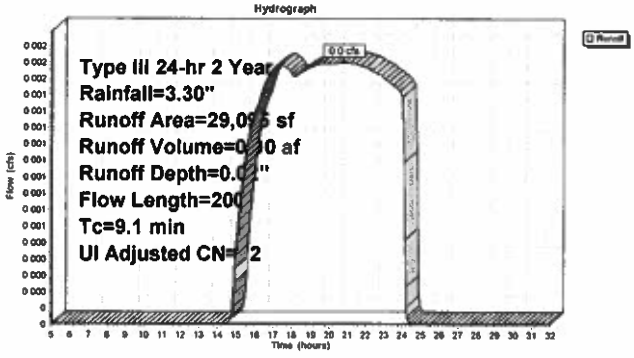
Runoff = 0.0 cfs @ 20.80 hrs, Volume= 0.00 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
2,770	30	Woods, Good, HSG A
22,785	39	>75% Grass cover, Good, HSG A
1,495	98	Unconnected roofs, HSG A
2,045	98	Unconnected pavement, HSG A
29,095	45	Weighted Average, UI Adjusted CN = 42
25,555		87.83% Pervious Area
3,540		12.17% Impervious Area
3,540		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
2.1	90	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	50	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.1	200	Total			

Subcatchment Ex1: Existing to FRONT



Summary for Subcatchment Ex2: Existing to REAR

[45] Hint: Runoff=Zero

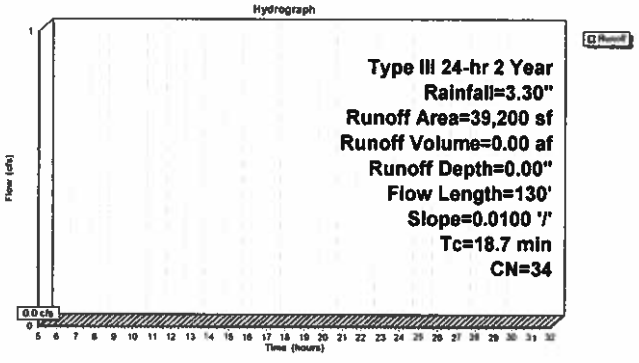
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
25,150	30	Woods, Good, HSG A
13,595	39	>75% Grass cover, Good, HSG A
455	98	Unconnected roofs, HSG A
39,200	34	Weighted Average
38,745		98.84% Pervious Area
455		1.16% Impervious Area
455		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
2.7	80	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
18.7	130	Total			

Subcatchment Ex2: Existing to REAR



Summary for Subcatchment P1: Proposed to RAIN GARDEN

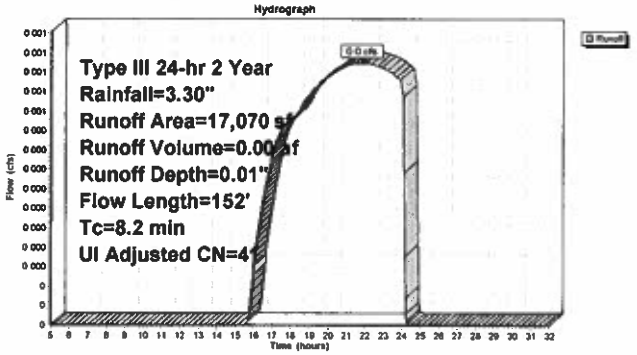
Runoff = 0.0 cfs @ 21.80 hrs, Volume= 0.00 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
15,655	39	>75% Grass cover, Good, HSG A
1,415	98	Unconnected pavement, HSG A
17,070	44	Weighted Average, UI Adjusted CN = 41
15,655		91.71% Pervious Area
1,415		8.29% Impervious Area
1,415		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
1.9	80	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	10	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.2	152	Total			

Subcatchment P1: Proposed to RAIN GARDEN



Summary for Subcatchment P2: Proposed to FRONT

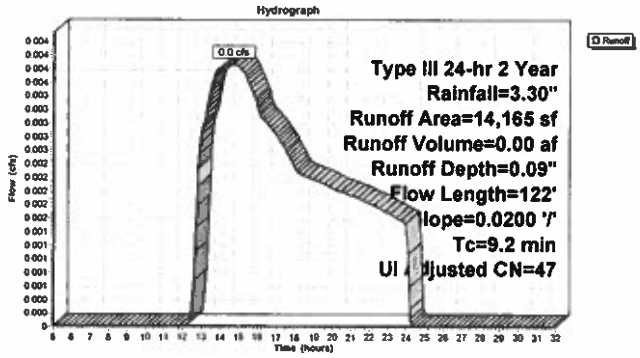
Runoff = 0.0 cfs @ 14.65 hrs, Volume= 0.00 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
10,120	39	>75% Grass cover, Good, HSG A
4,045	98	Unconnected pavement, HSG A
14,165	56	Weighted Average, UI Adjusted CN = 47
10,120		71.44% Pervious Area
4,045		28.56% Impervious Area
4,045		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	60	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	122	Total			

Subcatchment P2: Proposed to FRONT



Summary for Subcatchment P3: Proposed to REAR

[45] Hint: Runoff=Zero

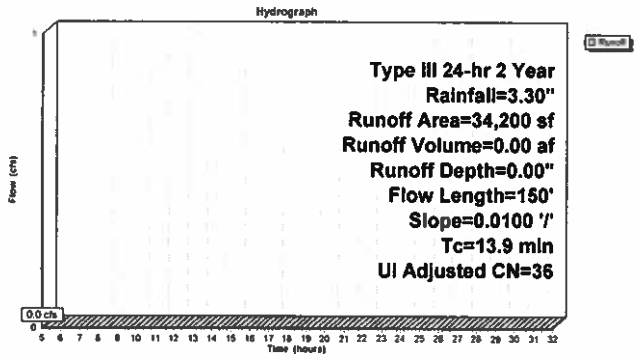
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
15,500	30	Woods, Good, HSG A
17,195	39	>75% Grass cover, Good, HSG A
1,505	98	Unconnected pavement, HSG A
34,200	38	Weighted Average, UI Adjusted CN = 36
32,695		95.60% Pervious Area
1,505		4.40% Impervious Area
1,505		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
3.3	100	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	150	Total			

Subcatchment P3: Proposed to REAR



Summary for Subcatchment P4: Roof

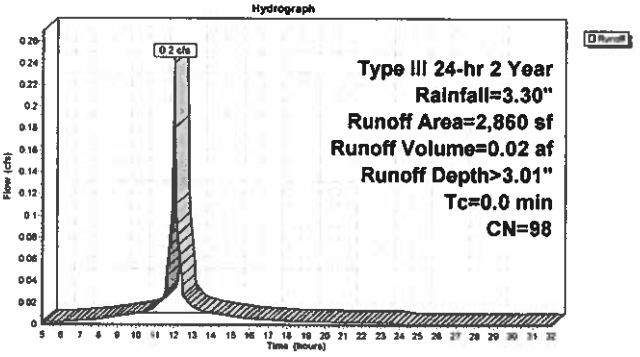
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.2 cfs @ 12.00 hrs, Volume= 0.02 af, Depth> 3.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
* 2,860	98	Roof
2,860		100.00% Impervious Area

Subcatchment P4: Roof



Summary for Pond P5: Rain Garden

Inflow Area = 0.392 ac, 8.29% Impervious, Inflow Depth = 0.01" for 2 Year event
Inflow = 0.0 cfs @ 21.80 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 21.81 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.9 min
Discarded = 0.0 cfs @ 21.81 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 165.00' @ 21.81 hrs Surf.Area= 350 sf Storage= 0 cf

Plug-Flow detention time= 0.9 min calculated for 0.00 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (1,225.7 - 1,224.8)

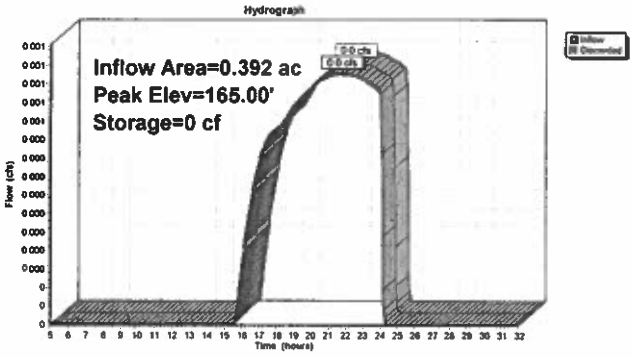
Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	1,175 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	350	0	0
166.00	2,000	1,175	1,175

Device	Routing	Invert	Outlet Devices
#1	Discarded	165.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 21.81 hrs HW=165.00' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.1 cfs)

Pond P5: Rain Garden



Summary for Pond P6: Roof Drywell

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.066 ac,100.00% Impervious, Inflow Depth > 3.01" for 2 Year event
Inflow = 0.2 cfs @ 12.00 hrs, Volume= 0.02 af
Outflow = 0.1 cfs @ 12.30 hrs, Volume= 0.02 af, Atten= 73%, Lag= 17.9 min
Discarded = 0.1 cfs @ 12.30 hrs, Volume= 0.02 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 0.83' @ 12.30 hrs Surf.Area= 276 sf Storage= 125 cf

Plug-Flow detention time= 9.8 min calculated for 0.02 af (100% of inflow)
Center-of-Mass det. time= 9.7 min (770.5 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	266 cf	11.50'W x 24.00'L x 3.54'H Field A 978 cf Overall - 313 cf Embedded = 665 cf x 40.0% Voids
#2A	0.50'	313 cf	Cultec R-330XL x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.1 cfs @ 12.30 hrs HW=0.83' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.1 cfs)

Pond P6: Roof Drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

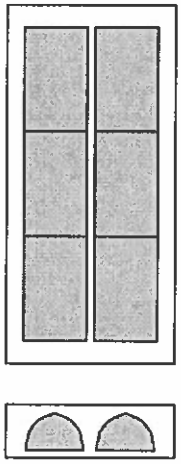
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 14.0" Side Stone x 2 = 11.50' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

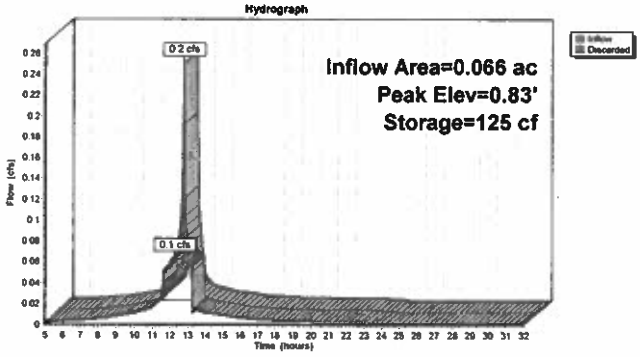
977.5 cf Field - 312.9 cf Chambers = 664.6 cf Stone x 40.0% Voids = 265.8 cf Stone Storage

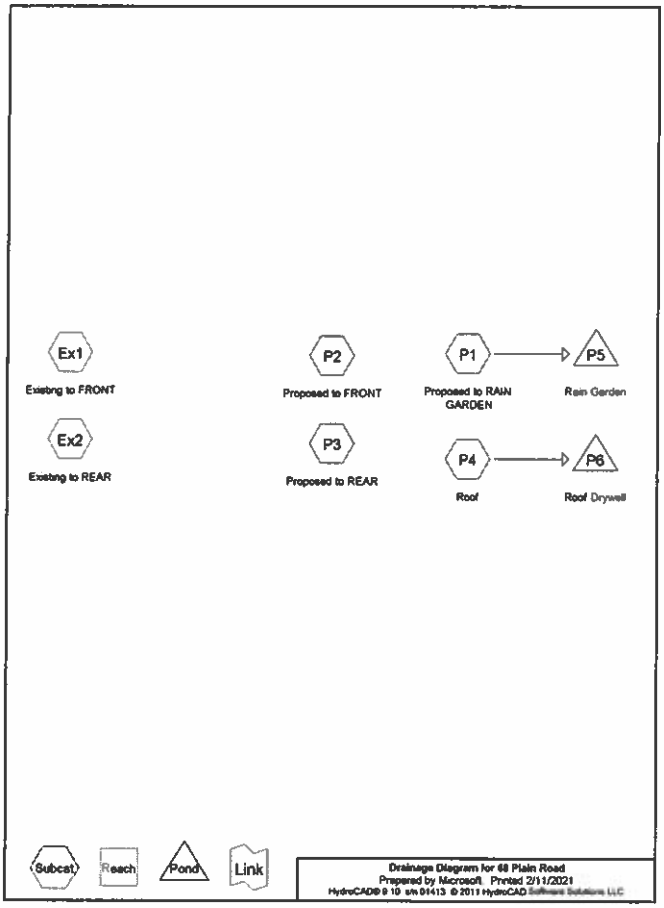
Stone + Chamber Storage = 578.8 cf = 0.01 af

6 Chambers
36.2 cy Field
24.6 cy Stone



Pond P6: Roof Drywell





Summary for Subcatchment Ex1: Existing to FRONT

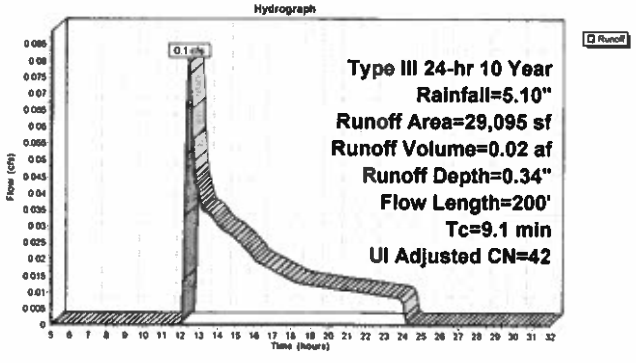
Runoff = 0.1 cfs @ 12.42 hrs, Volume= 0.02 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
2,770	30	Woods, Good, HSG A
22,785	39	>75% Grass cover, Good, HSG A
1,495	98	Unconnected roofs, HSG A
2,045	98	Unconnected pavement, HSG A
29,095	45	Weighted Average, UI Adjusted CN = 42
25,555		87.83% Pervious Area
3,540		12.17% Impervious Area
3,540		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
2.1	90	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	50	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.1	200	Total			

Subcatchment Ex1: Existing to FRONT



Summary for Subcatchment Ex2: Existing to REAR

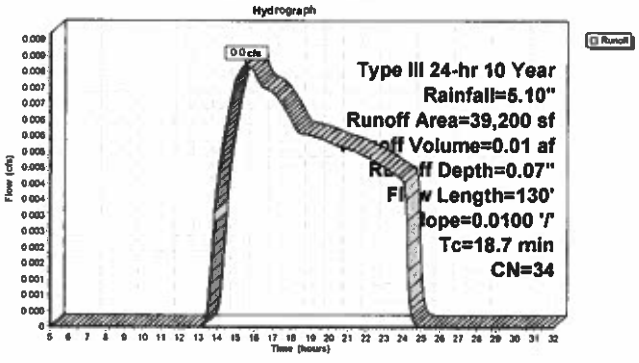
Runoff = 0.0 cfs @ 15.52 hrs, Volume= 0.01 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
25,150	30	Woods, Good, HSG A
13,595	39	>75% Grass cover, Good, HSG A
455	98	Unconnected roofs, HSG A
39,200	34	Weighted Average
38,745		98.84% Pervious Area
455		1.16% Impervious Area
455		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
2.7	80	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
18.7	130	Total			

Subcatchment Ex2: Existing to REAR



Summary for Subcatchment P1: Proposed to RAIN GARDEN

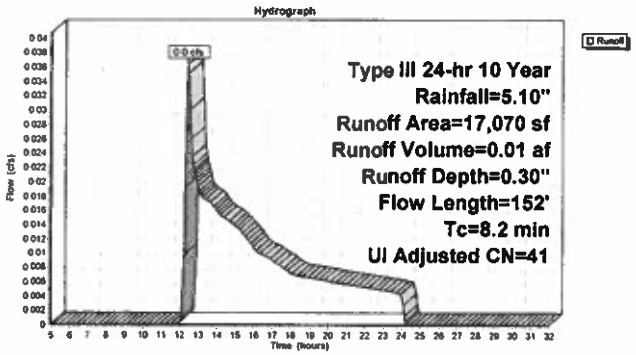
Runoff = 0.0 cfs @ 12.43 hrs, Volume= 0.01 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
15,655	39	>75% Grass cover, Good, HSG A
1,415	98	Unconnected pavement, HSG A
17,070	44	Weighted Average, UI Adjusted CN = 41
15,655		91.71% Pervious Area
1,415		8.29% Impervious Area
1,415		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
1.9	80	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	10	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.2	152	Total			

Subcatchment P1: Proposed to RAIN GARDEN



Summary for Subcatchment P2: Proposed to FRONT

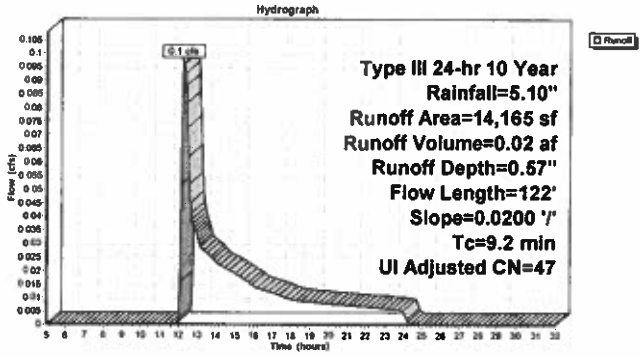
Runoff = 0.1 cfs @ 12.20 hrs, Volume= 0.02 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
10,120	39	>75% Grass cover, Good, HSG A
4,045	98	Unconnected pavement, HSG A
14,165	56	Weighted Average, UI Adjusted CN = 47
10,120		71.44% Pervious Area
4,045		28.56% Impervious Area
4,045		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	60	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	122	Total			

Subcatchment P2: Proposed to FRONT



Summary for Subcatchment P3: Proposed to REAR

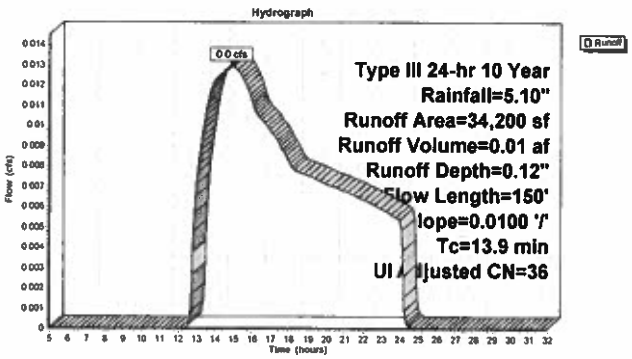
Runoff = 0.0 cfs @ 14.84 hrs, Volume= 0.01 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
15,500	30	Woods, Good, HSG A
17,195	39	>75% Grass cover, Good, HSG A
1,505	98	Unconnected pavement, HSG A
34,200	38	Weighted Average, UI Adjusted CN = 38
32,695		95.60% Pervious Area
1,505		4.40% Impervious Area
1,505		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
3.3	100	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	150	Total			

Subcatchment P3: Proposed to REAR



Summary for Subcatchment P4: Roof

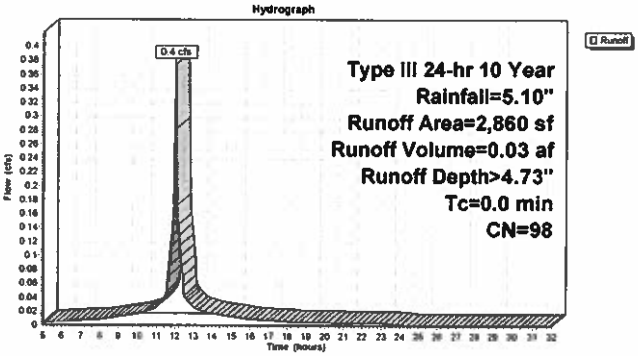
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.4 cfs @ 12.00 hrs, Volume= 0.03 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
* 2,860	98	Roof
2,860		100.00% Impervious Area

Subcatchment P4: Roof



Summary for Pond P5: Rain Garden

Inflow Area = 0.392 ac, 8.29% Impervious, Inflow Depth = 0.30" for 10 Year event
Inflow = 0.0 cfs @ 12.43 hrs, Volume= 0.01 af
Outflow = 0.0 cfs @ 12.44 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.9 min
Discarded = 0.0 cfs @ 12.44 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 165.01' @ 12.44 hrs Surf.Area= 359 sf Storage= 2 cf

Plug-Flow detention time= 0.9 min calculated for 0.01 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (981.6 - 980.8)

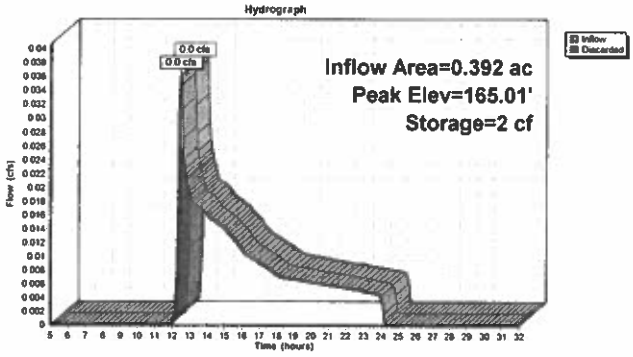
Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	1,175 cf	**Custom Stage Data (Prismatic) Listed below (Recalc)**

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	350	0	0
166.00	2,000	1,175	1,175

Device	Routing	Invert	Outlet Devices
#1	Discarded	165.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.1 cfs @ 12.44 hrs HW=165.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond P5: Rain Garden



Summary for Pond P6: Roof Drywell

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.066 ac,100.00% Impervious, Inflow Depth > 4.73" for 10 Year event
Inflow = 0.4 cfs @ 12.00 hrs, Volume= 0.03 af
Outflow = 0.1 cfs @ 12.39 hrs, Volume= 0.03 af, Atten= 80%, Lag= 23.2 min
Discarded = 0.1 cfs @ 12.39 hrs, Volume= 0.03 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 1.53' @ 12.39 hrs Surf.Area= 276 sf Storage= 267 cf

Plug-Flow detention time= 20.5 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 20.4 min (777.7 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	266 cf	**11.50'W x 24.00'L x 3.54'H Field A** 978 cf Overall - 313 cf Embedded = 665 cf x 40.0% Voids
#2A	0.50'	313 cf	**Cultec R-330XL x 6 Inside #1** Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.1 cfs @ 12.39 hrs HW=1.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond P6: Roof Drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

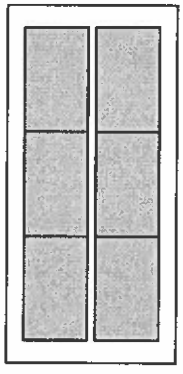
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 14.0" Side Stone x 2 = 11.50' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

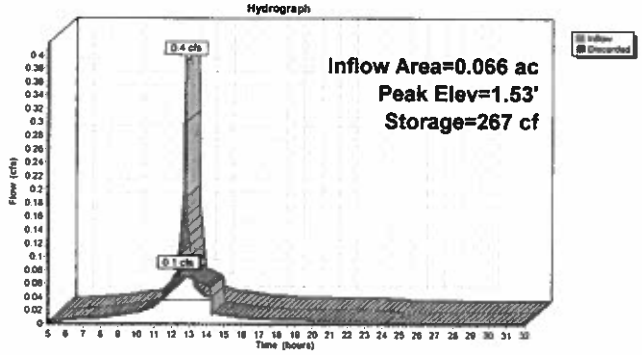
977.5 cf Field - 312.9 cf Chambers = 664.6 cf Stone x 40.0% Voids = 265.8 cf Stone Storage

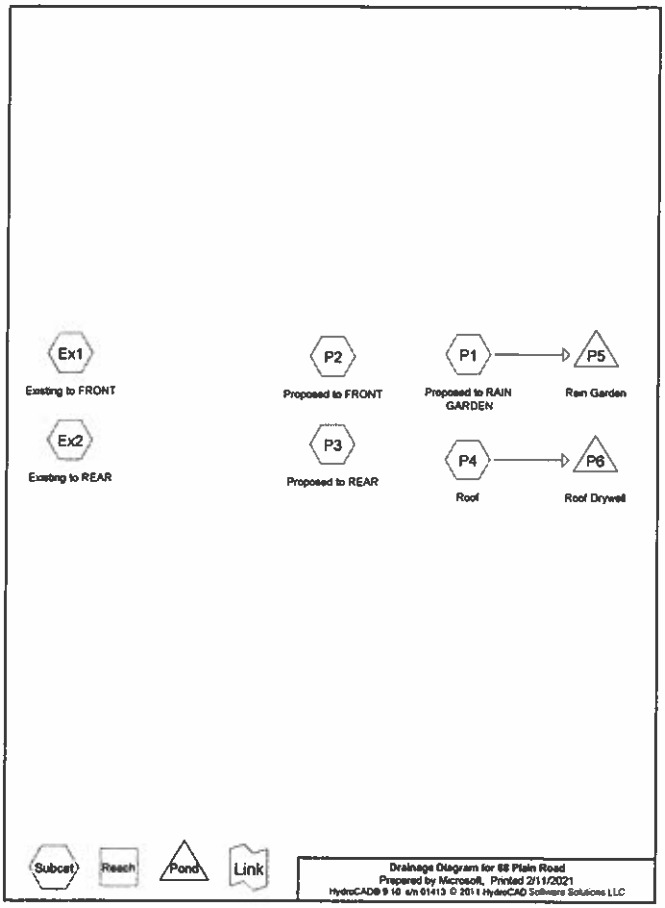
Stone + Chamber Storage = 578.8 cf = 0.01 af

6 Chambers
38.2 cy Field
24.6 cy Stone



Pond P6: Roof Drywell





Summary for Subcatchment Ex1: Existing to FRONT

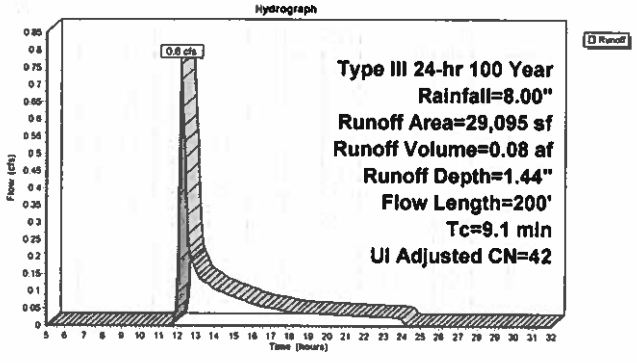
Runoff = 0.8 cfs @ 12.16 hrs, Volume= 0.08 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
2,770	30	Woods, Good, HSG A
22,785	39	>75% Grass cover, Good, HSG A
1,495	98	Unconnected roofs, HSG A
2,045	98	Unconnected pavement, HSG A
29,095	45	Weighted Average, UI Adjusted CN = 42
25,555		87.83% Pervious Area
3,540		12.17% Impervious Area
3,540		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.1	90	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	50	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	200	Total			

Subcatchment Ex1: Existing to FRONT



Summary for Subcatchment Ex2: Existing to REAR

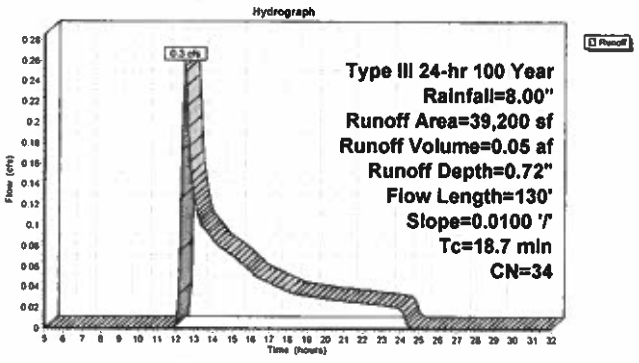
Runoff = 0.3 cfs @ 12.50 hrs, Volume= 0.05 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
25,150	30	Woods, Good, HSG A
13,595	39	>75% Grass cover, Good, HSG A
455	98	Unconnected roofs, HSG A
39,200	34	Weighted Average
38,745		98.84% Pervious Area
455		1.16% Impervious Area
455		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.7	80	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.7	130	Total			

Subcatchment Ex2: Existing to REAR



Summary for Subcatchment P1: Proposed to RAIN GARDEN

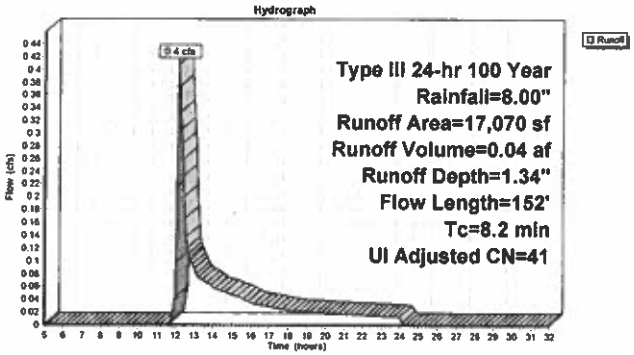
Runoff = 0.4 cfs @ 12.15 hrs, Volume= 0.04 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
15,655	39	>75% Grass cover, Good, HSG A
1,415	98	Unconnected pavement, HSG A
17,070	44	Weighted Average, UI Adjusted CN = 41
15,655		91.71% Pervious Area
1,415		8.29% Impervious Area
1,415		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
1.9	80	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	10	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.2	152	Total			

Subcatchment P1: Proposed to RAIN GARDEN



Summary for Subcatchment P2: Proposed to FRONT

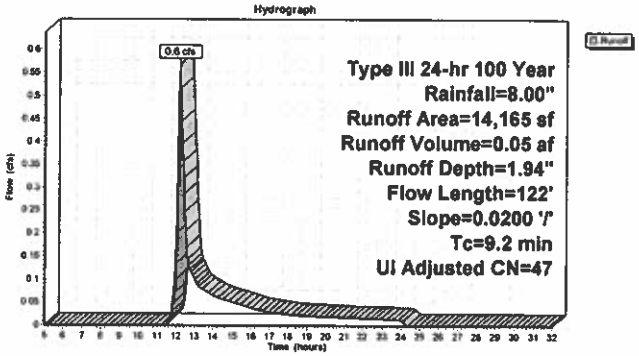
Runoff = 0.6 cfs @ 12.15 hrs, Volume= 0.05 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
10,120	39	>75% Grass cover, Good, HSG A
4,045	98	Unconnected pavement, HSG A
14,165	58	Weighted Average, UI Adjusted CN = 47
10,120		71.44% Pervious Area
4,045		28.56% Impervious Area
4,045		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
0.1	12	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	60	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	122	Total			

Subcatchment P2: Proposed to FRONT



Summary for Subcatchment P3: Proposed to REAR

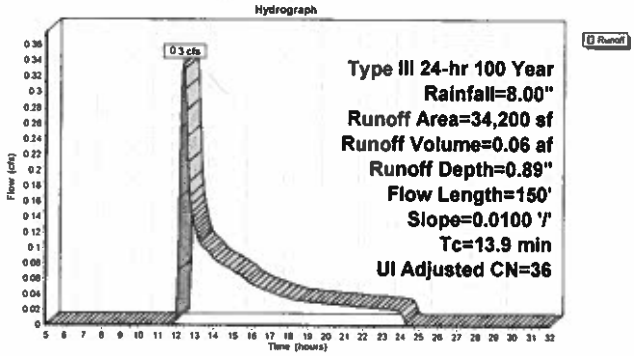
Runoff = 0.3 cfs @ 12.36 hrs, Volume= 0.06 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
15,500	30	Woods, Good, HSG A
17,195	39	>75% Grass cover, Good, HSG A
1,505	98	Unconnected pavement, HSG A
34,200	38	Weighted Average, UI Adjusted CN = 36
32,695		95.60% Pervious Area
1,505		4.40% Impervious Area
1,505		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
3.3	100	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	150	Total			

Subcatchment P3: Proposed to REAR



Summary for Subcatchment P4: Roof

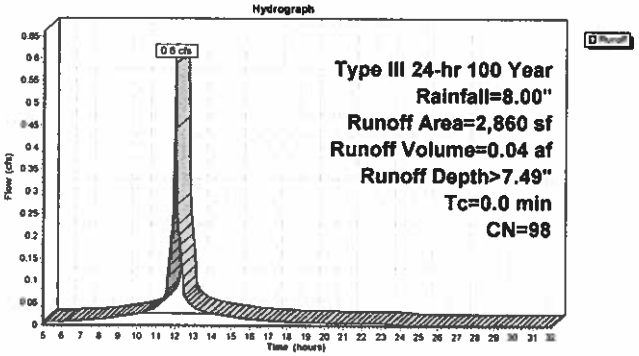
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.6 cfs @ 12.00 hrs, Volume= 0.04 af, Depth> 7.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
* 2,860	98	Roof
2,860		100.00% Impervious Area

Subcatchment P4: Roof



Summary for Pond P5: Rain Garden

Inflow Area = 0.392 ac, 8.29% Impervious, Inflow Depth = 1.34" for 100 Year event
Inflow = 0.4 cfs @ 12.15 hrs, Volume= 0.04 af
Outflow = 0.2 cfs @ 12.52 hrs, Volume= 0.04 af, Atten= 53%, Lag= 21.7 min
Discarded = 0.2 cfs @ 12.52 hrs, Volume= 0.04 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 165.39' @ 12.52 hrs Surf.Area= 995 sf Storage= 263 cf

Plug-Flow detention time= 8.4 min calculated for 0.04 af (100% of inflow)
Center-of-Mass det. time= 8.4 min (912.8 - 904.3)

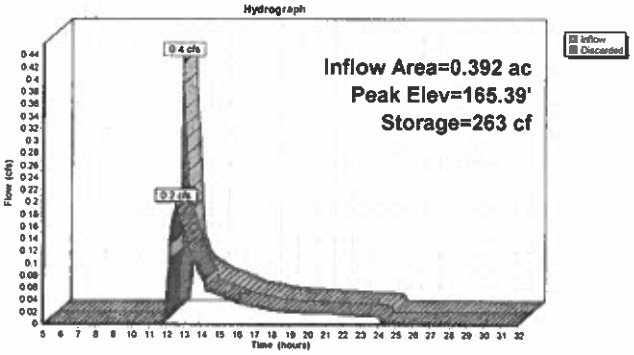
Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	1,175 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	350	0	0
166.00	2,000	1,175	1,175

Device	Routing	Invert	Outlet Devices
#1	Discarded	165.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.2 cfs @ 12.52 hrs HW=165.39' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.2 cfs)

Pond P5: Rain Garden



Summary for Pond P6: Roof Drywell

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.066 ac,100.00% Impervious, Inflow Depth > 7.49" for 100 Year event
Inflow = 0.6 cfs @ 12.00 hrs, Volume= 0.04 af
Outflow = 0.1 cfs @ 12.44 hrs, Volume= 0.04 af, Atten= 84%, Lag= 26.2 min
Discarded = 0.1 cfs @ 12.44 hrs, Volume= 0.04 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 2.92' @ 12.44 hrs Surf.Area= 276 sf Storage= 510 cf

Plug-Flow detention time= 37.1 min calculated for 0.04 af (100% of inflow)
Center-of-Mass det. time= 36.9 min (792.2 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	266 cf	11.50'W x 24.00'L x 3.54'H Field A 978 cf Overall - 313 cf Embedded = 665 cf x 40.0% Voids
#2A	0.50'	313 cf	Cultec R-330XL x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.1 cfs @ 12.44 hrs HW=2.92' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.1 cfs)

Pond P6: Roof Drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

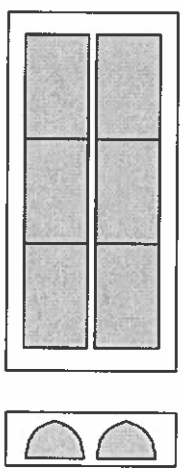
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 14.0" Side Stone x 2 = 11.50' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

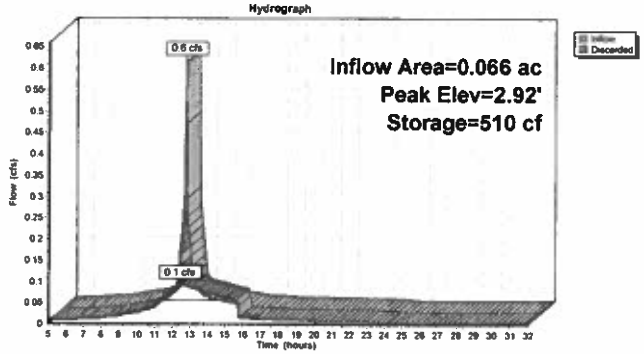
977.5 cf Field - 312.9 cf Chambers = 664.6 cf Stone x 40.0% Voids = 265.8 cf Stone Storage

Stone + Chamber Storage = 578.8 cf = 0.01 af

6 Chambers
36.2 cy Field
24.6 cy Stone



Pond P6: Roof Drywell



68 Plain Road, Wayland, MA
Stormwater Operations and Management Plan

Stormwater Management System Owner: & Responsible Party Property Owner

General Summary:

- System Components: Roof Drain Drywell (including collection system of gutters, drains, and outlet)
  Rain Garden (near driveway entrance)
- Discharge of any material other that stormwater to the stormwater system is not permitted.
- All assessments can be based upon visual inspections.
- Maintenance of the system is critical since blockages or backup of the system may result in ponding into the adjacent garage.

Drywell O&M Procedures:

Drywells should be inspected at a minimum of once per year. The pop-up emitters should be observed as necessary after periods of heavy rain to ensure functionality and to note any visual evidence of overflow. Inspection through the emitters can be performed to verify the drywells have fully drained after a storm event. If the drywells have not drained within 72 hours of the end of a storm event, or if continued overflow occurs, then a qualified engineer should be contacted. See Attached Manufacturer's O&M guidelines for additional details

Heavy machinery should not operate near or over the drywells, and the surface conditions should be checked for any settlement. Pop-up emitters should be kept free and clear of any landscape debris. Damaged pop-up emitters should be replaced as required. Roof gutters should be cleaned as necessary to prevent debris from entering the drywells and ensure gutters function properly. Visual inspection shall confirm connection of roof drains/downspouts to the conveyance pipe leading to the drywell.

Rain Garden

Rain gardens should be maintained similar to site landscaping and planting beads. The following is a typical maintenance schedule

Activity	Time of Year
Inspect & remove trash	Year round
Mulch	Spring
Remove dead vegetation	Spring or Fall
Replace dead vegetation	Spring or Fall
Prune	Spring or Fall
Remove sediment deposits	Spring or Fall

Paying careful attention to pretreatment and operation & maintenance can extend the life of the rain garden. In many cases, during routine landscaping the maintenance tasks can be completed. Inspect regularly for sediment build-up, structural damage, and standing water. If the rain garden has not drained within 72 hours of the end of a storm event, or if continued overflow occurs, then a qualified engineer should be contacted.

Inspect soil and repair eroded areas monthly. Re-mulch void areas as needed. Remove litter and debris. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall). Remove invasive species as needed to prevent these species from spreading into the area. Replace mulch every two years, in the early spring. A summary of maintenance activities can be found above.

Cold Climate Considerations - Never store snow in rain garden areas.

Record Keeping:
It shall be the responsibility of the homeowner to keep records of any pertinent inspection and/or maintenance information on site, and to ensure that all information including this "Stormwater Operations & Management Plan" are passed along to subsequent homeowners.

Additional Source Control Measures / Long Term Pollution Prevention Measures:
The following source control and pollution prevention measures shall be employed on the site to prevent contamination of stormwater runoff:

- Control litter on the site.
- Cover any dumpsters and maintain them to prevent leaks.
- Store lawn and deicing chemicals under cover.
- Apply fertilizers and pesticides sparingly to prevent washoff.
- Use of slow release nitrogen and low phosphorus fertilizers is encouraged.
- No fertilization or pesticide application in or near any wetland resource area.
- Limit exterior washing of vehicles and equipment to locations that drain to pervious surfaces and away from storm drains.
- Clean up spills immediately with absorbent materials; avoid washing of pavement.
- Pump and maintain septic systems.
- Use alternative deicers such as calcium chloride and magnesium chloride in lieu of sodium based deicers.
- Designate areas for snow storage in upland locations where meltwater can drain onto pervious surfaces away from water resources and wells.
- Discharge of any material other that stormwater to the stormwater system (drywell) is not permitted.
- Sweep any pavement areas regularly.
- Repair / replace any areas of scour or erosion within lawns areas.

Stormwater Operations and Maintenance BMP Inspection Form

Project: **136 Oxbow Road** **Date:**

Owner: **By:**

Location: **136 Oxbow Road**
Wayland, MA

Rain Events: **24 hrs**
72 hrs

Roof Drains Downspouts / Gutters

Gutter condition or debris present (y/n)	Downspout Connected (y/n)	Evidence of Overflow (y/n)	Action Required

Drywells

Surface Conditions	Sediment Depth	Water Depth	Action Required

Rain Garden

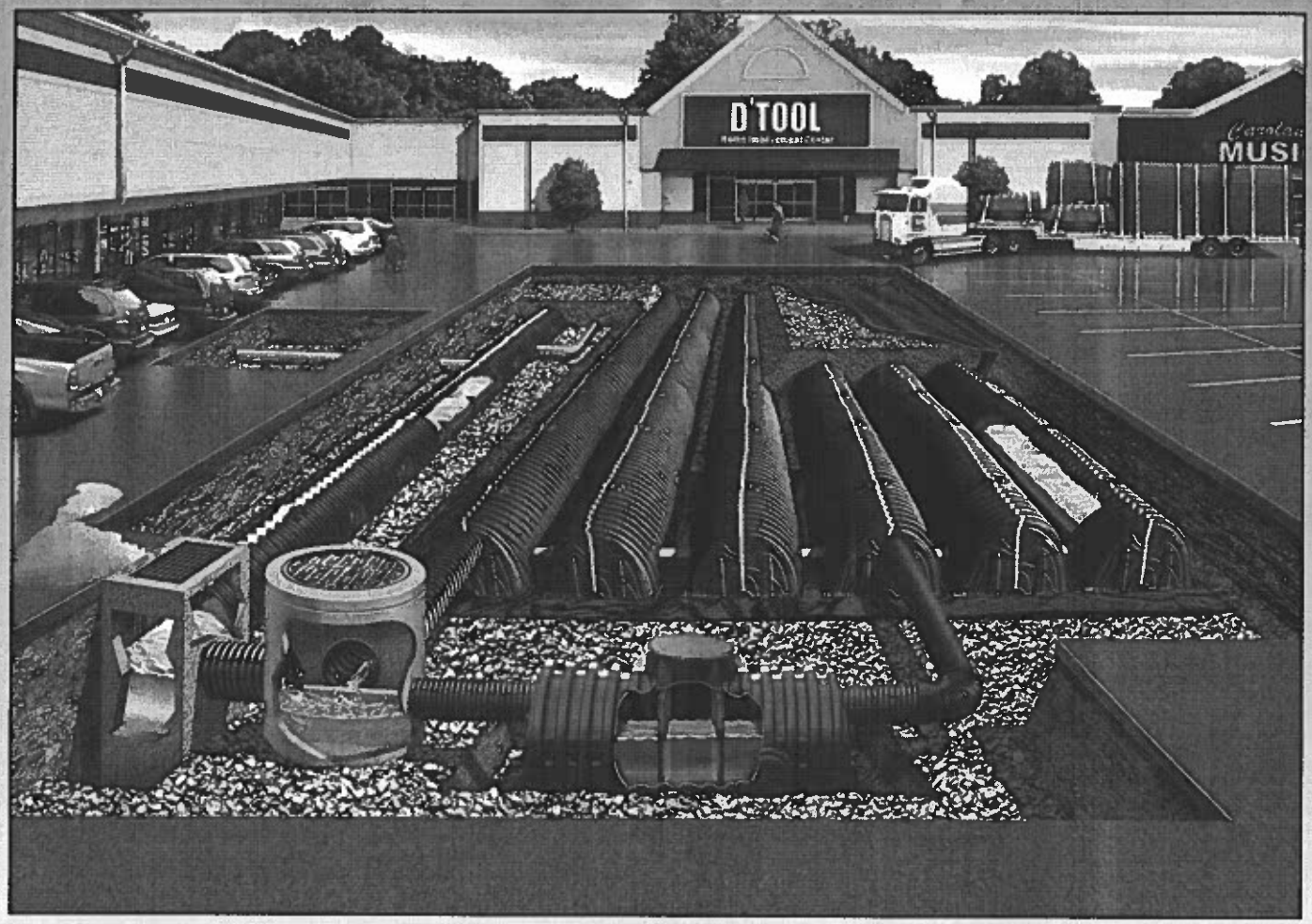
Surface / Vegetation Conditions	Sediment Depth	Water Depth	Action Required

Pavement / Vegetation

	Condition	Action Required
Driveway		
Site Vegetation		

Comments: _____

Contactor® & Recharger®
Stormwater Chambers The Chamber With The Stripe®



Operation and Maintenance Guidelines

CULTEC™

Operation & Maintenance

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pre-treatment device). CCTV inspection of this row can be deployed through this access port to determine if any sediment has accumulated in the inlet row.

B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.

1. Manhole Access

This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. **StormFilter Access**
Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.

B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.

C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.

D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. Minor Maintenance
The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris as required.

B. Major Maintenance
The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

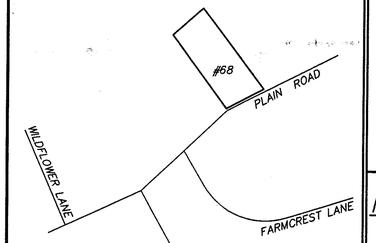
Major Maintenance *(continued)*

	Frequency	Action
Inlets and Outlets	Every 3 years	• Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	• Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	• Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	• Clean stormwater management chambers and feed connectors of any debris. • Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	• Clean stormwater management chambers and feed connectors of any debris. • Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. • Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique.
	45 to 50 years after commissioning	• Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. • Attain the appropriate approvals as required. • Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1st year	• Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	• Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	• Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

CULTEC
Chamber of Choice™

CULTEC, Inc.
878 Federal Road • P.O. Box 280 • Brookfield, CT 06804
Phone: 203-775-4416 • Toll Free: 800-4-CULTEC • Fax: 203-775-1462
Web: www.cultec.com • E-mail: custservice@cultec.com



LOCUS MAP

N.T.S.

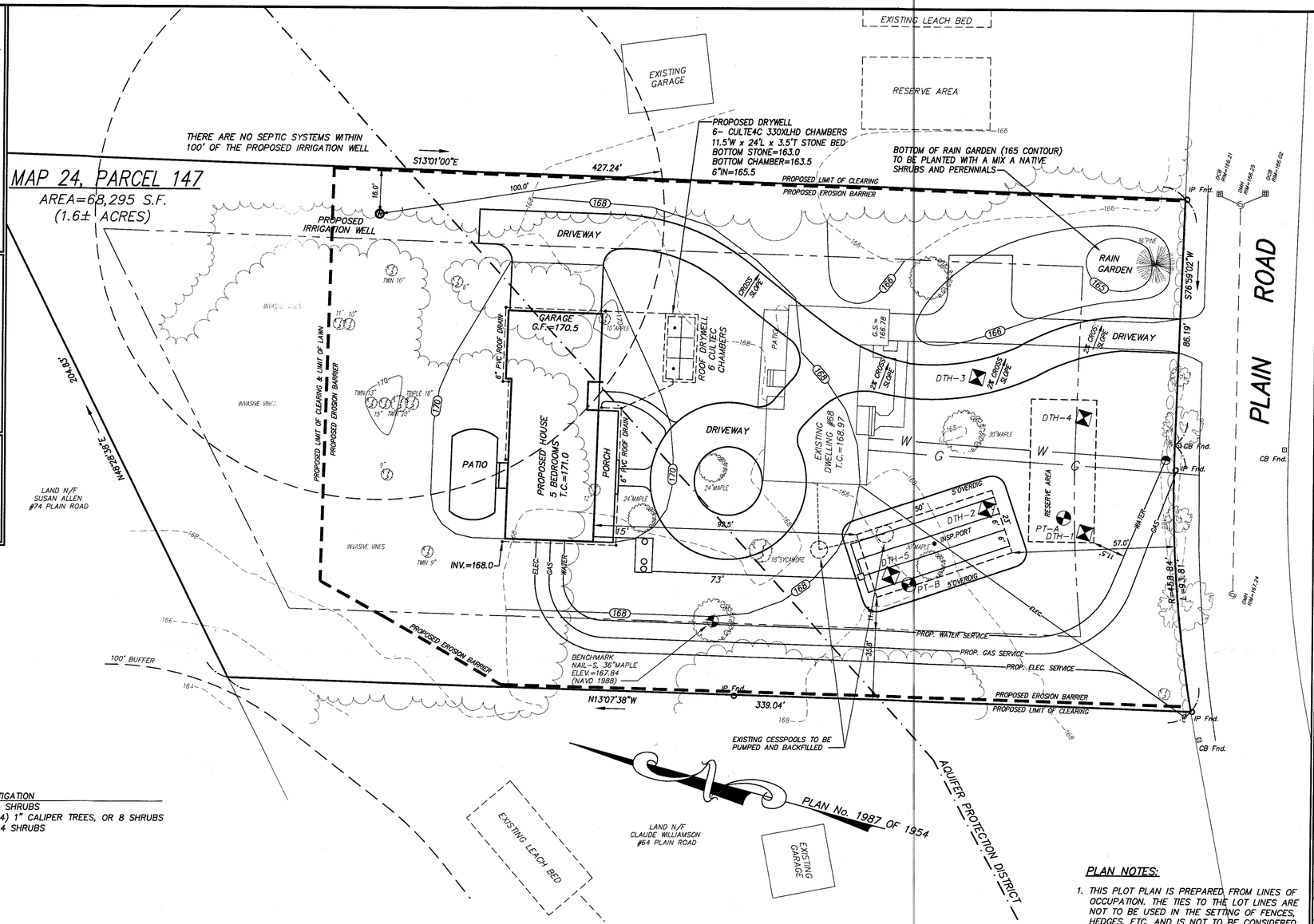
SCHEDULE OF ELEVATIONS

TOP OF FOUNDATION T.C. =	171.0
BASEMENT FLOOR FIN. C.F. =	
INVERT OF PIPE AT FOUNDATION =	166.5
INVERT AT SEPTIC TANK INLET =	166.0
INVERT AT SEPTIC TANK OUTLET =	165.8
INVERT AT DISTRIBUTION BOX INLET =	164.9
INVERT AT DISTRIBUTION BOX OUTLET =	164.7
INVERT AT LEACHING LINES (BEGINNING) =	164.5
INVERT AT LEACHING LINES (END) =	164.25
ELEVATION OF BED BOTTOM =	163.75
FINISH GRADE OVER LEACHING AREA =	168–167

DESIGN CRITERIA

1. ESTIMATED FLOW = 5 BDRMS X 165 GPD/BR=825 GPD
2. DESIGN PERCOLATION RATE = 2 MPI
3. LEACHING AREA CALCULATION =

BED AREA = 50'x23' = 1,150 SF(0.74 GPD/SF)=851 GPD



PROPOSED TREE REMOVAL SUMMARY

TREE REMOVAL	REQUIRED MITIGATION
SMALL TREES: 6	(2) 1" CALIPER TREES, OR 4 SHRUBS
MEDIUM TREES: 7	(2) 2" CALIPER TREES, OR (4) 1" CALIPER TREES, OR 8 SHRUBS
LARGE TREES: 7	(7) 2" CALIPER TREES, OR 14 SHRUBS

TANK SIZING:

5 BEDROOMS = 550 GPD
TWO COMPARTMENT TANK
FIRST COMPARTMENT=2 DAYS STORAGE=1100 GPD
SECOND COMPARTMENT=1 DAY STORAGE=550 GPD
1,650 GPD REQUIRED. 2,000 GPD PROVIDED (1330/670)

SITE PLAN

SCALE: 1" = 20'

GENERAL NOTES:

1. Contractor shall call Digsafe at (888) 344–7233 a minimum of 72 hours prior to commencing any construction activities on site.
2. Inspections by Design Engineer and Board of Health are as required by the Board of Health.
3. This plan was prepared for the design of the subsurface sewage disposal system only and is based on the subsurface explorations and percolation tests listed below.
4. System was designed only to accomodate sanitary sewage associated with normal domestic usage, consisting of water carried putrescible waste, and for flows indicated in the design criteria.
5. The system must be vented through the buildings plumbing in accordance with the state building code.
6. Plans show only features that were visually apparent on the date of the topographic survey, and the absence of subsurface structures, utilities, etc. is not guaranteed.
7. Contractor to determine if site conditions are suitable for construction of proposed system, and must promptly notify the Design Engineer and Owner, in writing, of any plan deficiencies, unforseen subsurface conditions, or required changes.
8. There are no wells located within 100 feet of the proposed leaching area or within 100 feet of the proposed septic tank (except as shown).
9. The subject property is not located within a Zone II of a public drinking water supply well.
10. All construction is to conform to the requirements of the Massachusetts Environmental Code, Title V, and the town of WAYLAND Board of Health regulations.
11. There are no bordering vegetated wetlands, inland banks, or surface waters within 100' of the proposed system.
12. There are no surface or subsurface drains which are used to lower the ground water.
13. All elevations refer to TBM 36" MAPLE, NAIL EL.=167.84
14. For proper performance, septic tank should be pumped annually.
15. System cannot be backfilled or concealed until design firm and board of health have inspected the system and permission to backfill has been given.
16. Design firm must prepare and submit "As–Built" plan to Board of Health. This plan must certify that the system was installed in accordance with state and local regulations and that it complies with the proposed plan.
17. Property lines are approximate and are not to be used for boundary survey purposes. Surface features and topography outside of work area are approximate.

TECHNICAL NOTES:

1. Building sewer shall be in accordance with state plumbing code and have a minimum of 4" of cover in landscaped areas. A minimum of 12" of cover and/or appropriate sleeving shall be used in areas subject to vehicular traffic.
2. All tanks, including septic tanks, distribution boxes, dosing chambers, and grease traps shall be either watertight through manufacturer's specification and warranty; or made watertight by the manufacturer or other individual by means and persons as approved in 310 CMR 15.221. Septic tank shall be constructed and placed in accordance with 310 CMR 15.223 through 310 CMR 15.228.
3. Septic tanks shall have at least three (3) 20" manholes with at least one (1) of these manholes located no more than 6" below finish grade. (Systems over 1,000 gpd shall have access ports at both the inlet and outlet tees.)
4. Distribution box ("d–box") shall be of watertight construction, installed level on a firm base, and installed in accordance with 310 CMR 15.232.
5. Septic tank covers and d–box are to be brought within 6" and 9" of finish grade respectively by the use of riser sections.
6. When the soil absorption system (SAS) is to be dosed or the slope of the inlet pipe exceeds 0.08 feet per foot, an inlet tee, baffle or splash plate extending to one inch above the outlet invert elevation shall be provided to dissipate velocity of the influent.
7. When the SAS is installed within the top and subsoil layers of above natural grade, all topsoil and subsoil shall be removed below and laterally a minimum of 5 feet surrounding the SAS. Removed material shall be replaced with clean granular material in accordance with 310 CMR 15.255(3).
8. All disturbed areas shall be loamed, seeded, and maintained so as to prevent erosion.
9. All native soil interfaces which will contact the SAS shall be scarified prior to placement of stone.

PERCOLATION TESTS

HOLE NO. & DATE	TOP ELEVATION	DEPTH (In.)	SATURATION (Min.)	12"–9" DROP (Min.)	9"–6" DROP (Min.)	PERC. RATE (Min./In.)
PT–A 12/21/20	166.7	60"	COULD NOT SATURATE			<2 MIN/IN
PT–B 12/21/20	168.0	48"	COULD NOT SATURATE			<2 MIN/IN

DEEP OBSERVATION HOLE LOG

NO., DATE & ELEV.	DEPTH (In.)	SOIL HORIZON	TEXTURE (USDA)	COLOR (MUNSELL)	SOIL MOTTLING	OTHER
DTH–1	0–15"	Ap	SANDY LOAM	10YR3/2		
12–21–2020	15–42"	Bw	LOAMY SAND	10YR6/8		
166.7	42–120"	C1	MED.–CRS. SAND	2.5Y5/4	NONE	
PARENT MATERIAL: GLACIAL TILL	DEPTH TO BEDROCK: –	STANDING WATER: –	WEEPING FROM PIT FACE: –	ESHWT: 156.7		
DTH–2	0–32"		FILL			
12–21–2020	32–53"	Bw	LOAMY SAND	10YR6/8		
167.5	53–124"	C1	MED.–CRS. SAND	2.5Y5/4		
PARENT MATERIAL: GLACIAL TILL	DEPTH TO BEDROCK: –	STANDING WATER: –	WEEPING FROM PIT FACE: –	ESHWT: 157.2		
DTH–3	0–61"		FILL			
12–21–2020	61–89"	Bw	LOAMY SAND	10YR6/8		
167.3	89–108"	C1	LOAMY SAND	10YR6/4		
	108–120"	C2	MED.–CRS. SAND	2.5Y5/4	NONE	
PARENT MATERIAL: GLACIAL TILL	DEPTH TO BEDROCK: –	STANDING WATER: –	WEEPING FROM PIT FACE: –	ESHWT: 157.3		
DTH–4	0–18"	Ap	SANDY LOAM	10YR3/2		
12–21–2020	18–35"	Bw	LOAMY SAND	10YR6/8		
166.8	35–121"	C1	MED.–CRS. SAND	2.5Y5/4	NONE	
PARENT MATERIAL: GLACIAL TILL	DEPTH TO BEDROCK: –	STANDING WATER: –	WEEPING FROM PIT FACE: –	ESHWT: 158.7		
DTH–5	0–10"	Ap	SANDY LOAM	10YR3/2		
12–21–2020	10–26"	Bw	LOAMY SAND	10YR6/8		
168.0	26–120"	C1	MED.–CRS. SAND	2.5Y5/4	NONE	
PARENT MATERIAL: GLACIAL TILL	DEPTH TO BEDROCK: –	STANDING WATER: –	WEEPING FROM PIT FACE: –	ESHWT: 158.0		

TESTS CONDUCTED BY: MIKE SULLIVAN
TESTS OBSERVED BY: DARREN MacCAUGHEY DATE: 12–21–2020

I certify that I have passed the examination approved by the department of Environmental Protection and that the above analysis has been performed by me consistent with the required training, expertise, and experience described in 310 CMR 15.018(2).

Certified:

PLAN NOTES:

1. THIS PLOT PLAN IS PREPARED FROM LINES OF OCCUPATION. THE TIES TO THE LOT LINES ARE NOT TO BE USED IN THE SETTING OF FENCES, HEDGES, ETC. AND IS NOT TO BE CONSIDERED A PROPERTY LINE SURVEY.
2. THIS PLAN IS NOT FOR THE PURPOSE OF BUILDING HEIGHT COMPLIANCE.

SEPTIC TANK NOTES

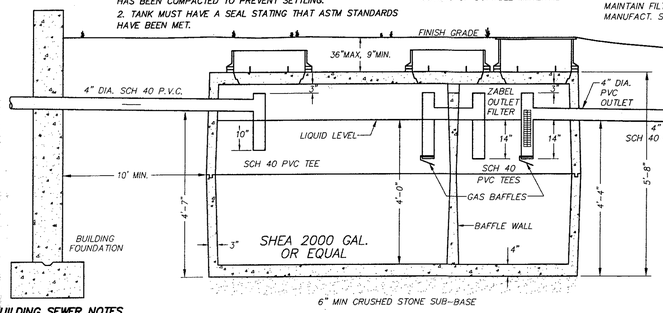
1. MUST BE WATER TIGHT AND SET ON A LEVEL BASE THAT HAS BEEN COMPACTED TO PREVENT SETTLING.
2. TANK MUST HAVE A SEAL STATING THAT ASTM STANDARDS HAVE BEEN MET.

THREE 20" MANHOLES WITH READILY REMOVABLE IMPERMEABLE COVERS OF DURABLE MATERIAL

IF A FILTER IS INSTALLED: BRING COVER OVER FILTER TO FINISH GRADE. MAINTAIN FILTER PER MANUFACT. SPECS./APPROVAL

SYSTEM PROFILE

NOT TO SCALE

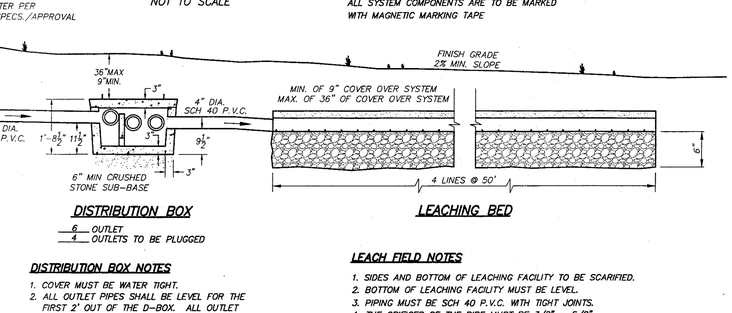


BUILDING SEWER NOTES

1. SEWER LINE MUST BE LAID ON A FIRM COMPACTED BASE.
2. PIPE MUST BE SLOPED AT A MIN. OF 1% (2% PREFERRED)
3. PIPE MUST BE LAID ON A CONTINUOUS UNIFORM GRADIENT.

SEPTIC TANK

PRECAST REINFORCED CONCRETE
CAPACITY OF TANK = 2000 GAL.



DISTRIBUTION BOX

6 OUTLET
4 OUTLETS TO BE PLUGGED

DISTRIBUTION BOX NOTES

1. COVER MUST BE WATER TIGHT.
2. ALL OUTLET PIPES SHALL BE LEVEL FOR THE FIRST 2' OUT OF THE D–BOX. ALL OUTLET PIPES TO BE AT THE SAME ELEVATION.
3. SOIL MUST BE COMPACTED UNDER "D" BOX TO PREVENT SETTLING.

NOTE:

ALL SYSTEM COMPONENTS ARE TO BE MARKED WITH MAGNETIC MARKING TAPE

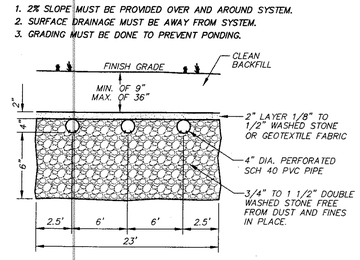
LEACHING BED

LEACH FIELD NOTES

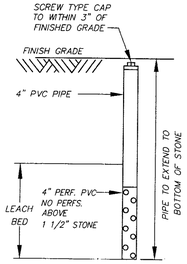
1. SIDES AND BOTTOM OF LEACHING FACILITY TO BE SCARIFIED.
2. BOTTOM OF LEACHING FACILITY MUST BE LEVEL.
3. PIPING MUST BE SCH 40 P.V.C. WITH TIGHT JOINTS.
4. THE ORIFICES OF THE PIPE MUST BE 3/8" – 5/8".
5. VENT REQUIRED IF LEACH LINES ARE GREATER THAN 50'.

FINAL GRADING NOTES

1. 2% SLOPE MUST BE PROVIDED OVER AND AROUND SYSTEM.
2. SURFACE DRAINAGE MUST BE AWAY FROM SYSTEM.
3. GRADING MUST BE DONE TO PREVENT PONDING.



LEACHING BED CROSS SECTION



INSPECTION PORT

NOT TO SCALE

APPLICANT / OWNER
TERRA HOLDINGS, LLC
215 BOSTON POST ROAD
SUDBURY, MA
DEED BK. 76839, PG. 481

LOCATION
68 PLAIN ROAD
WAYLAND, MA
ASSESSORS MAP 24 & PARCEL 127

NO.	DATE:	REVISION:	BY:
		RECEIVED	
		FEB 16 2021	
		WAYLAND CONSERVATION COMMISSION	

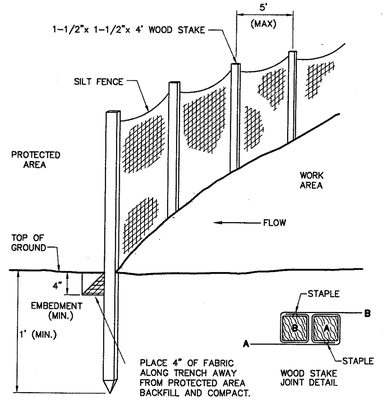
PROPOSED SEWAGE DISPOSAL SYSTEM

SULLIVAN, CONNORS AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST RD. SUDBURY, MA. 01776
PHONE: 978-443-9566 FAX: 978-443-8915

COMMONWEALTH OF MASSACHUSETTS VITO COLCHIMA No. 47035 REGISTERED PROFESSIONAL ENGINEER

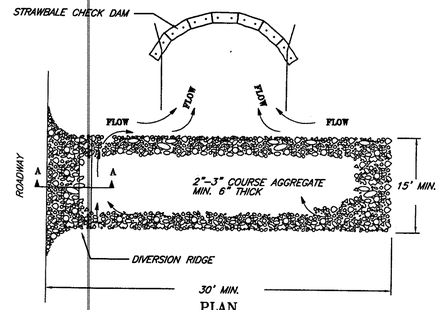
1-22-21

DATE: 1/22/2021 SHEET 1 OF 2



EROSION BARRIER/SILT FENCE DETAIL

NOT TO SCALE

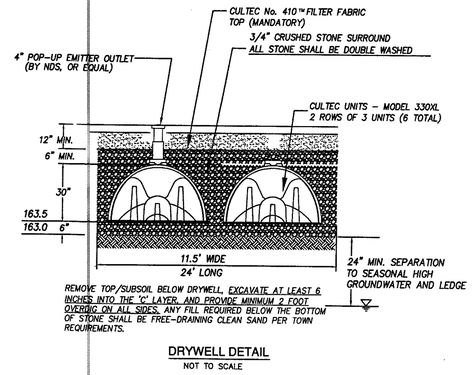


PLAN

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY
GRAVEL
CONSTRUCTION
ENTRANCE/EXIT



REMOVE TOP/SUBSOIL BELOW DRYWELL. EXCAVATE AT LEAST 6 INCHES INTO THE 'C' LAYER, AND PROVIDE MINIMUM 2 FOOT OVERHANG ON ALL SIDES. ANY FILL REQUIRED BELOW THE BOTTOM OF STONE SHALL BE FREE-DRAINING CLEAN SAND PER TOWN REQUIREMENTS.

DRYWELL DETAIL

NOT TO SCALE

SEDIMENTATION & EROSION CONTROL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CHAPTER 193 PERMIT.
2. PRIOR TO THE COMMENCEMENT OF WORK, SEDIMENT BARRIERS SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT, AND AS INDICATED ON THE PLANS. ADDITIONAL BARRIERS, SILT FENCE OR BERMS SHALL BE LOCATED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER, HIS REPRESENTATIVES, OR THE LOCAL AUTHORITY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT SEDIMENTATION AND EROSION CONTROLS UNTIL WORK IS COMPLETE AND ALL AREAS HAVE BEEN PERMANENTLY STABILIZED.
4. THE CONTRACTOR SHALL INSPECT SEDIMENTATION AND EROSION CONTROLS ON A WEEKLY BASIS AND IMMEDIATELY AFTER EACH RAINFALL; REPAIRS SHALL BE MADE BY THE END OF THE WORKING DAY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR, AS REQUIRED BY THE LOCAL AUTHORITY OR AS DIRECTED BY THE ENGINEER.
5. THE CONTRACTOR SHALL BE PREPARED TO ALLOW WORK TO WAIT A DAY OR TWO AFTER RAIN EVENTS TO ALLOW SURFACE SOILS TO DRY.
6. NO MATERIALS SUBJECT TO EROSION SHALL BE STOCKPILED OVERNIGHT WITHIN 100 FEET OF A WETLAND UNLESS PROTECTED.
7. DISTURBED AREAS SHALL BE STABILIZED BY LOAMING AND SEEDING, OR BY ANOTHER APPROVED METHOD, AS SOON AS POSSIBLE AFTER THE FINISHED GRADE HAS BEEN MET. IF FINAL GRADING DOES NOT OCCUR DURING THE GROWING SEASON, THESE AREAS SHALL BE MULCHED WITH HAY AND SECURED.
8. STREET SWEEPING IN THE VICINITY OF THE PROJECT AREA SHALL BE PERFORMED AS NEEDED UNTIL THE PROJECT LIMITS HAVE BEEN STABILIZED. ALL SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS OR PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
9. REFUELING SHALL BE PERFORMED OFFSITE TO THE MAXIMUM EXTENT PRACTICAL. IF ON-SITE REFUELING IS REQUIRED IT SHALL BE PERFORMED OUTSIDE THE BUFFER AND A SPILL KIT SHALL BE KEPT ON-SITE AT ALL TIMES.
10. SILT SACKS TO BE PLACED IN ANY CATCH BASIN WITHIN 100 FEET OF THE SITE AND PROPERLY MAINTAINED THROUGHOUT CONSTRUCTION.
11. MAINTAIN ALL SOIL STOCKPILES WITHIN LIMIT OF EROSION BARRIERS AND OUTSIDE 100 FOOT BUFFER ZONE.

APPLICANT / OWNER
TERRA HOLDINGS, LLC
215 BOSTON POST ROAD
SUDBURY, MA
DEED BK. 76839, PG. 481

LOCATION
68 PLAIN ROAD
WAYLAND, MA
ASSESSORS MAP 24 & PARCEL 127

NO.	DATE:	REVISION:	BY:

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
1-22-21

PROPOSED SEWAGE DISPOSAL SYSTEM

SULLIVAN, CONNORS
AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST RD. SUDBURY, MA. 01776
PHONE: 978-443-9566 FAX: 978-443-8915

DATE: 1/22/2021 SHEET 2 OF 2

Sullivan, Connors & Associates

Land Surveying and Civil Engineering

Wayland Conservation Commission
Town Building
41 Cochituate Road
Wayland, MA 01778

February 17, 2021

Attention: **Ms. Linda Hansen, Conservation Administrator**

Subject: **Chapter 193 Application**
105 Plain Road, Wayland, MA

Dear Ms. Hansen:

On behalf of the applicant (Tamposi Brothers I, LLC), Sullivan Connors & Associates, Inc., is pleased to submit the enclosed Chapter 193 Application related to the above referenced project. Please find the enclosed.

1. Copies of the application forms and documentation package:
   - Completed Chapter 193 Application & Checklist;
   - Stormwater Management Report:
     - Project narrative
     - Locus Mapping
     - Documentation of MassDEP Stormwater Standards
     - Drainage Pipe Sizing Calculations
     - Stormwater Operations and Maintenance Plan
     - Construction Period Stormwater Pollution Prevention Plan

2. Copies of the Proposed Definitive Plan, Cluster Site Plan of Emeline Path, prepared by Sullivan Connors & Associates, Inc., dated April 20, 2020, and revised through 2/10/2021.

3. A check in the amount of $100.

The proposed project includes a Conservation Cluster Subdivision at 105 Plain Road, Wayland. The project would create two (2) residential lots. Lot 1 near Plain Road would contain and preserve the existing historic home at #105 Plain Road. The intent is to not only preserve the existing home, but also the existing view and appearance from the public roadway. Lot 2 is located to the rear, and would contain four detached dwelling units. The work would also include a 495-foot long private road, utility infrastructure, stormwater management, septic system, and miscellaneous site work as shown on the attached plans. The proposed development would preserve roughly half of the lot area through either Open Space Land or No Disturb Easements. See the attached reports and plans for additional details.

We look forward to discussing the proposed project at the next available meeting date, and should you have any questions please contact our office.

Sincerely,
Sullivan Connors & Associates, Inc.

Vito Colonna, PE

121 Boston Post Road • Sudbury, Massachusetts 01776
TEL (978) 443-9566 • FAX (978) 443-8915

TOWN OF WAYLAND
41 COCHITUATE ROAD
WAYLAND, MASSACHUSETTS 01778

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw

A. General Information

1. Project Location

105 Plain Road — a. Street Address
Wayland — b. City/Town
01778 — c. Zip code
Map 20, Lot 30 — d. Parcel/ Lot Number

2. Applicant:

Tamposi Brothers I, LLC — a. First Name
b. Last Name
32 Pine Hill Road, Unit A — c. Street Address
Nashua, NA 03063 — e. State
f. Zip Code
d. City
978-419-1699 — g. Work/ Cell Phone #
jake.tamposi@gmail.com — h. Email Address

3. Property Owner (required if different from applicant):

Same as applicant — a. First Name
b. Last Name
c. Street Address
e. State
f. Zip Code
d.City
g. Work/ Cell Phone #
h. Email Address

4. Representative (if any):

Vito — a. First Name
Colonna — b. Last Name

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw

Sullivan Connors & Associates, Inc.
c. Company

121 Boston Post Road
c. Street Address

Sudbury, MA 01776 508-393-9727
e. State f. Zip Code d.City g. Work/ Cell Phone #

vc@csei.net
h. Email Address

5a. Project Type Checklist (check all that applies):

1. [X] Creation of new or increasing existing impervious surface of 500 sq. ft. or more.

   Impervious Surface: Is any material or structure on or above the ground that prevents water infiltration to the underlying soils. Impervious surface includes without limitation roads, paved parking lots, sidewalks, stone patios, decking, and rooftops.

2. [X] Alteration and/or land disturbance of at least 5,000 sq. ft. or 10% of the parcel; whichever is less.

   Alteration and/or land disturbance as defined in Chapter 193 Bylaw.

5b. General Project Description:

Proposed Conservation Cluster Subdivision to create two (2) lots. Lot 1 would contain and preserve the existing historic home at #105 Plain Road, and Lot 2 would contain four proposed dwelling units. The work would also include a 495 foot long private road, utility infrastructure, stormwater management, septic system, and miscellaneous site work as shown on the attached plans. The proposed development would preserve roughly half of the lot area through either Open Space Land or No Disturb Easements. See the attached reports and plans for additional details.

B. Additional Information

By submitting an application for coverage under the Stormwater Management and Land Disturbance Permit, the Applicant agrees to the following:

1. At a minimum, the proposed project complies with the performance standards of the most recent version of the Massachusetts Stormwater Management Handbook including but not limited to:

   a. Employing environmentally sensitive site design
   b. Evaluation of Low Impact Development practices
   c. Incorporation of source controls of contaminants and employing BMPs to minimize stormwater pollution
   d. Sizing of water quality volume of BMPs are based on 1-inch of runoff
   e. Methodology for hydrologic analyses (if necessary) is based on TR-55/TR-20 methodology
   f. Designing redevelopment of existing sites must provide a net improvement to stormwater conditions at the site.

2. The activity shall not increase either the rate or volume of stormwater runoff leaving the site, nor shall it alter stormwater flow to any adjoining properties, public ways, or any wetland resource areas, unless otherwise permitted based on improvements over existing conditions.

Please check all that apply to this project:

Roadway Drainage

- [X] ~~Roof drains~~ emptying into dry wells/recharge basins
- [ ] Grassed swales constructed
- [ ] Porous pavement installed; _____ sq. ft.
- [ ] Water quality swale
- [ ] Rain barrels/cisterns for irrigation
- [X] Other methods (please list/describe): Hydrodynamic Separators

3. The Applicant shall provide and maintain Erosion and Sedimentation controls as necessary until the site is permanently stabilized. BMP's selected for erosion controls shall be chosen to minimize site disturbance from erosion control installation. As soon as the site is stabilized, such measures shall be removed.

   Please check all that apply to this project:

   - [X] Sediment filter fence with either hay bales or straw wattles
   - [ ] Mulch filled fabric sock
   - [X] Construction entrance
   - [X] Temporary vegetative cover – mulch, netting
   - [X] Permanent vegetative cover – hydro seeding, seeding, sodding
   - [ ] Slope stabilization
   - [ ] Retaining Walls
   - [ ] Slope drains
   - [ ] Other methods (please list/describe): _____

4. The Applicant shall ensure that the site and stormwater management systems are perpetually inspected and maintained to function as designed.

   Please check all that apply to this project:

   - [X] Visual inspections by contractor
   - [X] Visual inspections by homeowner's Association
   - [X] Operation and Maintenance Plan
   - [ ] Maintenance contract for stormwater components
   - [ ] Other methods (please list/describe): _____

5. Other Jurisdiction

   - [ ] Massachusetts Wetlands Protection Act (310 CMR 10.00) and it's implementing Regulations
   - [ ] Wayland's Wetlands and Water Resource Protection Bylaw – Chapter 194

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw

- [X] Subdivision Approval
- [X] Board of Health Permit
- [X] Special Permit or Site Plan Review
- [X] Building Permit

C. Fees

Applicants must submit a $100 application fee.

D. Signatures and Submittal Requirements

I certify that I have reviewed the design standards above and the information contained herein, including all attachments, is true, accurate, and complete to the best of my knowledge. Further, I grant the Wayland Conservation Commission and its authorized Agents permission to enter the property to review this application and make inspections before, during and after construction. I **have included a check for the application fee of $100.**

Signature of Applicant — Date: 2/17/21

Signature of Property Owner (if different) — Date

Signature of Representative (if any) — Date: 2-17-21

For Conservation Commission:
Two copies of the completed Stormwater Management and Land Disturbance Bylaw (Chapter 193), including plans and documents, and the bylaw fee payment, to the Conservation Commission by mail or hand delivery.

TOWN OF WAYLAND
41 COCHITUATE ROAD

WAYLAND, MASSACHUSETTS 01778

CHAPTER 193 APPLICATION
Stormwater Management and Land Disturbance Bylaw Checklist

Submittal Requirements:

The applicant shall file eight copies of the completed application package to the Conservation Commission for a Stormwater Management and Land Disturbance Permit. The application package shall include:

[X] Application form with original signatures of all owners and representatives.

Two copies of the completed application form

Two copies of 11x17 size site plans

One copy of a full size site plan.

All documents emailed t rbrown@wayland.ma.us

[ ] Number and size (dbh) of proposed trees to be removed. Replanting will be based on Replacement Tree and Shrub Schedule.

[X] Locus map showing location of the property.

[X] Any and all applications fees ($100 transmittal fee)

[X] Stormwater Management and Land Disturbance Plan (per the Massachusetts Stormwater Management Regulations and Massachusetts Stormwater Management handbook as applicable for the scope of the project.)

[X] Supporting Stormwater Management Report and engineering calculations (per the Massachusetts Stormwater Management Regulations and Massachusetts Stormwater Management handbook as applicable for the scope of the project.) The report must contain a narrative describing the project and how the project will comply with the Wayland Stormwater Management and Land Disturbance Bylaw. List any requested waivers and the reasons the standards cannot be met.

[X] Stormwater Pollution Preventative Plan (SWPPP) if coverage is required under the U.S. EPA Construction General Permit, Multi-Sector Permit or an individual permit under the NPDES Phase II requirements.

[X] Long-term Pollution Prevention Plan

[X] Erosion and Sediment Control Plan

[X] Stormwater System Operation and Maintenance Plan

The property owner, as well as the applicant and/or representative (if different from owner) must sign this checklist and all other applicable applications. The property owner, by signing this checklist and the applications, acknowledges that the Commission and Staff may enter the property to inspect the premises as part of the assessment of the application.

Signature of Property Owner

2/17/21
Date

I certify under penalty of law that this document and all its attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Signature of Applicant

2/17/21
Date

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

I CERTIFY THAT THE ACTUAL SURVEY OF THE BOUNDARY LINES OF THIS TRACT OF LAND WAS MADE IN ACCORDANCE WITH THE SPECIFICATIONS IN "THE ETHICAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS"

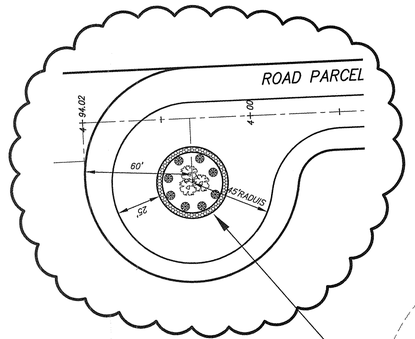
2/9/21

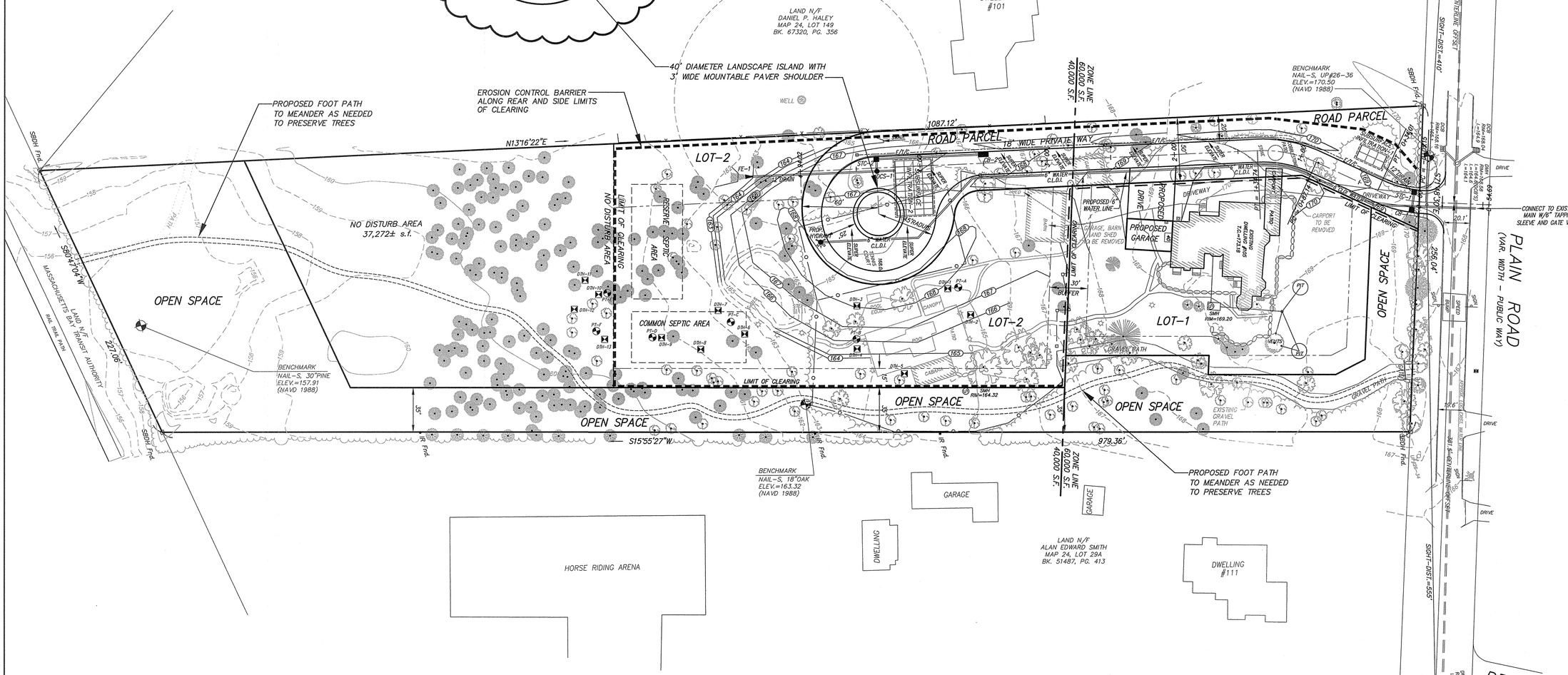
VAROUJAN H. HAGOPIAN, P.L.S. 49665

COMMONWEALTH OF MASSACHUSETTS
VAROUJAN H. HAGOPIAN
No. 49665
PROFESSIONAL LAND SURVEYOR

OPEN LAND SUMMARY

TOTAL LOT AREA = 239,315 S.F.
SITE AREA MINUS ROAD AREA = 206,566 S.F.
REQUIRED OPEN LAND = 72,298 S.F. (35%)
PROPOSED OPEN LAND = 72,315 S.F. (35%)
NO DISTURB AREA = 46,092 S.F.
TOTAL PROTECTED LAND = 118,407 S.F. (57%)





APPROVED SPECIAL PERMIT
CONSERVATION CLUSTER DEVELOPMENT
WAYLAND PLANNING BOARD

DATE: _____

SULLIVAN CONNORS & ASSOCIATES INC. DOES NOT GUARANTEE THE LOCATION OF UNDERGROUND UTILITIES, THAT ALL UNDERGROUND UTILITIES HAVE BEEN SHOWN, OR THE CHARACTER OF SUBSURFACE GROUND CONDITIONS. THE CONTRACTOR SHALL VERIFY THE LOCATION, SIZE, AND ELEVATION OF UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR IS CAUTIONED TO CONTACT THE TOWN DPW AND DIG SAFE (1–888–344–7233) FOR UTILITY LOCATIONS 72 HOURS BEFORE EXCAVATION.

CONSERVATION CLUSTER DEVELOPMENT DISTRICT
ZONING BYLAW SECT.198–1803.1.3 YIELD CALCULATION

SECT.198–1803.1.3.(a) CONVENTIONAL LAYOUT YIELDS = 4 LOTS

SECT.198–1803.1.3.(b)
TOTAL SITE AREA = 239,315 S.F.
LAND AREA WITHIN FLOOD PLAIN AND WETLANDS = 0 S.F.
239,315 S.F. x 90% = 215,384 S.F.
215,384 S.F. / 40,000 S.F = 5.38 LOTS

ZONING BYLAW SECT.198–1803.3. LOT IN TWO OR MORE DISTRICTS

ALL OF THE LAND SHALL BE CONSIDERED LYING IN THE DISTRICT THAT CONTAINS MORE THAN 75% OF THE TOTAL AREA SHOWN AS BUILDING LOTS.

TOTAL BUILDING LOT AREA = 134,251 S.F. (EXCLUDES ROAD AND OPEN SPACE)
75% OF BUILDING LOT AREA = 100,689 S.F.
BUILDING LOT AREA IN 40,000 DISTRICT = 100,738 S.F. > 75%
BUILDING LOT AREA IN 60,000 DISTRICT = 33,513 S.F. < 25%
ALL OF THE LAND CONSIDERED LYING WITHIN THE 40,000 S.F. DISTRICT

LEGEND

- DRAIN MAN HOLE
- DRAINAGE LINE
- CATCH BASIN
- SEWER LINE
- SEWER MAN HOLE
- BITUMINOUS CURBING
- EDGE OF PAVEMENT
- GUARD RAIL
- APPROX. WATERLINE
- HYDRANT
- WATERGATE
- APPROX. GAS LINE
- GAS GATE
- UTILITY POLE & GUY WIRE
- CHAIN LINK FENCE
- LIGHTPOST
- HANDICAP SPACE
- ELECTRIC TRANSFORMER
- SIGN
- VERTICAL BENCHMARK
- DECIDUOUS TREE >8"
- CONIFEROUS TREE >8"
- TREELINE
- SPOT GRADE
- WETLAND LINE
- TELEPHONE MAN HOLE

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
2-9-21

GRAPHIC SCALE: 1"=40'
0 10 20 30 40 50 75 100 150 200 FEET
0 5 10 15 20 30 40 50 60 METERS

GENERAL NOTES:

1. THIS PLAN IS BASED ON AN ON–GROUND SURVEY BY SULLIVAN, CONNORS & ASSOCIATES PERFORMED ON FEBRUARY 2020.

2 LEGAL STATUS OF EASEMENTS AND WAYS, NOT DETERMINED BY THIS SURVEY.

3. NO WETLANDS LOCATED ON–SITE.

ZONED: SINGLE RESIDENCE
CONSERVATION CLUSTER
AREA = 20,000 sf
FRONTAGE = 50 feet
SETBACKS:
50' TO PERIMETER
15' TO OPEN LAND

NO LOT SHALL BE FURTHER DIVIDED SO AS TO CREATE ADDITIONAL LOTS.

DRAINAGE TABULATION

CB–1, STA. 0+05–L
RIM=168.20
12"OUT=165.20

STC–1 (MODEL 450i)
STA. 0+05–R, RIM=165.25
12"IN=164.75
12"OUT=164.50

SUBSURFACE INFILTRATION SIS–1
6 CULTEC CHAMBERS (330XLHD)
24'x13'X3.5' STONE BED
BOTTOM STONE BED=162.0
BOTTOM OF CHAMBERS=162.5
12" INV. IN=163.75

CB–2, STA. 3+50–L
DOUBLE GRATE INLET
RIM=167.35
12"OUT=164.10

STC–2 (MODEL 450i)
STA. 4+34, RIM=166.5
12"IN=163.25
12"OUT=163.0

SUBSURFACE INFILTRATION SIS–2
39 CULTEC CHAMBERS (330XLHD)
45'x31'X3.5' STONE BED
BOTTOM STONE BED=160.0
BOTTOM OF CHAMBERS=160.5
12" INV. IN=160.7

OCS–1, STA. 4+40
DOUBLE GRATE INLET
RIM=166.7
12"IN=162.7
12"OUT=163.2 (OVERFLOW)
12"OUT=160.9 (DRYWELL)

FES–1
12" OUT=162.2

OWNERS:
TAMPOSI BROTHERS I, LLC
37 REVERE STREET, No. 8
BOSTON, MA 02114

SULLIVAN, CONNORS AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978–443–9566 FAX: 978–443–8915

"DEFINITIVE PLAN"
CLUSTER SITE PLAN
OF
EMMELINE PATH
WAYLAND, MA

REVISED:	DESCRIPTION:
2-9-2021	PLANNING BOARD COMMENTS
1-13-2021	FINALIZE PLAN SET
12-28-2020	MISC. EDITS
10-9-2020	REVISED LAYOUT
9-14-2020	DPW COMMENTS

DRAWN BY: REM | CHECK BY: VC
DATE: APRIL 20, 2020
SCALE: 1"=40' | SHEET 1 OF 3.

SOIL TEST LOGS:

DTH-1 3/31/20		
0-14"	Ap	SANDY LOAM 10YR3/2
14-26"	Bw	LOAMY SAND 10YR6/8
26-67"	C1	CRS. SAND 2.5Y5/4
67-91"	C2	FINE-MED. SAND 10YR6/4
91-120"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 84"		

DTH-2 3/31/20		
0-12"	Ap	SANDY LOAM 10YR3/2
12-27"	Bw	LOAMY SAND 10YR6/8
27-81"	C1	CRS. SAND 2.5Y5/4
81-109"	C2	FINE-MED. SAND 10YR6/4
109-144"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 94"		

DTH-3 3/31/20		
0-13"	Ap	SANDY LOAM 10YR3/2
13-35"	Bw	LOAMY SAND 10YR6/8
35-78"	C1	CRS. SAND 2.5Y5/4
78-95"	C2	LOAMY SAND 10YR6/4
95-120"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 81"		

DTH-4 3/31/20		
0-9"	Ap	SANDY LOAM 10YR3/2
9-22"	Bw	LOAMY SAND 10YR6/8
22-128"	C1	CRS. SAND 2.5Y5/4
MOTTLES AT 87" WATER AT 116"		

DTH-5 3/31/20		
0-24"		FILL
24-125"	C1	CRS. SAND 2.5Y5/4
MOTTLES AT 80" WATER AT 118"		

DTH-6 3/31/20		
0-8"	Ap	SANDY LOAM 10YR3/2
8-25"	Bw	LOAMY SAND 10YR6/8
25-41"	C1	SAND 2.5Y5/4
41-68"	C2	FINE-SAND 10YR6/4
68-115"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 52" WATER AT 83"		

DTH-7 3/31/20		
0-9"	Ap	SANDY LOAM 10YR3/2
9-22"	Bw	LOAMY SAND 10YR6/8
22-38"	C1	CRS. SAND 2.5Y5/4
38-75"	C2	FINE SAND 10YR6/4
75-112"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 55" WATER AT 84"		

DTH-8 3/31/20		
0-9"	Ap	SANDY LOAM 10YR3/2
9-32"	Bw	LOAMY SAND 10YR6/8
32-66"	C1	CRS. SAND 2.5Y5/4
66-118"	C2	FINE SAND 10YR6/4
91-120"	C3	CRS. SAND 2.5Y5/4
MOTTLES AT 56" WATER AT 84"		

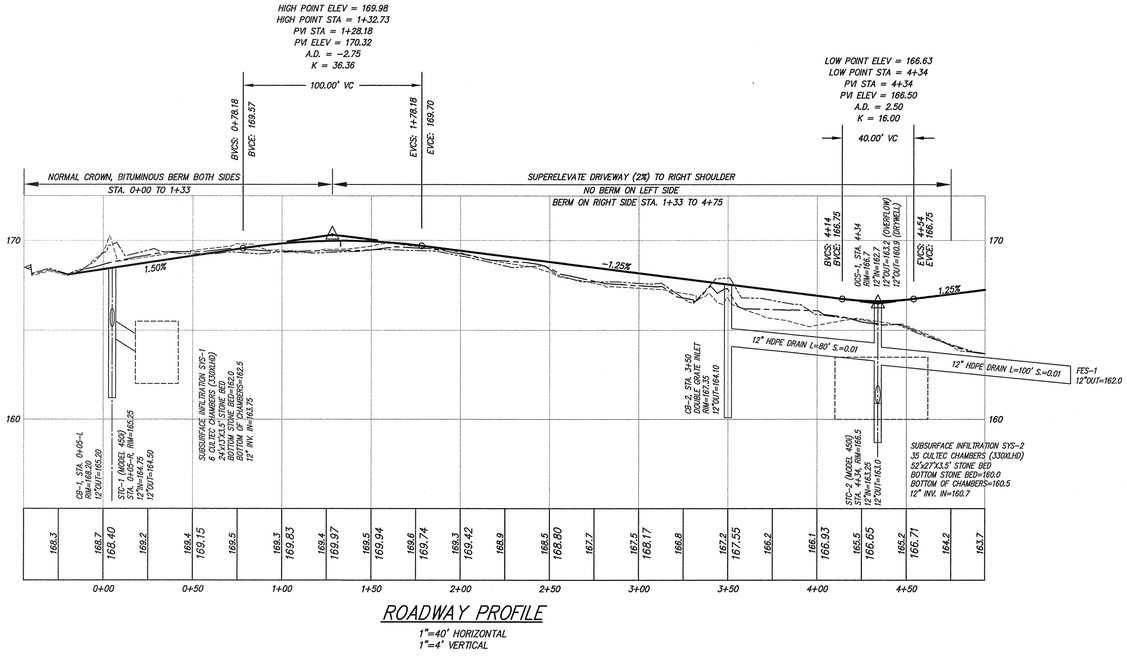
DTH-9 3/31/20		
0-32"		FILL
32-115"	C1	FINE-MED. SAND 10YR6/4
MOTTLES AT 59" WATER AT 88"		

DTH-10 3/31/20		
0-10"	Ap	SANDY LOAM 10YR3/2
10-28	Bw	LOAMY SAND 10YR6/8
28-120"	C1	FINE-MED. SAND 10YR6/4
MOTTLES AT 58" WATER AT 89"		

DTH-11 3/31/20		
0-11"	Ap	SANDY LOAM 10YR3/2
11-29"	Bw	LOAMY SAND 10YR6/8
29-47"	C1	CRS. SAND 2.5Y5/4
47-120"	C2	FINE-MED. SAND 10YR6/4
MOTTLES AT 54" WATER AT 89"		

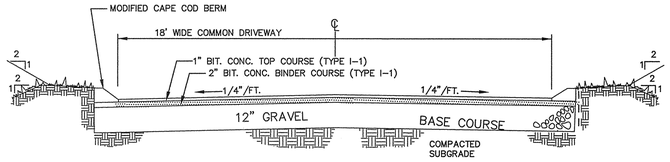
DTH-12 3/31/20		
0-15"	Ap	SANDY LOAM 10YR3/2
15-28"	Bw	LOAMY SAND 10YR6/8
28-47"	C1	CRS. SAND 2.5Y5/4
47-121"	C2	FINE-MED. SAND 10YR6/4
MOTTLES AT 56" WATER AT 84"		

DTH-13 3/31/20		
0-10"	Ap	SANDY LOAM 10YR3/2
10-25"	Bw	LOAMY SAND 10YR6/8
25-43"	C1	CRS. SAND 2.5Y5/4
43-120"	C2	FINE-MED. SAND 10YR6/4
MOTTLES AT 55" WATER AT 86"		



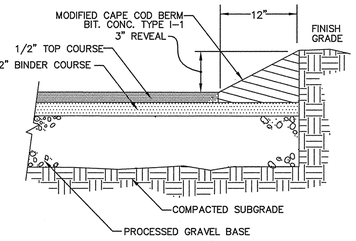
ROADWAY PROFILE

1"=40' HORIZONTAL
1"=4' VERTICAL



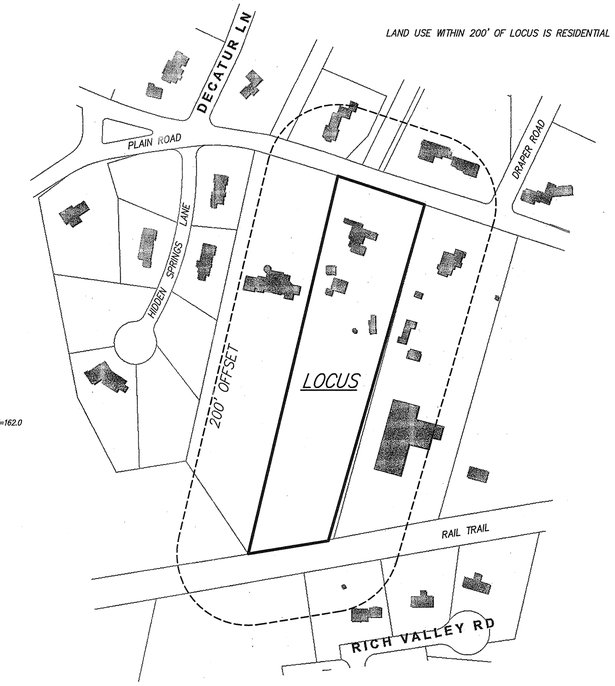
TYPICAL PRIVATE WAY SECTION

NOT TO SCALE



MODIFIED CAPE COD BERM & TYPICAL PAVEMENT STRUCTURE

NOT TO SCALE



LOCUS: 1"=200'

LOCUS: 1"=1000'

CONSTRUCTION NOTES:

1. EXISTING UTILITY LINES SHOWN ON THIS DRAWING ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL CONTACT DIG SAFE: 1-800-344-7233 (72 HOURS BEFORE DIGGING), AND TOWN DPW FOR UTILITY LOCATIONS PRIOR TO EXCAVATION. TEST PITS SHALL BE UTILIZED FOR UTILITY CONNECTIONS.

2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

3. ALL MATERIALS AND CONSTRUCTION PRACTICES SHALL BE IN CONFORMANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE WAYLAND DEPARTMENT OF PUBLIC WORKS, OR THE LATEST EDITION OF THE MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) CONSTRUCTION STANDARDS AND THE MHD "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES", WHICHEVER IS MORE STRINGENT.

4. THE WATER SYSTEM SHALL BE INSTALLED IN COMPLIANCE WITH THE TOWN OF WAYLAND DPW WATER DIVISION RULES AND REGULATIONS. CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE PERMITS (TO BE OBTAINED BY THE CONTRACTOR).

5. THE LAYOUT AND INSTALLATION OF ELECTRIC, GAS, TELEPHONE AND CATV UTILITY CONNECTIONS AND SERVICES SHALL IN ACCORDANCE WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY.

6. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE HIS WORK WITH THE APPROPRIATE HIGHWAY & UTILITY DEPARTMENTS. WORK WITHIN THE HIGHWAY LAYOUT SHALL CONFORM TO THE CONDITIONS OF THE PERMIT ISSUED BY MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION OR THE LOCAL AUTHORITY.

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

I CERTIFY THAT THE ACTUAL SURVEY OF THE BOUNDARY LINES OF THIS TRACT OF LAND WAS MADE IN ACCORDANCE WITH THE SPECIFICATIONS IN "THE ETHICAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS"

COMMONWEALTH OF MASSACHUSETTS
VAROUJAN H. HAGOPIAN
No. 49665
PROFESSIONAL LAND SURVEYOR

7/6/21

VAROUJAN H. HAGOPIAN, P.L.S. 49665

GENERAL NOTES:

1. THIS PLAN IS BASED ON AN ON-GROUND SURVEY BY SULLIVAN, CONNORS & ASSOCIATES PERFORMED ON FEBRUARY 2020.

2 LEGAL STATUS OF EASEMENTS AND WAYS, NOT DETERMINED BY THIS SURVEY.

3. NO WETLANDS LOCATED ON-SITE.

ZONED: SINGLE RESIDENCE
CONSERVATION CLUSTER
AREA = 20,000 sf
FRONTAGE = 50 feet
SETBACKS:
50' TO PERIMETER
15' TO OPEN LAND

NO LOT SHALL BE FURTHER DIVDED SO AS TO CREATE ADDITIONAL LOTS.

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
7-7-21

OWNERS:
TAMPOSI BROTHERS I, LLC
37 REVERE STREET, No. 8
BOSTON, MA 02114

SULLIVAN, CONNORS AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978-443-9566 FAX: 978-443-8915

"DEFINITIVE PLAN"
CLUSTER SITE PLAN
DRIVEWAY PROFILE
OF EMMELINE PATH
WAYLAND, MA

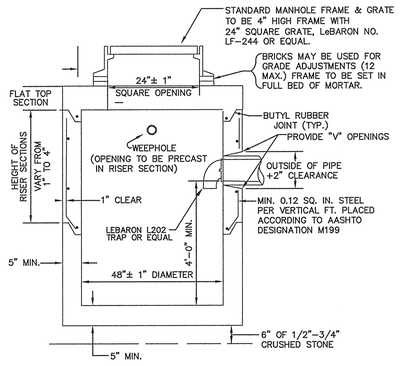
REVISED:	DESCRIPTION:
2-9-2021	PLANNING BOARD COMMENTS
1-13-2021	FINALIZE PLAN SET
12-28-2020	MISC. EDITS
10-9-2020	REVISED LAYOUT
9-14-2020	DPW COMMENTS

DRAWN BY: REM | CHECK BY: VC
DATE: APRIL 20, 2020
SCALE: AS SHOWN | SHEET 2 OF 3.

APPROVED SPECIAL PERMIT
CONSERVATION CLUSTER DEVELOPMENT
WAYLAND PLANNING BOARD

DATE: _____

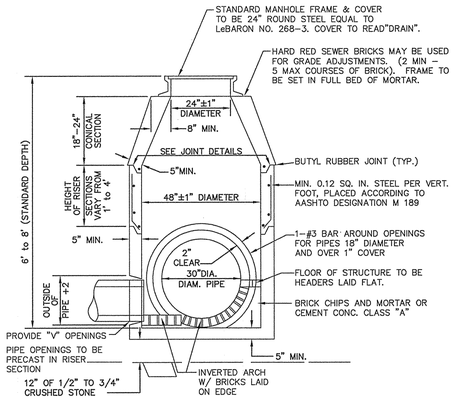
SULLIVAN CONNORS & ASSOCIATES INC. DOES NOT GUARANTEE THE LOCATION OF UNDERGROUND UTILITIES, THAT ALL UNDERGROUND UTILITIES HAVE BEEN SHOWN, OR THE CHARACTER OF SUBSURFACE GROUND CONDITIONS. THE CONTRACTOR SHALL VERIFY THE LOCATION, SIZE, AND ELEVATION OF UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR IS CAUTIONED TO CONTACT THE TOWN DPW AND DIG SAFE (1-888-344-7233) FOR UTILITY LOCATIONS 72 HOURS BEFORE EXCAVATION.



NOTE: NO BELL ENDS IN CATCH BASIN. CONNECTIONS TO BE TIGHTLY SEALED WITH MORTAR.

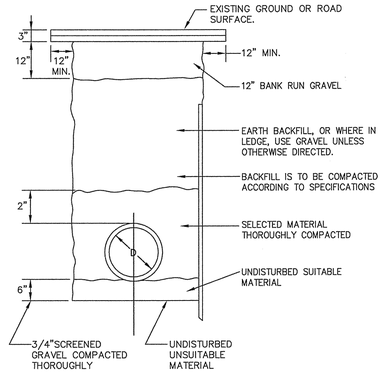
PRECAST CONCRETE DRAIN CATCH BASIN DETAIL

NOT TO SCALE



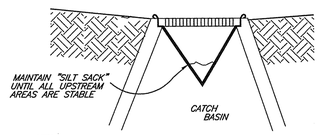
PRECAST CONCRETE MANHOLE DETAIL

NOT TO SCALE



TYPICAL DRAIN TRENCH DETAILS

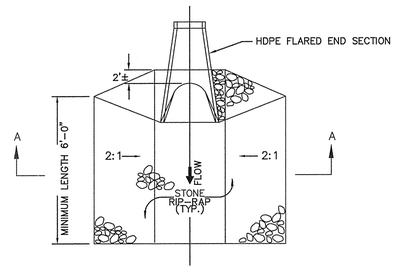
NOT TO SCALE



NOTES:
1. SILT SACKS ARE TO BE INSPECTED WEEKLY DURING CONSTRUCTION AND IMMEDIATELY AFTER STORM EVENTS.
2. IF SILT SACKS ARE MORE THAN 1/3RD FULL, THEY SHALL BE EMPTIED IMMEDIATELY. CAPTURED SILT SHALL BE RETAINED ON SITE AND REUSED.

SILT SACK OR EQUAL SEDIMENT CONTAINMENT SYSTEM

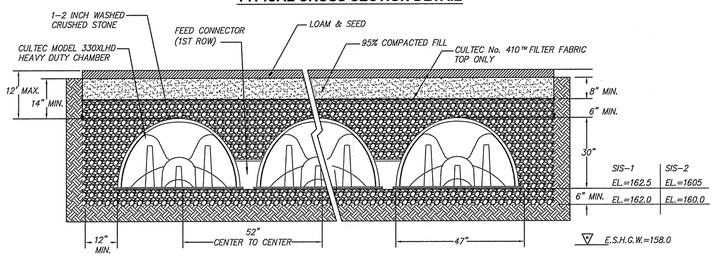
NOT TO SCALE



RIP-RAP APRON

NOT TO SCALE

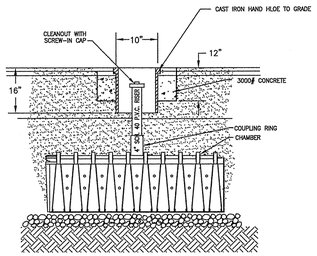
CULTEC RECHARGER R330XLHD CHAMBER SYSTEM
PAVED TRAFFIC APPLICATION
TYPICAL CROSS SECTION DETAIL



NOTES:
1. BOTTOM OF EXCAVATION SHALL BE WITNESSED BY THE ENGINEER TO VERIFY SOIL CONDITIONS & DEPTH TO GROUNDWATER
2. EXCAVATE MINIMUM 6 INCHES INTO NATURAL 'C' LAYER ANY FILL REQUIRED BELOW THE SYSTEM SHALL BE CLEAN FREE DRAINING FILL WITH LESS THAN 5% PASSING THE #200 SIEVE (C-33 WASHED SAND OR TITLE 5 FILL MEETS THIS REQUIREMENT)

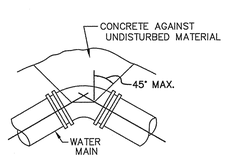
DRYWELL DETAIL

NOT TO SCALE

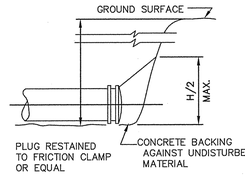


INSPECTION PORT DETAIL

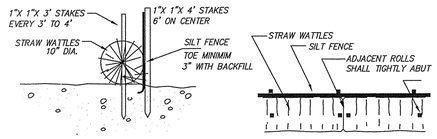
NOT TO SCALE



TYPICAL BEND



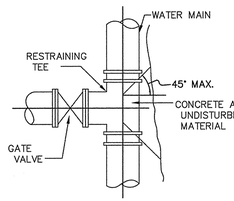
TYPICAL PLUG



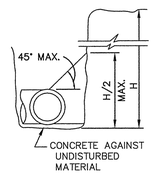
STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL TO ENSURE RUNOFF DOES NOT RUN UNDER OR AROUND ROLL.

SEDIMENT BARRIER DETAIL

NOT TO SCALE



TYPICAL TEE & VALVE



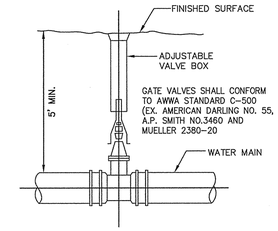
TYPICAL SECTION

NOTE: CONCRETE FOR THRUST BLOCKS SHALL BE NO LONGER THAN THE RATIO OF 2 1/2 : 5 1/2 AND SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 2000 PSI (SO THAT FLANGES AND BOLTS ARE ACCESSIBLE.)

BEARING AREAS OF THRUST BLOCKS (BEARING AREA IN SQUARE FT.)				
PIPE SIZE INCHES	1/4 BEND	1/8 BEND	1/16 BEND OR LESS	PLUG TEES
6 AND 8	8	8		8
10 AND 12	22	13	8	16

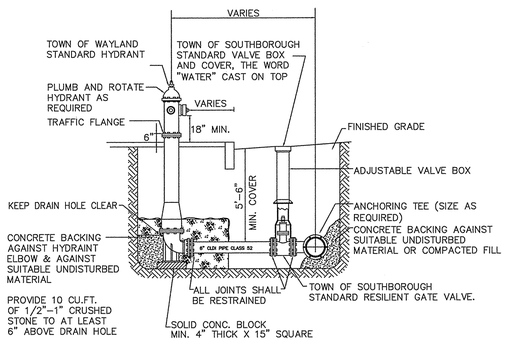
TYPICAL THRUST BLOCK DETAIL

NOT TO SCALE



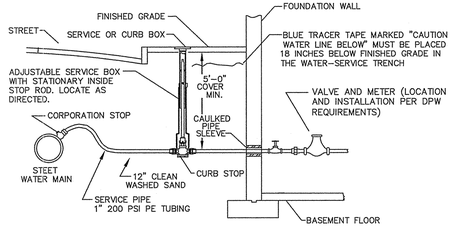
TYPICAL GATE VALVE

NOT TO SCALE



TYPICAL HYDRANT & VALVE DETAIL

NOT TO SCALE



NOTES:
PLASTIC 200 PSI TUBING SHALL MEET AWWA SPEC. AND BE 200 PSI (MIN.)

ALL CONSTRUCITON METHODS AND MATERIALS INCLUDING CURB STOP, CORPORATION STOP, SERVICE PIPE, SERVICE BOX, VALVES, AND METER SHALL BE IN ACCORDANCE WITH THE TOWN OF NORTHBOROUGH DPW STANDARDS AND SPECIFICATIONS.

TYPICAL WATER SERVICE CONNECTION

NOT TO SCALE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

I CERTIFY THAT THE ACTUAL SURVEY OF THE BOUNDARY LINES OF THIS TRACT OF LAND WAS MADE IN ACCORDANCE WITH THE SPECIFICATIONS IN "THE ETHICAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS"

2/5/21

VAROUJAN H. HAGOPIAN, P.L.S. 49665

COMMONWEALTH OF MASSACHUSETTS VAROUJAN H. HAGOPIAN No. 49665 PROFESSIONAL LAND SURVEYOR

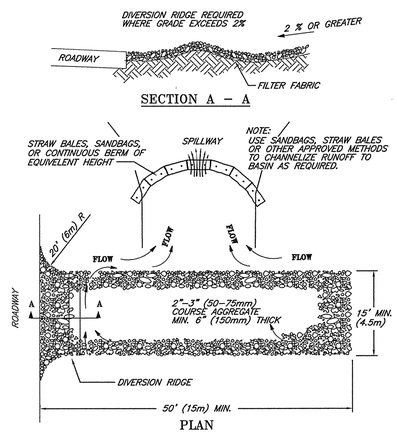
APPROVED SPECIAL PERMIT
CONSERVATION CLUSTER DEVELOPMENT
WAYLAND PLANNING BOARD

_____
_____
_____
_____
_____
_____
_____

DATE: _____

EROSION AND SEDIMENTATION CONTROL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CHAPTER 193 PERMIT (IF REQUIRED) ISSUED BY THE TOWN OF WAYLAND CONSERVATION COMMISSION, AND THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
2. PRIOR TO INITIATING CONSTRUCTION, PERIMETER EROSION CONTROL BARRIERS SHALL BE INSTALLED AROUND THE PROPOSED LIMIT OF WORK AND AS SHOWN ON THE DETAIL DRAWINGS.
3. THE CONTRACTOR SHALL EMPLOY ADDITIONAL SEDIMENTATION AND EROSION CONTROL MEASURES AS NECESSITATED BY SITE CONDITIONS, OR AS DIRECTED BY THE OWNER, THE OWNER'S REPRESENTATIVE, OR THE CONSERVATION COMMISSION TO ENSURE PROTECTION OF ALL WETLAND RESOURCES, PROTECT ABUTTING PROPERTIES, AND CONTROL SEDIMENT TRANSPORT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT SEDIMENTATION AND EROSION CONTROLS UNTIL WORK IS COMPLETE AND ALL AREAS HAVE BEEN PERMANENTLY STABILIZED. AT SUCH TIME THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SEDIMENTATION AND EROSION CONTROL MEASURES.
5. THE CONTRACTOR SHALL INSPECT SEDIMENTATION AND EROSION CONTROLS ON A DAILY BASIS; REPAIRS SHALL BE MADE BY THE END OF THE WORKING DAY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR WHEN THE VOLUME REACHES ½ THE HEIGHT OF SEDIMENT BARRIER, HAYBALE, OR SEDIMENT TRAP CAPACITY, OR AS DIRECTED BY THE LOCAL AUTHORITY.
6. DISTURBED AREAS SHALL BE STABILIZED BY LOAMING AND SEEDING, OR BY ANOTHER APPROVED METHOD, WITHIN 7 DAYS AFTER THE FINISHED GRADE HAS BEEN MET. DISTURBED AREAS WITH SLOPES 3:1 (H:V) OR GREATER SHALL BE COVERED WITH LOAM AND STABILIZED WITH HYDROSEED AND SOIL TACKIFIER. IF FINAL GRADING DOES NOT OCCUR DURING THE GROWING SEASON, THESE AREAS SHALL BE MULCHED WITH STRAW AND SECURED.
7. STREET SWEEPING IN THE VICINITY OF THE PROJECT AREA (INCLUDING SITE ACCESS DRIVEWAYS) SHALL BE PERFORMED AS NEEDED UNTIL THE PROJECT LIMITS HAVE BEEN STABILIZED. ALL SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
8. DUST CONTROL MEASURES THROUGH WATER SPRINKLING SHALL BE IMPLEMENTED AND MAINTAINED PROPERLY THROUGHOUT DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
9. ALL VEHICLES SHALL ENTER AND EXIT THE SIT VIA THE STABILIZED CONSTRUCTION ENTRANCE. IF THE SITE CONDITIONS ARE SUCH THAT THE GRAVEL PAD DOES NOT REMOVE THE MAJORITY OF THE MUD AND DEBRIS, THEN THE TIRES SHALL BE WASHED BEFORE ANY VEHICLES ENTER ADJACENT ROADWAYS. ALL WATER USED FOR TIRE WASHING SHALL BE COLLECTED AND TREATED PRIOR TO ENTERING THE DRAINAGE SYSTEM. THE CONTRACTOR SHALL INSPECT THE CONSTRUCTION ENTRANCE DAILY AND AFTER HEAVY USE.



NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

COMMONWEALTH OF MASSACHUSETTS VITO COLONNA No. 47635 REGISTERED PROFESSIONAL ENGINEER
2-9-21

OWNERS:
TAMPOSI BROTHERS I, LLC
37 REVERE STREET, No. 8
BOSTON, MA 02114

SULLIVAN, CONNORS AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978-443-9566 FAX: 978-443-8915

"DEFINITIVE PLAN"
CLUSTER SITE PLAN
CONSTRUCTION DETAILS
OF EMMELINE PATH
WAYLAND, MA

REVISED:	DESCRIPTION:
2-9-2021	PLANNING BOARD COMMENTS
1-13-2021	FINALIZE PLAN SET
12-28-2020	MISC. EDITS
10-9-2020	REVISED LAYOUT
9-14-2020	DPW COMMENTS

DRAWN BY: REM | CHECK BY: VC
DATE: APRIL 20, 2020
SCALE: AS SHOWN | SHEET 3 OF 3.

APPROVAL UNDER THE
SUBDIVISION CONTROL LAW
WAYLAND PLANNING BOARD

_____

_____

_____

_____

_____

_____

_____

DATE: _____

CONSERVATION CLUSTER DEVELOPMENT DISTRICT
ZONING BYLAW SECT.198–1803.1.3 YIELD CALCULATION

SECT.198–1803.1.3.(a) CONVENTIONAL LAYOUT YIELDS = 4 LOTS

SECT.198–1803.1.3.(b)

TOTAL SITE AREA = 239,315 S.F.
LAND AREA WITHIN FLOOD PLAIN AND WETLANDS = 0 S.F.
239,315 S.F. x 90% = 215,384 S.F.
215,384 S.F. / 40,000 S.F = 5.38 LOTS

ZONING BYLAW SECT.198–1803.3. LOT IN TWO OR MORE DISTRICTS

ALL OF THE LAND SHALL BE CONSIDERED LYING IN THE DISTRICT THAT CONTAINS MORE THAN 75% OF THE TOTAL AREA SHOWN AS BUILDING LOTS.

TOTAL BUILDING LOT AREA = 134,251 S.F. (EXCLUDES ROAD AND OPEN SPACE)
75% OF BUILDING LOT AREA = 100,689 S.F.
BUILDING LOT AREA IN 40,000 DISTRICT = 100,738 S.F. > 75%
BUILDING LOT AREA IN 60,000 DISTRICT = 33,513 S.F. < 25%
ALL OF THE LAND CONSIDERED LYING WITHIN THE 40,000 S.F. DISTRICT

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

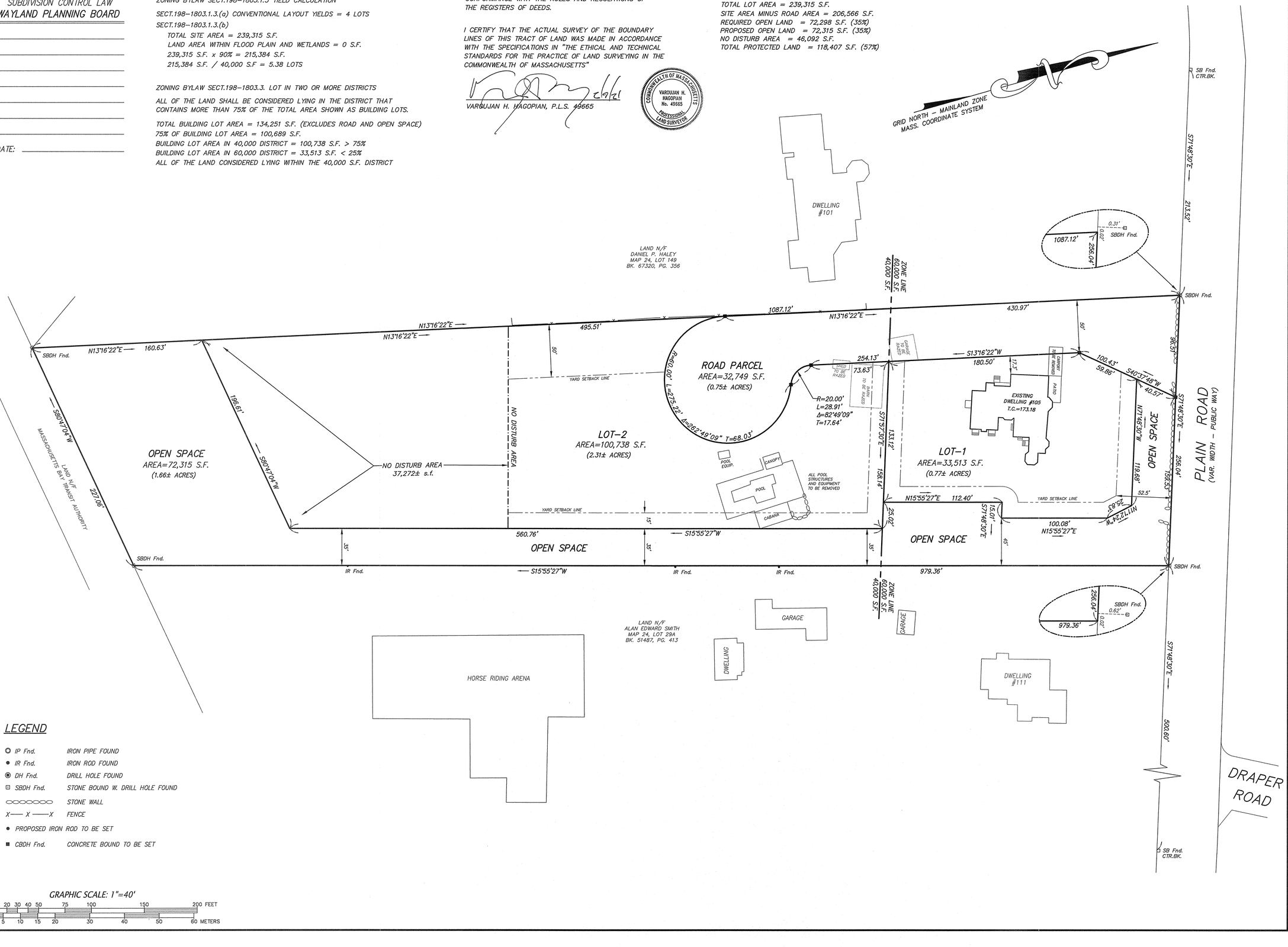
I CERTIFY THAT THE ACTUAL SURVEY OF THE BOUNDARY LINES OF THIS TRACT OF LAND WAS MADE IN ACCORDANCE WITH THE SPECIFICATIONS IN "THE ETHICAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS"

VAROUJAN H. HAGOPIAN, P.L.S. 49665

COMMONWEALTH OF MASSACHUSETTS
VAROUJAN H. HAGOPIAN
No. 49665
PROFESSIONAL LAND SURVEYOR

OPEN LAND SUMMARY

TOTAL LOT AREA = 239,315 S.F.
SITE AREA MINUS ROAD AREA = 206,566 S.F.
REQUIRED OPEN LAND = 72,298 S.F. (35%)
PROPOSED OPEN LAND = 72,315 S.F. (35%)
NO DISTURB AREA = 46,092 S.F.
TOTAL PROTECTED LAND = 118,407 S.F. (57%)



LEGEND

IP Fnd.	IRON PIPE FOUND
IR Fnd.	IRON ROD FOUND
DH Fnd.	DRILL HOLE FOUND
SBDH Fnd.	STONE BOUND W. DRILL HOLE FOUND
	STONE WALL
X—— X ——X	FENCE
	PROPOSED IRON ROD TO BE SET
CBDH Fnd.	CONCRETE BOUND TO BE SET

GRAPHIC SCALE: 1"=40'

0 10 20 30 40 50 75 100 150 200 FEET
0 5 10 15 20 30 40 50 60 METERS

GENERAL NOTES:

1. THE CERTIFICATION SHOWN HEREON IS INTENDED TO MEET REGISTRY OF DEEDS REQUIREMENTS AND IS NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT TOWN OF WAYLAND ASSESSORS RECORDS.

2. THIS PLAN IS BASED ON AN ON–GROUND SURVEY BY SULLIVAN, CONNORS & ASSOCIATES PERFORMED ON FEBRUARY 2020.

3 LEGAL STATUS OF EASEMENTS AND WAYS, NOT DETERMINED BY THIS SURVEY.

4. NO WETLANDS LOCATED ON–SITE.

ZONED: SINGLE RESIDENCE
CONSERVATION CLUSTER
AREA = 20,000 sf
FRONTAGE = 50 feet
SETBACKS:
50' TO PERIMETER
15' TO OPEN LAND

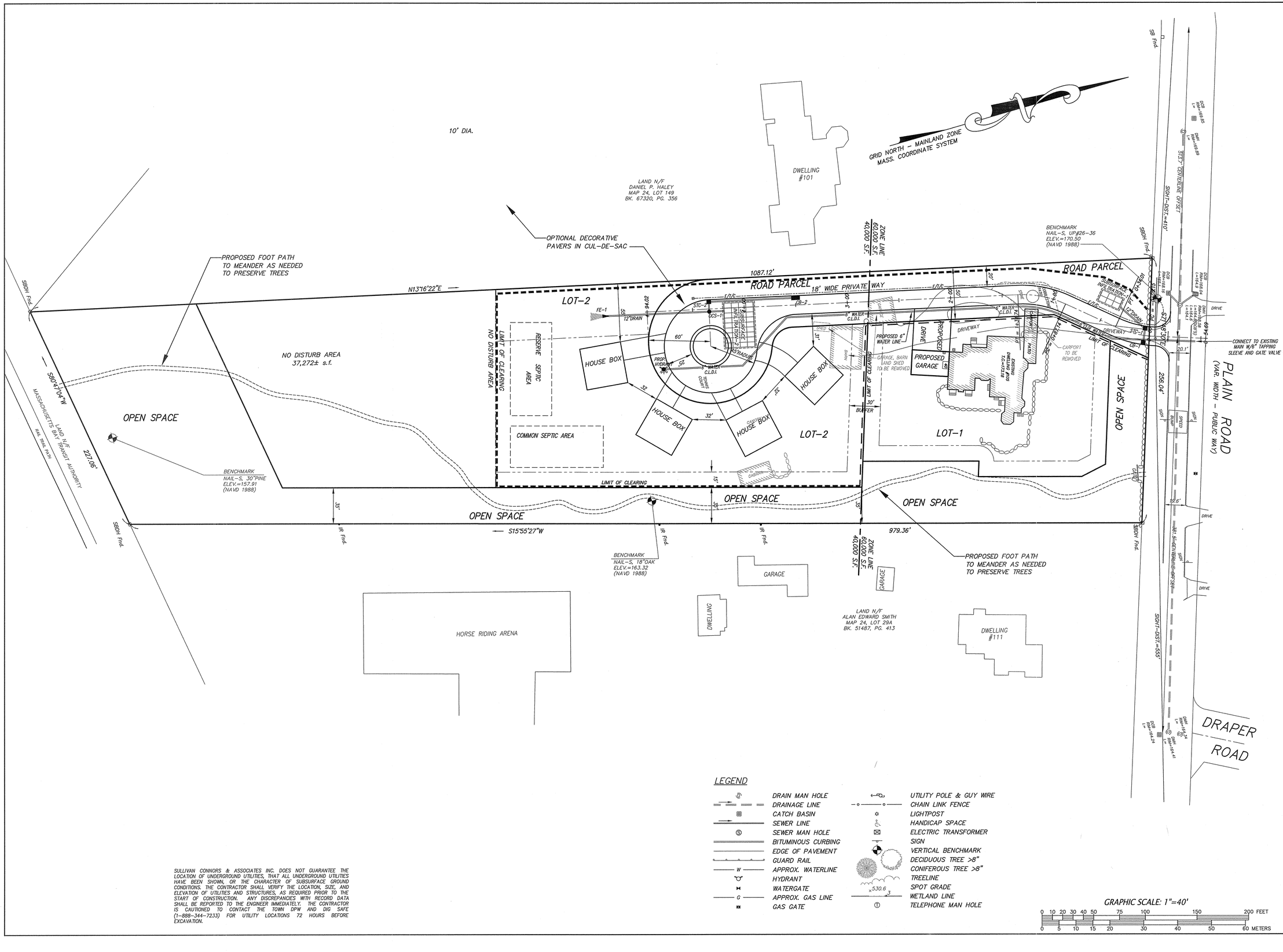
NO LOT SHALL BE FURTHER DIVIDED SO AS TO CREATE ADDITIONAL LOTS.

OWNERS:
TAMPOSI BROTHERS I, LLC
37 REVERE STREET, No. 8
BOSTON, MA 02114

SULLIVAN, CONNORS AND ASSOCIATES
LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978–443–9566 FAX: 978–443–8915

"DEFINITIVE PLAN"
CLUSTER PLAN OF LAND
OF
EMMELINE PATH
WAYLAND, MA

2–9–2021	PLANNING BOARD COMMENTS
1–13–2021	FINALIZE PLAN SET
9–14–2020	DPW COMMENTS
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VHH
DATE: APRIL 20, 2020	
SCALE: 1"=40'	SHEET 1 OF 1.



LEGEND

- DRAIN MAN HOLE
- DRAINAGE LINE
- CATCH BASIN
- SEWER LINE
- SEWER MAN HOLE
- BITUMINOUS CURBING
- EDGE OF PAVEMENT
- GUARD RAIL
- APPROX. WATERLINE
- HYDRANT
- WATERGATE
- APPROX. GAS LINE
- GAS GATE
- UTILITY POLE & GUY WIRE
- CHAIN LINK FENCE
- LIGHTPOST
- HANDICAP SPACE
- ELECTRIC TRANSFORMER
- SIGN
- VERTICAL BENCHMARK
- DECIDUOUS TREE >8"
- CONIFEROUS TREE >8"
- TREELINE
- SPOT GRADE
- WETLAND LINE
- TELEPHONE MAN HOLE

GRAPHIC SCALE: 1"=40'

0 10 20 30 40 50 75 100 150 200 FEET
0 5 10 15 20 30 40 50 60 METERS

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GENERAL NOTES:

1. THIS PLAN IS BASED ON AN ON-GROUND SURVEY BY SULLIVAN, CONNORS & ASSOCIATES PERFORMED ON FEBRUARY 2020.

2 LEGAL STATUS OF EASEMENTS AND WAYS, NOT DETERMINED BY THIS SURVEY.

3. NO WETLANDS LOCATED ON-SITE.

ZONED: SINGLE RESIDENCE
CONSERVATION CLUSTER
AREA = 20,000 sf.
FRONTAGE = 50 feet
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LAND SURVEYING AND CIVIL ENGINEERING
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978-443-9566 FAX: 978-443-8915

"CONCEPT BUILDING PLAN"
CLUSTER SITE PLAN
OF
105 PLAIN ROAD
WAYLAND, MA

2-9-2021	PLANNING BOARD COMMENTS
1-13-2021	FINALIZE PLAN SET
12-28-2020	MISC. EDITS
10-9-2020	REVISED LAYOUT
9-14-2020	DPW COMMENTS
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: SEPTEMBER 19, 2020	
SCALE: 1"=40'	SHEET 1 OF 1.

Stormwater Management Report

105 Plain Road
Wayland, Massachusetts

May 6, 2020
Revised January 12, 2021

Prepared by:
Sullivan, Connors & Associates, Inc.
121 Boston Post Road
Sudbury, MA

The purpose of this analysis is to summarize the design calculations, and design a stormwater management system in accordance with the requirements of the Town of Wayland Subdivision Rules and Regulations and the Stormwater Bylaw, Chapter 193.

Existing Conditions:
The site consists of a 5.5 acre parcel located at 105 Plain Road. The lot is currently developed as a single family house including several outbuildings, pool, and tennis court, and has an existing impervious area of 26,345 square feet. The rear portion of the site behind the pool/tennis court is currently wooded sloping down to the rear of the property. There are no known wetland resources within 100 feet of the site or proposed work. Site topography is fairly flat sloping down away from Plain Road toward the rear (south) and side (east) property lines with an overall elevation change of approximately 14 feet.

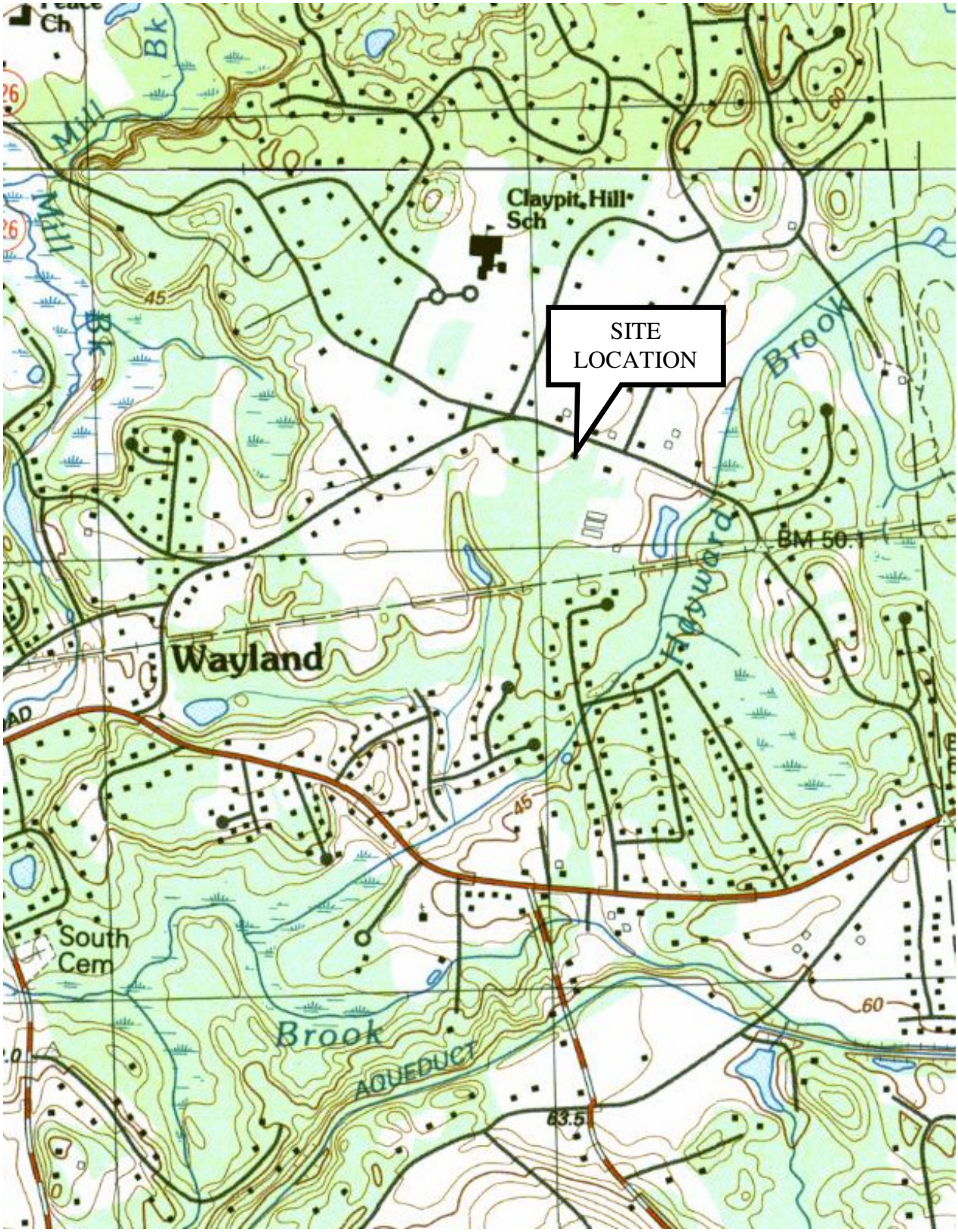
The Natural Resource Conservation Service has mapped the soils within the proposed project area as Haven Silt Loam, which is a well-drained highly permeable soil classified as soil group A. Soil testing for the septic systems was performed by this office in March 2020. The results were consistent with the soil mapping and showed well-drained sand.

Proposed Conditions:
The proposed project consists of a cluster development subdivision consisting of two (2) total lots. The front lot shown as Lot 1 on the plan would contain and preserve the existing house. The rear lot shown as Lot 2 on the plan would contain four (4) detached dwelling units. Both lots would have access off a proposed 500 foot long private roadway. The site would be serviced by a private on-site septic system and municipal water extended from Plain Road.

The total post development impervious area used in the calculations is 37,300 square feet. This includes the proposed roadway, existing roof and impervious areas to remain on Lot 1, and impervious areas for the proposed driveways and dwelling units (assumed allowance of 3,700 square feet of impervious per dwelling unit). This would be an increase of 10,955 S.F. +/- over the existing conditions.

In order to mitigate the increase in runoff due to the impervious area, a stormwater management system has been proposed, which will collect runoff from the common driveway and portions of the development area. The stormwater management includes two subsurface infiltration systems (cultec drywells). One located at the entrance of the roadway and the second at the end within the cul-de-sac. Surface runoff would be collected via catch basins and conveyed to a hydrodynamic separator for pretreatment, and then a subsurface infiltration system for final treatment, recharge, and reduction of peak flow rates.

USGS LOCUS MAP



MA D.E.P. STORMWATER STANDARDS REQUIRED DOCUMENTATION

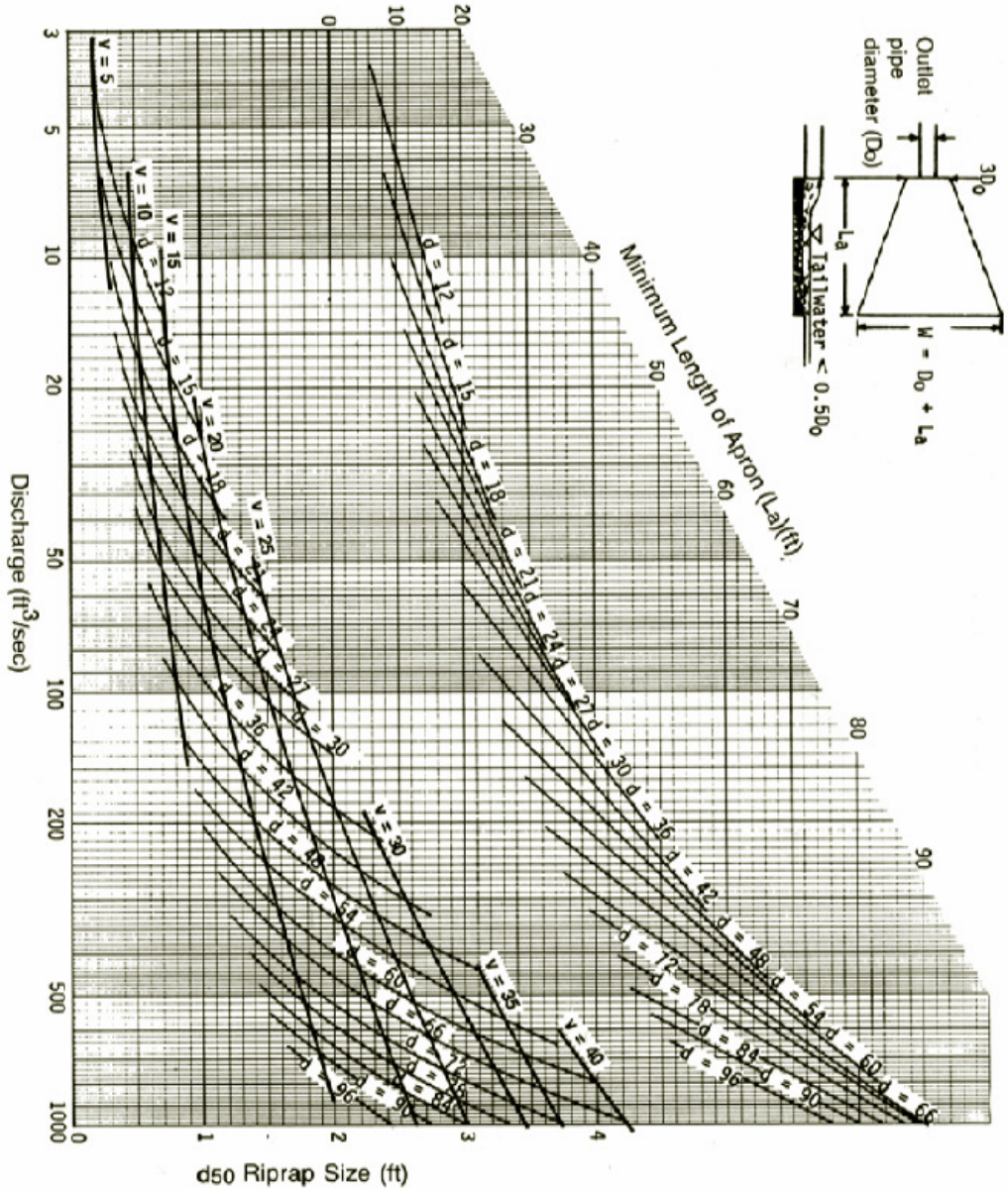
Standard 1: No New Untreated Discharges

There are no new untreated discharges to any wetland resource area.

A stone outlet splash pad has been placed at the drainage system overflow.

Stormwater Discharge Velocity:
12" FE: Q_{FULL}= 3.9 cfs / V_{FULL}= 4.9 fps

Riprap sizing: Use: Riprap Size = 3" Minimum
Length= 6 feet



Standard 2: Peak Rate Attenuation

The analysis indicates the proposed project will not result in an increase in peak rate or volume of runoff for the 2-yr 10-yr, and 100-yr storm events. The calculations were performed with HydroCAD 9.10 Stormwater modeling Software, which utilizes Soil Conservation Service (SCS) Technical Release No. 20 (TR-20) and SCS Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds. Rainfall intensities are based upon the most current NOAA Atlas 14 data.

Stormwater was analyzed along the downgradient property lines below the limit of work.

The following table summarized the peak rate and volume of runoff leaving the property to verify there would be no increases under the post-development condition.

Table 1: Peak Rate of Runoff

Storm Event	**2-year**	**10-year**	**25-year**	**100-year**
Intensity	**3.3 inches**	**5.1 inches**	**6.3 inches**	**8.0 inches**
	Existing (Proposed)	**Existing (Proposed)**	**Existing (Proposed)**	**Existing (Proposed)**
Rear Property Line	0.0 cfs (0.0 cfs)	0.1 cfs (0.1 cfs)	0.4 cfs (0.3 cfs)	1.5 cfs (1.5 cfs)
East Property Line	0.0 cfs (0.0 cfs)	0.0 cfs (0.0 cfs)	0.1 cfs (0.1 cfs)	0.5 cfs (0.5 cfs)

Table 2: Volume of Runoff

Storm Event	**2-year**	**10-year**	**25-year**	**100-year**
Intensity	**3.3 inches**	**5.1 inches**	**6.3 inches**	**8.0 inches**
	Existing (Proposed)	**Existing (Proposed)**	**Existing (Proposed)**	**Existing (Proposed)**
Rear Property Line	0.0 ac-ft (0.0 ac-ft)	0.03 ac-ft (0.03 ac-ft)	0.11 ac-ft (0.10 ac-ft)	0.29 ac-ft (0.26 ac-ft)
East Property Line	0.0 ac-ft (0.0 ac-ft)	0.01 ac-ft (0.01 ac-ft)	0.03 ac-ft (0.02 ac-ft)	0.06 ac-ft (0.03 ac-ft)

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater in excess of that required by Standard 3. Recharge has been provided through two drywells.

Required Recharge Volume:

Increase to impervious area = 10,955 S.F.
On-site Hydrologic Soil Group = A (0.60"/impervious area)
Recharge Volume = 10,955 S.F. x 0.6 / 12 = 548 cubic feet

Proposed Recharge Volume

FRONT Subsurface infiltration System = 630 c.f.
REAR Subsurface infiltration System = 2,915 c.f. (to overflow)
Total Proposed Recharge Volume = 3,545 Cubic Feet

Pretreatment:

Hydrodynamic Separator = 80% TSS removal

Draw Down Calculations – 72 hours maximum allowed

= Volume / (Saturated Hydraulic Conductivity x Bottom Area)

FRONT Infiltration System
= 630 cubic feet / (8.27 in/hr x 312 sq. ft. / 12 in/ft) = 3 hours

REAR Infiltration System
= 2,915 cubic feet / (8.27 in/hr x 1,395 sq. ft. / 12 in/ft) = 3 hours

Groundwater Separation

The bottom of drywells have been set a minimum of 2 feet above estimated groundwater and/or ledge elevation based upon on-site soil testing. A mounding analysis has also been provided for the rear drywell as required.

Standard 4: Water Quality

The proposed project has been designed to remove greater than 80% of the total suspended solids (TSS) through the use of a rain garden and subsurface infiltration system.

Area 1 (to Infiltration System)

1 **BMP**	2 **TSS removal**	3 **Starting TSS** (5 from previous BMP)	4 **TSS Removal** **(2 * 3)**	5 **Remaining TSS** **(3 - 4)**
Hyd. Separator (Stormceptor)	80%	100%	80%	20%
Subsurface Infiltration	80%	20%	16%	4%
		Total TSS Removal =	96%	

FRONT Infiltration System

Required Water Quality Volume (WQV): 1.0 inches

Tributary Impervious Area = 2,400 s.f.

1.0" x 2,400 s.f. /12 = 200 Cubic Feet

Proposed Storage Volume (WQV) = 630 Cubic Feet

FRONT Hydrodynamic Separator

TSS removal rate = 80%

Drainage Area = 0.2 acres

Impervious Area = 0.1 acres

Water Quality Flow Rate Conversion

WQF = qu x A x WQV = 0.1 cfs

Where

qu=795 csm/in

A = impervious area = 0.0001 sq. mi.

WQV = 1-inch

REAR Infiltration System

Required Water Quality Volume (WQV): 1.0 inches

Tributary Impervious Area = 17,815 s.f.

1.0" x 17,815 s.f. /12 = 1,484 Cubic Feet

Proposed Storage Volume (WQV) = 2,915 Cubic Feet

REAR Hydrodynamic Separator

TSS removal rate = 80%

Drainage Area = 0.66 acres

Impervious Area = 0.4 acres

Water Quality Flow Rate Conversion

WQF = qu x A x WQV = 0.51 cfs

Where

qu=795 csm/in

A = impervious area = 0.00064 sq. mi.

WQV = 1-inch

Standard 5: Land Uses With Higher pollutant Loads

Not applicable - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

Not applicable – The site is not located within any critical areas.

Standard 7: Redevelopment

The proposed project is a partial redevelopment. However, all of the stormwater standards have been met.

Standard 8: Construction Period Controls

Construction period erosion and sedimentation controls have been provided on the design plans, and a Stormwater Pollution Prevention Plan has been prepared.

Standard 9: Operation and Maintenance Plan

An Operation and Maintenance Plan has been attached with this report.

Standard 10: Illicit Discharges

Based upon site observations made by Sullivan Connors and Associates, no illicit discharges have been observed on the site. All proposed sewerage flow shall be discharged to the proposed subsurface sewerage disposal system.

DRAIN PIPE SIZING CALCULATIONS

The street drainage system has been designed from calculations based upon the 25-year design storm. Storm intensities were determined from exhibit 8-14 "*Intensity – Duration – Frequency Curve for Worcester, MA*" from the MassHighway Design Manual. The resulting analysis was performed using the Rational Method of determining peak storm flows. All storm sewer pipe sizes were determined using Manning's Equation for pipes flowing full.

The following table presents the hydraulic calculations performed for sizing the site drainage system. The structure references refer to those as shown on the site plan submitted with this report.

DRAIN PIPE SIZING CALCULATIONS

PROJECT 105 Plain Road
Cluster Subdivision

LOCATION Wayland, MA
SHEET 1 OF 1

BY: VC
DATE: 1/12/2021

n= 0.012
RETURN PERIOD **25 YEAR**

Line		Area	Percent Impervious	C	CA	Ci	Tc	rain	Inlet flow Q	Pipe flow Qd	Pipe Size	Pipe Length	Slope	flowing full		Rim (feet)		Inv. El.	
FROM	TO	ac					min.	in/hr	cfs	cfs	in	ft	ft/ft	Qf	Vf	Upper	Lower	Upper	Lower
CB-1	STC-1	0.10	40%	0.47	0.05	1.1	5.0	6.5	0.34	**0.34**	12	14	0.032	**6.92**	8.8	164.50	164.50	165.20	164.75
STC-1	Front Drywell	0.10	40%	0.47	0.05	1.1	5.0	6.5	0.34	**0.67**	12	30	0.025	**6.11**	7.8	164.50	---	164.50	163.75
CB 2	STC-2	0.30	70%	0.71	0.21	1.1	5.0	6.5	1.52	**1.52**	12	80	0.011	**3.98**	5.1	167.35	166.50	164.10	163.25
STC-1	OCS-1	0.35	70%	0.71	0.25	1.1	5.0	6.5	1.78	**3.30**	12	10	0.030	**6.69**	8.5	166.50	166.70	163.00	162.70
OCS-1	Rear Drywell									**3.30**	12	5	0.040	**7.72**	9.8	166.70	---	160.90	160.70

C (Lawn) 0.15
C (impervious) 0.95

Stormceptor®

FRONT STC-1

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	2021
Project Name	105 Plain Road
Project Number	N/A
Location	FRONT STC

Designer Information

Company	SCA
Contact	N/A

Notes

Front Stormceptor

Drainage Area

Total Area (ac)	0.2
Imperviousness (%)	33

The Stormceptor System model STC 450i achieves the water quality objective removing 93% TSS for a NJDEP (clay, silt, sand) particle size distribution; providing continuous positive treatment for a stormwater quality flow rate of 0.1 cfs.

Rainfall

Name	WORCESTER WSO AP
State	MA
ID	9923
Years of Records	1948 to 2005
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective

TSS Removal (%)	80
WQ Flow Rate (cfs)	0.1

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	**93**
STC 900	97
STC 1200	97
STC 1800	97
STC 2400	98
STC 3600	98
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Rinker MATERIALS™

Stormceptor®

REAR STC-2

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	2021
Project Name	105 Plain Road
Project Number	N/A
Location	

Designer Information

Company	SCA
Contact	N/A

Notes

Drainage Area

Total Area (ac)	0.66
Imperviousness (%)	62

The Stormceptor System model STC 450i achieves the water quality objective removing 81% TSS for a NJDEP (clay, silt, sand) particle size distribution; providing continuous positive treatment for a stormwater quality flow rate of 0.51 cfs.

Rainfall

Name	WORCESTER WSO AP
State	MA
ID	9923
Years of Records	1948 to 2005
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective

TSS Removal (%)	80
WQ Flow Rate (cfs)	0.51

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	**81**
STC 900	88
STC 1200	88
STC 1800	88
STC 2400	91
STC 3600	91
STC 4800	93
STC 6000	93
STC 7200	95
STC 11000	96
STC 13000	96
STC 16000	97

Rinker MATERIALS™

STORMWATER OPERATION & MAINTENANCE PLAN

Private Roadway, Plain Road, Wayland, MA
Stormwater Operations and Management Plan

Stormwater Management System Owner: Property Owners
Responsible Party: Property Owners

General Conditions:
Stormwater systems should be inspected at least once per year, and be scheduled, whenever possible, within 48 hours of a 1" or larger storm event. Upon completion of inspection, the inspector should specify any necessary corrective actions to be taken by ownership of the infiltration facility. Items to be inspected and maintained are described in the following sections. All assessments can be based upon visual inspections.

Based on the findings of the inspection, the Responsible Party shall immediately schedule the appropriate maintenance. Some minor maintenance, such as the removal of blockages or debris accumulation may be conducted at the time of the inspection.

The owner of the property shall maintain a log of all operation and maintenance activities, including without limitation, inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location). This log shall be made available to Planning Board or its designated Reviewing Agent upon request

Accompanying Plans
Plans "Definitive Plan, Cluster Development, 105 Plain Road in Wayland MA," dated April 20, 2020 including any revisions, is part of this document and depict the locations of all stormwater BMP's.

Source Control Measures:
The following source control and pollution prevention measures shall be employed on the site to prevent contamination of stormwater runoff:

- Control litter on the site.
- Cover any dumpsters and maintain them to prevent leaks.
- Store lawn and deicing chemicals under cover.
- Apply fertilizers and pesticides sparingly to prevent washoff.
- Use of slow release nitrogen and low phosphorus fertilizers is encouraged.
- No fertilization or pesticide application in or near any wetland resource area.
- Limit exterior washing of vehicles and equipment to locations that drain to pervious surfaces and away from storm drains.
- Clean up spills immediately with absorbent materials; avoid washing of pavement.
- Pump and maintain septic systems.
- Use alternative deicers such as calcium chloride and magnesium chloride in lieu of sodium based deicers.
- Designate areas for snow storage in upland locations where meltwater can drain onto pervious surfaces away from water resources and wells.
- Discharge of any material other that stormwater to the stormwater system (drywell) is not permitted.
- Sweep any pavement areas regularly.

Drywell / Subsurface infiltration system

The drywell is located at the base of the common driveway. Surface features for locating the system would include four cleanouts to grade.

Drywells shall be inspected after every major storm in the first few months after construction. After this initial period, the systems should be inspected at least twice annually (spring and fall) with one inspection performed after a major storm to see if they have fully drained. If the infiltration system does not drain within 72 hours of the end of a storm, then remediation may be necessary including replacement of the system. Heavy Machinery should not operate near of over the drywell. The outlet shall be inspected for functionality, debris and scour.

Deep Sump Catch Basin and Stormceptor

There is a catch basin and stormceptor located at the entrance near Plain Road and in the cul-de-sac at the end of the Roadway. The catch basin is serviced through the surface inlet grate and Stormceptor is via the manhole cover to grade.

Cleaning and maintaining the catch basins and Stormceptor will help improve the long term functionality of the drywells. The actual removal of sediments and associated pollutants and trash occurs only when sumps are cleaned out; therefore, regular maintenance is required. The more frequent the cleaning, the less likely sediments will be re-suspended and subsequently discharged. Frequent cleaning also results in more volume available for future storms and enhances the overall performance. At a minimum, structures should be inspected four times annually, and cleaned whenever sediment accumulation exceeds 8 inches. Cleaning shall be performed with a vacuum truck, and disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations. At each inspection, inspect gas trap hoods and repair as necessary. Inspect outlet pipe and remove debris.

Vegetation

The on-site vegetation and landscaped areas shall be inspected. Vegetation shall be dense and healthy. The inspector shall determine and document: (1) whether fertilizing is required (2) the areas where maintenance is required, and (3) the areas which shall be protected against erosion. In addition, any recently seeded areas shall be inspected for failures.

Eroded areas shall be filled and compacted, if necessary, and reseeded as soon as possible. If an area erodes twice, then a geotextile fabric is to be installed to stabilize the area to allow vegetation to be established. These maintenance activities shall take place during the planting season. Areas affected by lack of rainfall shall be watered. If a recently established vegetated area is determined to be inadequate for erosion control it shall be re-fertilized with microbial release, not sulfur encapsulated, fertilizer, (using half of the rate originally applied). If the stand is more than 60% damaged, it shall be reestablished, following the original preparation and seeding instructions. Areas of repeated erosion/scour problems shall be lined with riprap only after twice attempting to stabilize the area with geotextile fabric.

Street Sweeping

Street sweeping of the roadway should be performed at least twice per year, preferably in the spring after the snow has melted and in the fall, prior to snowfall. Disposal of the sweepings must be in accordance with applicable local, state, and federal guidelines and regulations.

Reporting and Record Keeping
The responsible party will be responsible for maintaining accurate Maintenance Logs for all maintenance and inspections. The maintenance logs shall be kept on site for a minimum of three (3) years and be available for inspection by the Town municipal departments or other auditing authority, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location). This will be a perpetual requirement of the Owners or their Designated Party.

The Site Maintenance Log will be completed as described above, and at a minimum will include:

a. The date of inspection or activity;
b. Name of inspector;
c. Recent rain events;
d. The condition of each BMP listed above;
e. Description of the need for maintenance or corrective actions;
f. Any cleaning and disposal records.

Easements:
The site drainage system is located within the "common driveway easement," as shown on the applicable plans.

Changes to Operation and Maintenance Plans
The owner(s) of the stormwater management system must notify the Planning Board or its designated Reviewing Agent of changes in ownership or assignment of financial responsibility.

Estimated Budget
The estimated annual budget to perform the routine scheduled maintenance is approximately $2,000. This estimate does not include the repair of structures, pipes, embankments; cleaning drain lines; snow plowing; or other non-routine tasks.

Stormwater Operations and Maintenance BMP Inspection Form

Project: **Plain Road Private Roadway** **Date:**

Owner: **By:**

Location: **Plain Road**
Wayland, MA

Rain Events: **24 hrs =**
72 hrs =

Deep Sump Catch Basin & Stormceptor

	Sediment Depth	Oil depth	Structural Condition	Hood / Tee Condition	Last Cleaned	Action Required
Catch Basin 1						
Catch Basin 2						
Stormceptor 1 - Front						
Stormceptor 2 - Rear						

Infiltration Systems

	Sediment Depth	Water Depth	Action Required
FRONT Driveway Drywell			
REAR Driveway Drywell			

Pavement / Vegetation

	Condition	Action Required
Driveway		
Vegetation		

Comments: _____

_____

_____

_____

_____

Stormwater Pollution Prevention Plan and Construction Period Pollution Prevention and Erosion and Sediment Control Plan.

January 12, 2021

Plain Road, Cluster Development
Wayland, MA

This Stormwater Pollution Prevention Pan has been prepared in accordance with the MA Department of Environmental Protection Stormwater Standards and NPDES General Construction Permit for Stormwater Discharges from Construction Activities. All work shall be in accordance with the order of conditions issued by the Local Conservation Commission.

1.1 Project Information

Project Name and Location:	105 Plain Road Wayland, MA
Owner Name and Address:	_____ _____ _____
Site Operator:	_____ _____ _____
Accompanying Documents:	"Definitive Plan, Cluster Subdivision, 105 Plain Road in Wayland MA," dated April 20, 2020 including any revisions, is part of this document.
NDPES Tracking Number:	**MAR**_____
Latitude/Longitude:	Lat: 42.36900 Long: 71. 34250
Project Description:	Four Residential Lots (three proposed, one existing)
Estimated Dates:	Start: Summer 2021 Completion: Summer 2023
Name of Receiving Waters:	Hayward Brook
Estimated Area of Disturbance:	2.25 Acres

1.2 Contact Information / Responsible Parties (complete prior to construction)

Operator(s):

Company Name:
Address:
Telephone #:
Area of Control:

Project Manager(s) or Site Supervisor(s):

Company Name:
Name:
Address:
Telephone #:
Area of Control:

This SWPPP was Prepared by:

Sullivan Connors & Associates, Inc.:
121 Boston Post Road
Sudbury, MA 01776
978-443-9566

Emergency 24-Hour Contact:

Company Name:
Name:
Address:
Telephone #:

Subcontractors:

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the Subcontractor Certifications/Agreement (Attached).

1.3 Existing Conditions

The site consists of a 5.5 acre parcel located at 105 Plain Road. The lot is currently developed as a single family house including several outbuildings, pool, and tennis court, and has an existing impervious area of 26,345 square feet. The rear portion of the site behind the pool/tennis court is currently wooded sloping down to the rear of the property. There are no known wetland resources within 100 feet of the site or proposed work. Site topography is fairly flat sloping down away from Plain Road toward the rear (south) and side (east) property lines with an overall elevation change of approximately 14 feet.

1.4 Proposed Development / Nature of Construction Activities

The proposed project consists of a cluster development subdivision consisting of two (2) total lots. The front lot shown as Lot 1 on the plan would contain and preserve the existing house. The rear lot shown as Lot 2 on the plan would contain four (4) detached dwelling units. Both lots would have access off a proposed 500 foot long private roadway. The site would be serviced by a private on-site septic system and municipal water extended from Plain Road. The total post development impervious area used in the calculations is 37,300 square feet. This includes the proposed roadway, existing roof and impervious areas to remain on Lot 1, and impervious areas for the proposed driveways and dwelling units (assumed allowance of 3,700 square feet of impervious per dwelling unit). In order to mitigate the increase in runoff due to the impervious area, a stormwater management system has been proposed, which will collect runoff from the common driveway and portions of the development area. The stormwater management includes two subsurface infiltration systems (cultec drywells). One located at the entrance of the roadway and the second at the end within the cul-de-sac. Surface runoff would be collected via catch basins and conveyed to a hydrodynamic separator for pretreatment, and then a subsurface infiltration system for final treatment, recharge, and reduction of peak flow rates.

1.5 Construction Site Estimates

Total parcel area	6 acres
Total land disturbance:	2.25 acres
Impervious area before construction:	0.60 acres
Impervious area after construction:	0.85 acres

1.6 Sensitive Areas / Wetland Resources

There are no known wetland resource areas onsite or within 100 feet of the site.

1.7 Discharge Information

Stormwater from the site generally flows to the south and then east. Ultimately, this area would drain toward Hayward Brook located 800 feet to the east. Hayward Brook is not classified under the Surface water Standards nor listed on the Massachusetts year 2016 integrated list of waters this surface water as an impaired water.

1.8 Endangered Species Certification

The proposed project is not located in an Estimated or Priority Habitat of Rare Wildlife as indicated on the 2017 Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)

1.9 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing operations
- Grading and site excavation operations
- Vehicle tracking
- Topsoil stripping and stockpiling
- Landscaping operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area—small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage.
- Materials Storage Area—general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- Construction Activity—paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction.
- Concrete Washout Area

1.10 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE.

The operator must post a sign or other notice conspicuously at a safe, publicly accessible location in close proximity to the project site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way. At a minimum, the notice must include

a. The NPDES ID (i.e., permit tracking number assigned to your NOI);
b. A contact name and phone number for obtaining additional construction site information;
c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: “If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [include the appropriate CGP Regional Office contact information found at https://www.epa.gov/npdes/contact-us-stormwater#regional];” and
d. The following statement “If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations.”

2.1 General Construction Sequencing of Major Activities

Estimated Schedule: 18-24 months

Site Preparation

1. Install siltation barriers - erosion barriers as indicated on the plans
2. Construction stone tracking pad. Construction stone entrance to be replaced as needed to provide adequate storage capacity for accumulated sediment storage from vehicles leaving the site.
3. Prepare staging and stockpile areas
4. Demolish / raze existing site features.

Site development

1. Rough grade building pad.
2. Foundation and building construction
3. Install septic system and utilities
4. Stabilize slopes with hydroseed and/or mulch as construction areas are completed and/or construction temporarily ceases in areas.

Private Roadway

1. Rough grade driveway
2. Install utilities
3. Install drainage system components (drywell to remain offline until site is fully stabilized)
4. Gravel base for driveway
5. Driveway binder course pavement and berms
6. Stabilize slopes with hydroseed and/or mulch as construction areas are completed and/or construction temporarily ceases in areas.
7. Final Pavement
8. Place drywell on-line only after tributary area is fully stabilized

Final Cleanup:

1. Ensure site is fully stabilized and remove all sediment control devices once verifiy by the engineer and conservation commission.
2. Perform final cleanup.

2.2 Erosion and Sediment Controls

General Conditions – Prior to initiating construction, all sedimentation and erosion control measures shall be installed as shown on the plans and detail drawings. This plan depicts the minimum required sedimentation and erosion controls. The contractor shall employ additional sedimentation and erosion control measures as necessitated by site conditions, or as directed by the owner, the owner's representative, or the conservation commission to ensure protection of all wetland resources and control sediment transport. if sedimentation plumes occur, the contractor shall stop work and install additional sedimentation control devices immediately to prevent further sedimentation.

Temporary Stabilization – Topsoil stockpiles and disturbed portions of the site where construction activity temporarily ceases for at least 7 days will be stabilized with a temporary seed and mulch no later than 7 days from the last construction activity in that area. The temporary seed shall be Erosion Control mix. Seeding shall be nutrient enriched hydroseed and cellulose or other degradable fibers capable of retaining moisture.

Permanent Stabilization – Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 7 or more calendar days; and Complete the installation of stabilization measures as soon as practicable, but no later than 7 calendar days after stabilization has been initiated.

Final Stabilization Criteria (for any areas not covered by permanent structures). Establish uniform, perennial vegetation (i.e., evenly distributed, without large bare areas) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or implement permanent non-vegetative stabilization measures to provide effective cover. The permanent seed mix consists of tall fescue, and annual rye. Prior to seeding, ground agricultural limestone shall be applied. Seeding shall be nutrient enriched hydroseed and cellulose or other degradable fibers capable of retaining moisture.

Straw Wattles (or straw bales) and Silt Fence (Perimeter Controls) – Prior to the commencement of work, straw wattles/bales and silt fence (or approved equal) shall be installed along the edge of proposed development, and as indicated on the plans. Additional controls shall be located as conditions warrant or as directed by the owner, his representatives, or the local authority. In some areas wattles/silt fencing structures may have to be duplicated at regular intervals up gradient of wetlands, and it may be necessary to provide crushed stone armor to hay bales/silt fencing when anticipated flows are expected to be heavy or fast.

Track out controls / **Construction Entrance –** A stabilized stone apron construction entrance shall be at all construction entrances to help prevent vehicle tracking of sediments. All vehicles shall enter and exit the sit via the stabilized construction entrance. The contractor shall inspect the construction entrance daily and after heavy use. If mud and soil clogs the voids in the crushed stone reducing the effectiveness, the pad shall be top dressed with new, clean stone. If the pad becomes completely clogged, replacement of the entire pad may be necessary. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

Track out controls / **Street Sweeping** – Street sweeping in the vicinity of the project area shall be performed as needed until the project limits have been stabilized. All sediment tracked outside the limit of work shall be swept at the end of each working day.

Temporary Sediment Traps / **Basins** – If required Sediment traps and/or basins shall be constructed as necessitated by field conditions. The minimum volume shall be 3600 cubic feet of storage for each acre of drainage area. Sediment traps/basins should be readily accessible for maintenance and sediment removal, and should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place. Remove basin after drainage area has been permanently stabilized, inspected, and approved. Before removing dam, drain water and remove sediment; place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize.

Inlet Protection – All existing and proposed drainage system inlets, which may receive stormwater flow from disturbed areas, shall be provided with inlet protection (ring of strawbales and catch basin inserts). The contractor shall maintain these devices until all work is completed and all areas have been adequately stabilized.

Dust Control – Dust control measures shall be implemented and maintained properly throughout dry weather periods until all disturbed areas have been permanently stabilized. Methods for dust control shall include water sprinkling and/or other methods approved by the engineer.

Soil Stockpiles – Soil stockpiles shall be stabilized to prevent erosion along with perimeter sedimentation controls. No materials subject to erosion shall be stockpiled overnight within 100 feet of a wetland unless covered. Stockpiling of “drier” glacial till material is not recommended unless protected from moisture.

Dewatering Operations – Dewatering operations, if required, shall discharge onto stabilized areas. All discharge water is to pass through sedimentation control devices to prevent impacts upon water bodies, bordering vegetated wetlands, drainage systems and abutting properties. No discharges from dewatering operations shall be discharged directly to the drainage system.

Snow Removal – Snow shall be plowed to the snow storage area indicated on the plans. Any excess of that which can be stored on-site shall be removed. Snow shall not be plowed into the 20-foot buffer zone to any wetland area. All catch basins shall be uncovered and functional immediately after snow plowing. The snow pile shall be placed so that it will not interfere with runoff flow.

Topsoil – Topsoil shall be stripped and stockpiled on-site for reuse, unless otherwise noted on the plans (per stockpile requirements). Materials shall be re-used on-site to the maximum extent practical. Any excess shall be properly exported off-site.

Minimize Soil Compaction – Within the limits of the infiltration galley, the use of heavy equipment shall be limited to the maximum extent practical.

Vehicle Washing – Vehicle and equipment washing, other than hose down with clean water, shall not be allowed. All wash down water shall be directed to a sediment control device (not directly to any stormwater drainage system or wetland).

Fertilizer Discharge Restrictions.

- Apply at a rate and in amounts consistent with manufacturer's specifications,
- Apply during the growing season, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- Never apply to frozen ground;
- Never apply to stormwater conveyance channels with flowing water; and
- Follow all other federal, state, and local requirements regarding fertilizer application.

Washing of Applicators and Containers used for Paint, Concrete, or Other Materials. - Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation Handle washout or cleanout wastes as follows: Do not dump liquid wastes in storm sewers; Dispose of liquid wastes in accordance with applicable regulations; and. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes. Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

2.3 Buffers

Not applicable. there are no wetland resources within 100 feet of the site.

2.4 Inspection and Maintenance Schedule

The responsible party shall be responsible for maintaining all temporary and permanent sedimentation and erosion controls until work is complete and all areas have been permanently stabilized. At such time all sedimentation and erosion control measures shall be removed. These are the inspection and maintenance practices that will be used to maintain erosion and sediment controls during construction.

Schedule:

- All control measures will be inspected each working day including within 24 hours following any precipitation event of 0.25 inches.
- Depth of precipitation events shall be based upon NCDC reporting or an on-site rain gauge.

Maintenance Practices:

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report of any deficiencies.
- Built up sediment shall be removed from the silt fence when it reaches a depth equal to one-third the height of the fence.
- The sediment basins shall be inspected for depth of sediment, and built up sediment will be removed when it reached 25 percent of the design capacity or at the end of the job. Check embankment for: settlement, seepage, or slumping along the toe or around pipe. Look for signs of piping. Repair immediately. Remove trash and other debris from principal spillway, emergency spillway, and pool area. Clean or replace gravel when sediment pool does not drain properly.
- Any diversion dikes will be inspected for breaches and promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts and healthy growth.
- Contractor to maintain a supply of erosion control devises on site at all times to repair any broken or damaged materials.

The site superintendent, will select three individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports. Personnel selected for inspection and maintenance responsibilities shall be a “qualified personnel” as defined in section 4. D of the GCP. Staff shall be trained in all inspection and maintenance practices for keeping the erosion and sediment controls used onsite in good working order.

An *inspection report* will be made after each inspection. Copies of the reports shall be maintained on site. At a minimum, the inspection report must include the following and be signed per the GCP.:

- The inspection date;
- Names, titles, and qualifications of personnel making the inspection;
- Weather information for the period since the last inspection including estimate of the beginning and duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
- Location(s) of discharges of sediment or other pollutants from the site;
- Location(s) of BMPs that need to be maintained;
- Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
- Corrective action required including implementation dates.

2.5 Staff and Training Requirements.

Prior to the commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, you must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
- Personnel responsible for the application and storage of treatment chemicals (if applicable);
- Personnel who are responsible for conducting inspections as required in Part 4.1.1; and
- Personnel who are responsible for taking corrective actions.

Notes: (1) If the person requiring training is a new employee, who starts after you commence earth-disturbing or pollutant-generating activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit. (2) For emergency-related construction activities, the requirement to train personnel prior to commencement of earth-disturbing activities does not apply, however, such personnel must have the required training prior to NOI submission.

The operator is responsible for ensuring that all activities on the site comply with the requirements of the permit. The operator is not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of the permit that may be affected by the work they are subcontracted to perform. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):

- The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
- The proper procedures to follow with respect to the permit's pollution prevention requirements; and
- When and how to conduct inspections, record applicable findings, and take corrective actions.

3.1 Storage, Handling, and Waste Disposal

Building Products - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Pesticides, herbicides, insecticides and fertilizers - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals- store chemicals in water-tight containers, and provide either (1) cover (e.g., plastic sheeting or temporary roofs) to prevent these containers from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., spill kits), or provide secondary containment (e.g., spill berms, decks, spill containment pallets). Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge

Hazardous Waste - Separate hazardous or toxic waste from construction and domestic waste. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements; iii. Store all containers that will be stored outside within appropriatelysized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in covered area or having a spill kit available on site);

Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements. site personnel will be instructed in these practice and the individual who manages the day to day site operations, will be responsible for seeing that these procedures are followed.

Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge

Sanitary Waste – All sanitary waste will be collected from the portable units a minimum of once per week by the sanitary pumping company, licensed by the Commonwealth of Massachusetts and as required by the local regulation. Position units in a secure location where they cannot be tipped over.

Waste Materials – All waste materials will be collected and stored in a securely lidded metal dumpster rented from a licensed waster management company. Dumpsters shall be kept closed or covered when not in use and overnight. The dumpster will meet all local and State solid waster management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied at least twice per month or more often if necessary, and the waste will be hauled to the waste management company. On work days, clean up and dispose of waste in designated waste containers. Clean up immediately if containers overflow. No construction waste materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer. The individual managing the day-to-day site operations will be responsible for seeing that these procedures are followed.

3.2 Building Material Inventory for Pollution Prevention Plan

The materials or substances listed below are expected to be present onsite during construction:

- Concrete
- Petroleum based products including asphalt concrete/emulsions, fuel(s), oil, etc.
- Wood
- Fertilizers and tachifiers
- Paints (enamel, latex and oil based stains)
- Metal studs and products
- Masonry block
- Roofing shingles
- Gypsum and plaster
- Stone products

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. A watertight container will be used to store hand tools, small parts, and other construction materials.

3.2 Spill Prevention Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping – The following good housekeeping practices will be followed onsite during the construction project**.**

- An effort will be made to store only enough products to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in this appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers and with the original manufacturers' label.
- Substances will not be mixed with one another unless recommended by the manufactures.
- Whenever possible, all of a product will be used up before disposing of the container.

- Manufacturers' recommendation for proper use and disposal will be followed.
- The Site Superintendent will inspect daily to ensure proper use and disposal of materials.
- Hazardous Procedures – In accordance with industry standards and Applicable regulations

Product Specific Practices – The following product specific practices will be followed onsite:
Petroleum Products – Transport and delivery of fuel in approved containers only.
Fertilizers – In accordance with labeling
Paints – In accordance with labeling

Spill Control Practices – Any spills of hazardous materials shall be contained and cleaned up immediately. If appropriate, the Massachusetts Department of Environmental Protection (DEP) shall be notified. There shall, at all times when work is underway on-site, be an individual present who is trained in proper spill control practices.

In the event that hazardous material, gasoline or other petroleum is released, the following procedure should be followed:

1. Immediately contact the following agencies:
   Wayland Fire Department (508) 358-4747
   MassDEP Emergency Response (888) 304-1133

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period:

- Provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–267–2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and

- Within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. You must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

Vehicle Fueling and Maintenance – All major equipment/vehicle fueling and maintenance will be performed off-site if practical. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area outside the buffer zone or resource area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets in accordance with Part 3.1 of the GCP. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.3 Non-Storm Water Discharges

It is expected that the following non-storm water discharge will occur from the site during the construction period:

- Pavement wash waters (where no spills or leaks of toxic or hazardous material have occurred).
- Discharges from Fire Fighting activities
- Hydrant and water line flushing
- Landscape irrigation
- Vehicle wash
- Water for dust control
- Foundation / footing drains
- Construction dewatering water

4.0 Record Keeping / Updating of Documentation

This document is intended as a living document to be continuously revised and updated based on changing site conditions and the progression of construction. The SWPPP shall be continuously revised to indicate the condition and location of the various Best Management Practices.

Copies of the GCP, signed and certified NOI, and EPA notification of receipt must be included in the SWPPP. This SWPPP plan, the approved drawings made part of this document, inspection reports (made at least weekly), and required logs shall be maintained on site at all times. Inspection reports shall be retained with the SWPPP for at least three years from the date the permit coverage expires or is terminated..

The following inspection reports and logs shall be maintained:

- Inspection Reports
- Corrective Action Log
- SWPPP Amendment Log
- Grading and Stabilization Activities Log

5.0 Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

Contact information: _____

_____

SWPPP Attachments

- ***NOI and Acknowledgement Letter from EPA/State (Insert once received)***

- ***Inspection Reports***

- ***Corrective Action Log***

- ***Subcontractor Certifications/Agreements***

- ***NPDES Construction General Permit***

Download at: https://www.epa.gov/sites/production/files/2019-06/documents/final_2017_cgp_current_as_of_6-6-2019.pdf

Stormwater Construction Site Inspection Report

General Information			
Project Name	**105 Plain Road**		
	Wayland, MA	**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Within 24 Hours: _____ inches
Within 72 Hours: _____ inches
Within 7 days: _____ inches

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Construction Entrance and Street Sweeping	❑Yes ❑No	❑Yes ❑No	
2	Sediment Basin/Trap (if Applicable)	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
3	Erosion Barrier	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
4	Soil Stockpile Protection / Stabilization	❑Yes ❑No	❑Yes ❑No	
5	Designated Construction Material Stockpile Areas	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
6	Catch Basin Inlet Protection	❑Yes ❑No	❑Yes ❑No	Any Evidence of Bypass_____
7	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
8	Are natural resource areas protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
9	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
10	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
11	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
12	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
13	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
14	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
15	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

Additional Comments / Description of Current Site Work

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature:_____**Date:**_____

Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

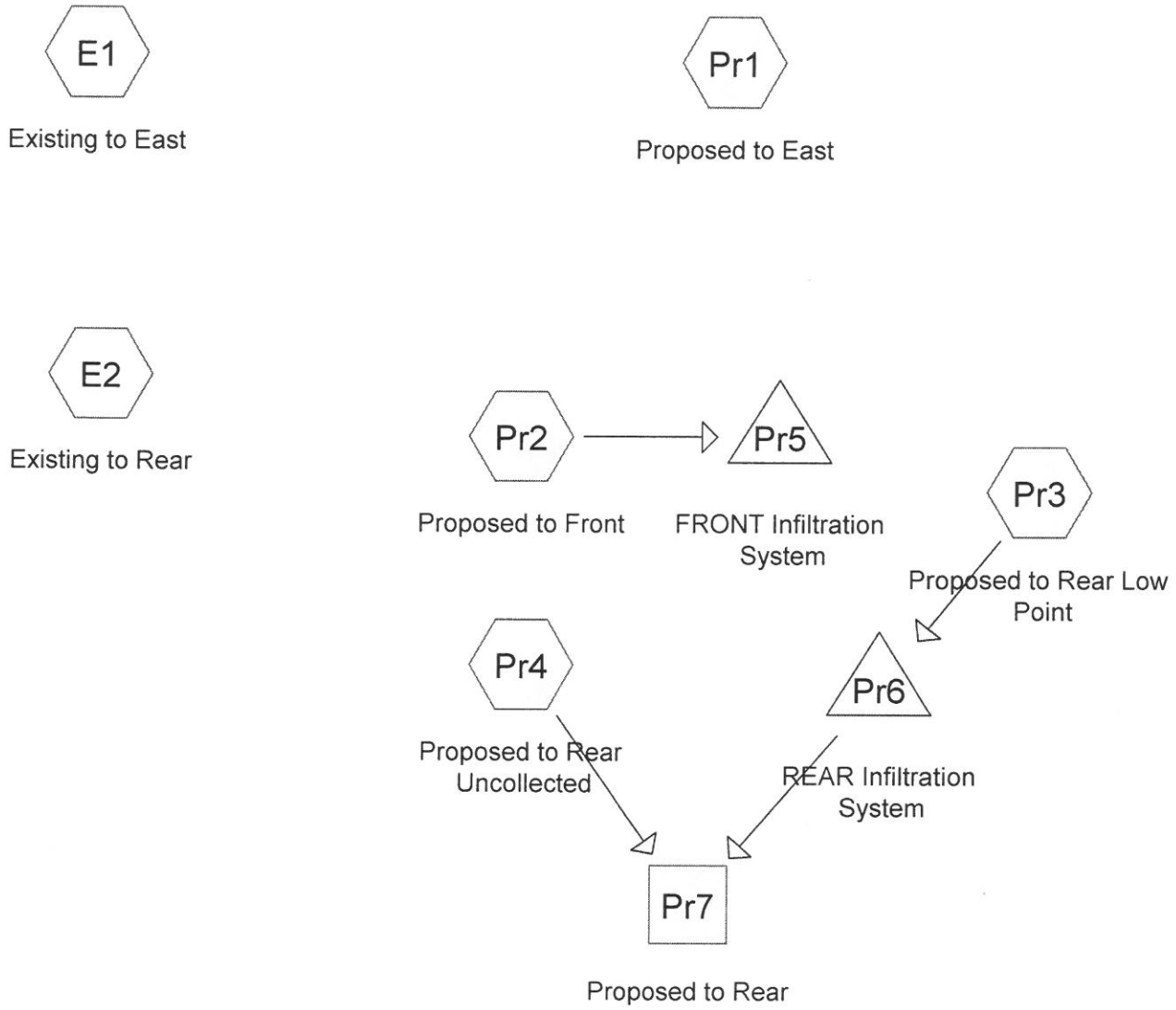
_____

_____

Signature: _____

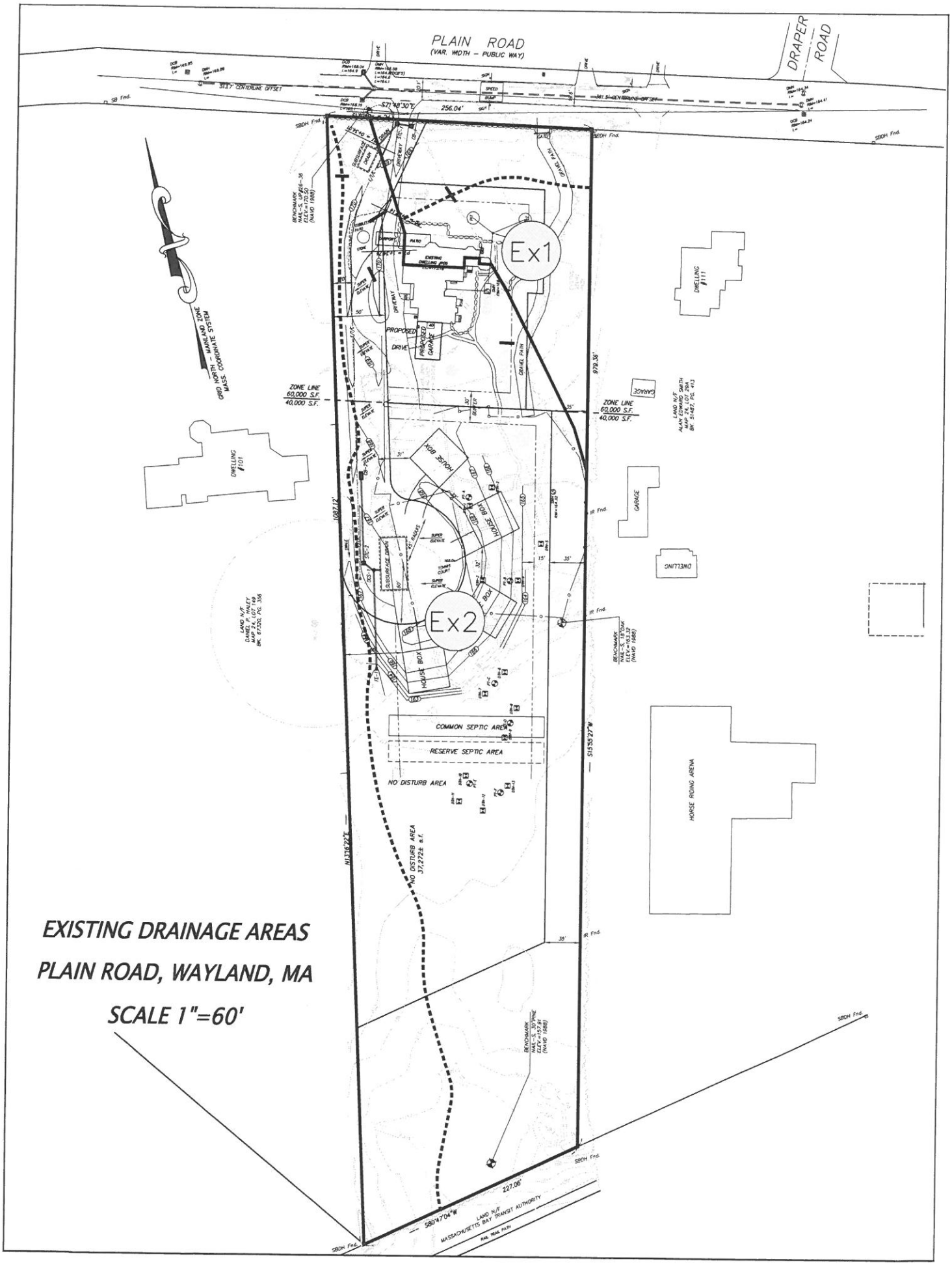
Title: _____

Date: _____



Subcat Reach Pond Link

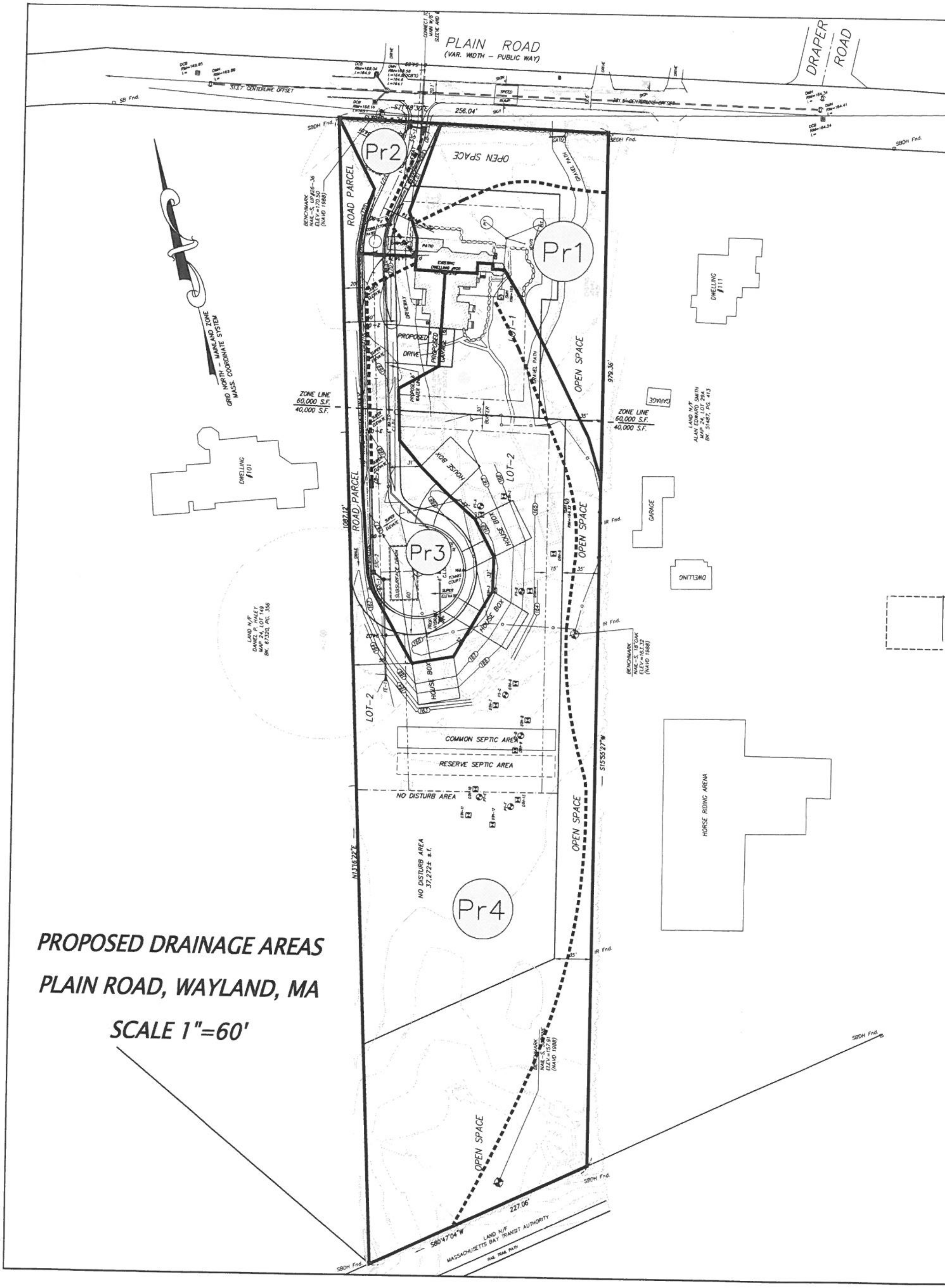
Drainage Diagram for 105 Plain Road 2021
Prepared by Microsoft, Printed 1/14/2021



EXISTING DRAINAGE AREAS

PLAIN ROAD, WAYLAND, MA

SCALE 1"=60'



PROPOSED DRAINAGE AREAS

PLAIN ROAD, WAYLAND, MA

SCALE 1"=60'

NOAA Atlas 14, Volume 10, Version 3
Location name: Wayland, Massachusetts, USA*
Latitude: 42.369°, Longitude: -71.3426°
Elevation: 166.29 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.316 (0.242-0.404)	0.385 (0.294-0.492)	0.498 (0.379-0.639)	0.591 (0.447-0.763)	0.720 (0.531-0.978)	0.816 (0.592-1.14)	0.919 (0.651-1.33)	1.04 (0.695-1.54)	1.22 (0.787-1.87)	1.37 (0.865-2.14)
10-min	0.448 (0.342-0.572)	0.546 (0.416-0.698)	0.706 (0.537-0.905)	0.839 (0.634-1.08)	1.02 (0.752-1.39)	1.16 (0.838-1.61)	1.30 (0.922-1.89)	1.47 (0.985-2.18)	1.72 (1.11-2.65)	1.94 (1.23-3.04)
15-min	0.527 (0.403-0.673)	0.642 (0.490-0.821)	0.830 (0.631-1.07)	0.986 (0.746-1.27)	1.20 (0.885-1.63)	1.36 (0.986-1.89)	1.53 (1.08-2.22)	1.73 (1.16-2.56)	2.03 (1.31-3.12)	2.28 (1.44-3.57)
30-min	0.718 (0.548-0.917)	0.875 (0.667-1.12)	1.13 (0.860-1.45)	1.34 (1.02-1.74)	1.64 (1.21-2.22)	1.85 (1.34-2.58)	2.09 (1.48-3.03)	2.36 (1.58-3.49)	2.76 (1.79-4.24)	3.10 (1.96-4.86)
60-min	0.909 (0.694-1.16)	1.11 (0.845-1.42)	1.43 (1.09-1.84)	1.70 (1.29-2.20)	2.07 (1.53-2.81)	2.35 (1.70-3.26)	2.64 (1.87-3.83)	2.99 (2.00-4.42)	3.49 (2.26-5.36)	3.92 (2.48-6.15)
2-hr	1.17 (0.900-1.48)	1.43 (1.10-1.81)	1.86 (1.43-2.37)	2.21 (1.69-2.83)	2.70 (2.01-3.65)	3.06 (2.24-4.24)	3.45 (2.47-5.01)	3.93 (2.64-5.77)	4.67 (3.03-7.11)	5.31 (3.37-8.25)
3-hr	1.36 (1.05-1.71)	1.66 (1.28-2.10)	2.16 (1.66-2.73)	2.57 (1.97-3.28)	3.14 (2.35-4.23)	3.56 (2.62-4.92)	4.02 (2.89-5.81)	4.59 (3.09-6.70)	5.48 (3.56-8.30)	6.25 (3.98-9.67)
6-hr	1.75 (1.36-2.18)	2.13 (1.66-2.67)	2.77 (2.15-3.49)	3.30 (2.55-4.18)	4.03 (3.04-5.38)	4.57 (3.38-6.26)	5.16 (3.74-7.40)	5.89 (3.99-8.53)	7.05 (4.59-10.6)	8.05 (5.14-12.3)
12-hr	2.22 (1.74-2.75)	2.71 (2.13-3.36)	3.51 (2.75-4.38)	4.18 (3.25-5.24)	5.10 (3.86-6.74)	5.77 (4.30-7.84)	6.51 (4.74-9.25)	7.43 (5.05-10.7)	8.85 (5.79-13.2)	10.1 (6.45-15.3)
24-hr	2.64 (2.09-3.25)	3.26 (2.58-4.01)	4.26 (3.36-5.21)	5.10 (4.00-6.34)	6.25 (4.77-8.21)	7.10 (5.32-9.16)	8.02 (5.88-11.3)	9.18 (6.27-13.1)	11.0 (7.21-16.2)	12.6 (8.06-18.9)
2-day	2.96 (2.37-3.61)	3.71 (2.97-4.54)	4.94 (3.93-6.06)	5.97 (4.72-7.36)	7.37 (5.67-9.62)	8.40 (6.35-11.3)	9.54 (7.06-13.4)	11.0 (7.54-15.5)	13.3 (8.79-19.5)	15.4 (9.92-23.0)
3-day	3.23 (2.59-3.92)	4.03 (3.24-4.90)	5.35 (4.28-6.53)	6.45 (5.13-7.92)	7.96 (6.15-10.3)	9.06 (6.88-12.1)	10.3 (7.64-14.4)	11.9 (8.15-16.6)	14.4 (9.50-20.9)	16.7 (10.7-24.7)
4-day	3.48 (2.81-4.21)	4.31 (3.47-5.23)	5.68 (4.55-6.90)	6.81 (5.43-8.33)	8.37 (6.49-10.8)	9.50 (7.24-12.6)	10.8 (8.02-15.0)	12.4 (8.53-17.3)	15.0 (9.93-21.8)	17.3 (11.2-25.6)
7-day	4.20 (3.41-5.05)	5.07 (4.11-6.10)	6.49 (5.24-7.83)	7.67 (6.15-9.31)	9.29 (7.24-11.9)	10.5 (8.01-13.8)	11.8 (8.80-16.3)	13.5 (9.31-18.7)	16.1 (10.7-23.2)	18.5 (12.0-27.1)
10-day	4.88 (3.97-5.83)	5.77 (4.70-6.91)	7.23 (5.86-8.69)	8.44 (6.80-10.2)	10.1 (7.89-12.9)	11.3 (8.67-14.8)	12.7 (9.44-17.3)	14.3 (9.94-19.8)	17.0 (11.3-24.2)	19.2 (12.5-28.1)
20-day	6.85 (5.64-8.13)	7.82 (6.42-9.29)	9.40 (7.69-11.2)	10.7 (8.70-12.8)	12.5 (9.80-15.7)	13.9 (10.6-17.7)	15.3 (11.3-20.3)	16.9 (11.8-23.0)	19.2 (12.8-27.2)	21.1 (13.7-30.5)
30-day	8.50 (7.02-10.0)	9.52 (7.86-11.3)	11.2 (9.20-13.3)	12.6 (10.3-15.0)	14.5 (11.4-18.0)	15.9 (12.2-20.2)	17.4 (12.8-22.8)	19.0 (13.3-25.7)	21.1 (14.1-29.6)	22.7 (14.8-32.6)
45-day	10.6 (8.77-12.4)	11.6 (9.66-13.7)	13.4 (11.1-15.8)	14.9 (12.2-17.7)	16.9 (13.3-20.8)	18.5 (14.2-23.2)	20.0 (14.7-25.9)	21.5 (15.1-28.9)	23.4 (15.7-32.6)	24.7 (16.1-35.3)
60-day	12.3 (10.3-14.4)	13.4 (11.2-15.7)	15.3 (12.7-18.0)	16.8 (13.8-19.9)	18.9 (15.0-23.1)	20.6 (15.8-25.6)	22.2 (16.3-28.4)	23.6 (16.7-31.6)	25.4 (17.1-35.3)	26.6 (17.4-37.8)

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

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

Please refer to NOAA Atlas 14 document for more information.

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Summary for Subcatchment E1: Existing to East

[45] Hint: Runoff=Zero

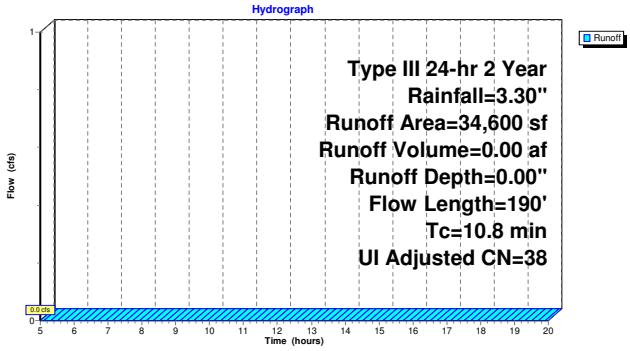
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
22,120	39	>75% Grass cover, Good, HSG A
10,045	30	Woods, Good, HSG A
820	98	Unconnected pavement, HSG A
1,615	98	Unconnected roofs, HSG A
34,600	41	Weighted Average, UI Adjusted CN = 38
32,165		92.96% Pervious Area
2,435		7.04% Impervious Area
2,435		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment E1: Existing to East



Summary for Subcatchment E2: Existing to Rear

[45] Hint: Runoff=Zero

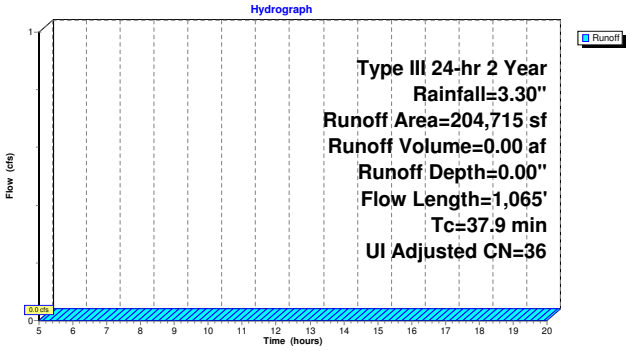
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
39,650	39	>75% Grass cover, Good, HSG A
141,155	30	Woods, Good, HSG A
18,590	98	Unconnected pavement, HSG A
5,320	98	Unconnected roofs, HSG A
204,715	40	Weighted Average, UI Adjusted CN = 36
180,805		88.32% Pervious Area
23,910		11.68% Impervious Area
23,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
27.6	1,015	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	1,065	Total			

Subcatchment E2: Existing to Rear



Summary for Subcatchment Pr1: Proposed to East

[45] Hint: Runoff=Zero

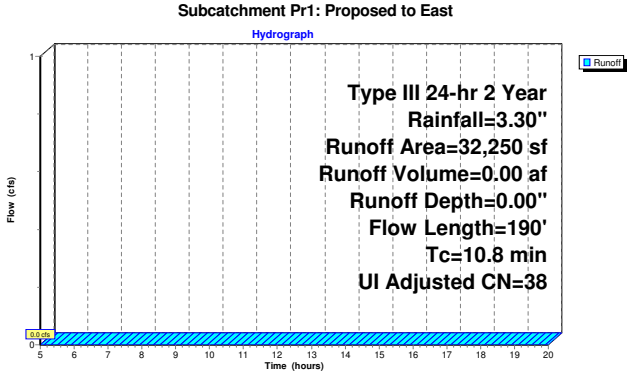
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
10,045	30	Woods, Good, HSG A
1,615	98	Unconnected roofs, HSG A
20,590	39	>75% Grass cover, Good, HSG A
32,250	39	Weighted Average, UI Adjusted CN = 38
30,635		94.99% Pervious Area
1,615		5.01% Impervious Area
1,615		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment Pr1: Proposed to East



Summary for Subcatchment Pr2: Proposed to Front

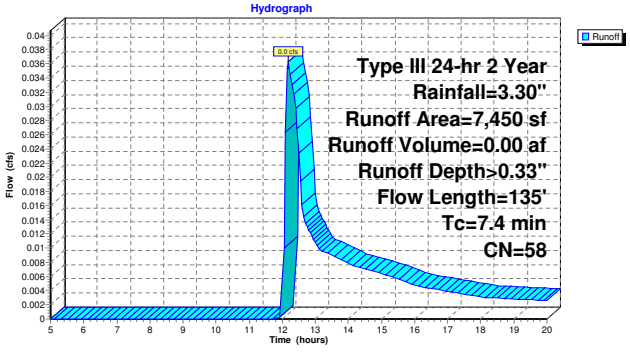
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 0.00 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
5,050	39	>75% Grass cover, Good, HSG A
2,400	98	Paved roads w/curbs & sewers, HSG A
7,450	58	Weighted Average
5,050		67.79% Pervious Area
2,400		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	40	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.6	95	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.4	135	Total			

Subcatchment Pr2: Proposed to Front



Summary for Subcatchment Pr3: Proposed to Rear Low Point

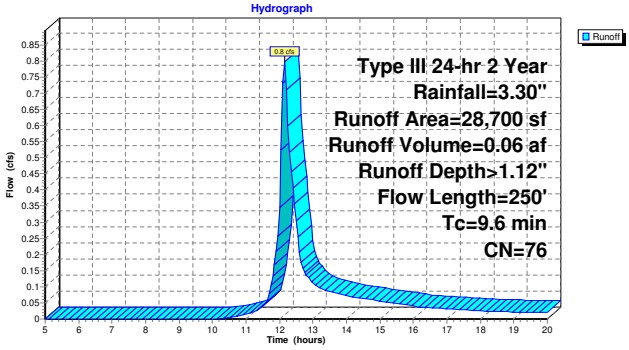
Runoff = 0.8 cfs @ 12.15 hrs, Volume= 0.06 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
10,885	39	>75% Grass cover, Good, HSG A
1,505	98	Roofs, HSG A
11,600	98	Paved roads w/curbs & sewers, HSG A
4,710	98	Paved parking, HSG A
28,700	76	Weighted Average
10,885		37.93% Pervious Area
17,815		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
1.5	200	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	250	Total			

Subcatchment Pr3: Proposed to Rear Low Point



Summary for Subcatchment Pr4: Proposed to Rear Uncollected

[45] Hint: Runoff=Zero

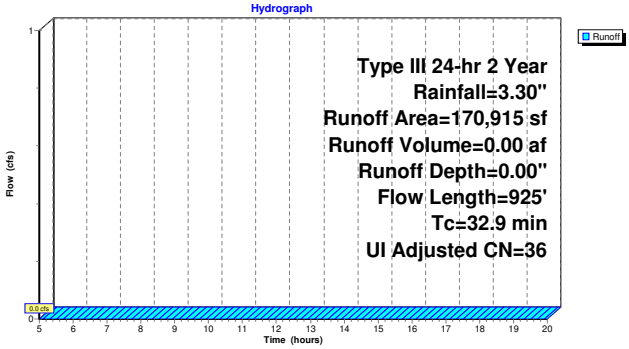
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
61,290	39	>75% Grass cover, Good, HSG A
94,155	30	Woods, Good, HSG A
2,000	98	Unconnected pavement, HSG A
1,870	98	Unconnected roofs, HSG A
11,600	98	Unconnected roofs, HSG A
170,915	39	Weighted Average, UI Adjusted CN = 36
155,445		90.95% Pervious Area
15,470		9.05% Impervious Area
15,470		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0125	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
4.9	275	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	600	0.0120	0.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	925	Total			

Subcatchment Pr4: Proposed to Rear Uncollected



Summary for Pond Pr5: FRONT Infiltration System

Inflow Area = 0.171 ac, 32.21% Impervious, Inflow Depth > 0.33" for 2 Year event
Inflow = 0.0 cfs @ 12.17 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 12.21 hrs, Volume= 0.00 af, Atten= 2%, Lag= 2.3 min
Discarded = 0.0 cfs @ 12.21 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 162.02' @ 12.21 hrs Surf.Area= 312 sf Storage= 3 cf

Plug-Flow detention time= 1.2 min calculated for 0.00 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (868.4 - 867.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	162.00'	317 cf	**13.00'W x 24.00'L x 3.54'H Field A** 1,105 cf Overall - 313 cf Embedded = 792 cf x 40.0% Voids
#2A	162.50'	313 cf	**Cultec R-330XL** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		630 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'

Discarded OutFlow Max=0.1 cfs @ 12.21 hrs HW=162.02' (Free Discharge)
↑**1=Exfiltration** (Controls 0.1 cfs)

Pond Pr5: FRONT Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

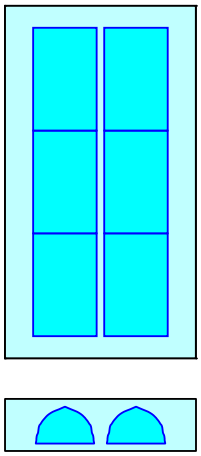
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 23.0" Side Stone x 2 = 13.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

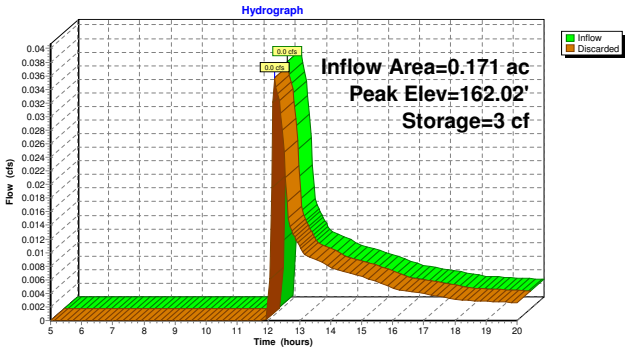
1,105.0 cf Field - 312.9 cf Chambers = 792.1 cf Stone x 40.0% Voids = 316.8 cf Stone Storage

Stone + Chamber Storage = 629.8 cf = 0.01 af

6 Chambers
40.9 cy Field
29.3 cy Stone



Pond Pr5: FRONT Infiltration System



Summary for Pond Pr6: REAR Infiltration System

Inflow Area = 0.659 ac, 62.07% Impervious, Inflow Depth > 1.12" for 2 Year event
Inflow = 0.8 cfs @ 12.15 hrs, Volume= 0.06 af
Outflow = 0.4 cfs @ 12.44 hrs, Volume= 0.06 af, Atten= 54%, Lag= 17.4 min
Discarded = 0.4 cfs @ 12.44 hrs, Volume= 0.06 af
Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 160.61' @ 12.44 hrs Surf.Area= 1,395 sf Storage= 407 cf

Plug-Flow detention time= 7.5 min calculated for 0.06 af (100% of inflow)
Center-of-Mass det. time= 7.0 min (821.8 - 814.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	160.00'	1,225 cf	**45.00'W x 31.00'L x 3.54'H Field A** 4,941 cf Overall - 1,878 cf Embedded = 3,063 cf x 40.0% Voids
#2A	160.50'	1,878 cf	**Cultec R-330XL** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
#3	163.00'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder** -Impervious
		3,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	160.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'
#2	Primary	163.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 163.20' / 162.20' S= 0.0100 '/' Cc= 0.900 n= 0.012

Discarded OutFlow Max=0.4 cfs @ 12.44 hrs HW=160.61' (Free Discharge)
↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=160.00' (Free Discharge)
↑**2=Culvert** (Controls 0.0 cfs)

Pond Pr6: REAR Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

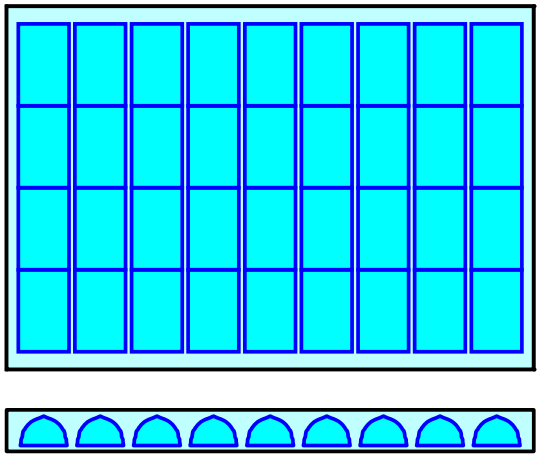
4 Chambers/Row x 7.00' Long = 28.00' + 18.0" End Stone x 2 = 31.00' Base Length
9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

36 Chambers x 52.2 cf = 1,877.7 cf Chamber Storage

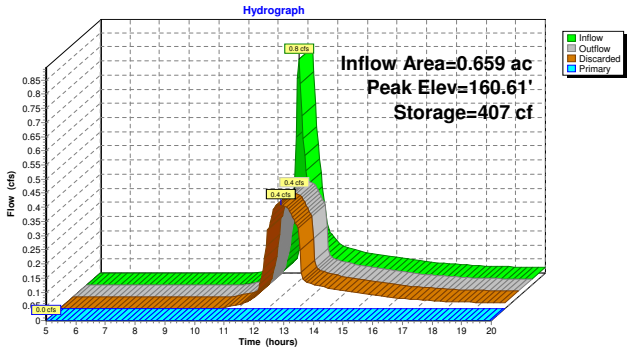
4,940.6 cf Field - 1,877.7 cf Chambers = 3,063.0 cf Stone x 40.0% Voids = 1,225.2 cf Stone Storage

Stone + Chamber Storage = 3,102.8 cf = 0.07 af

36 Chambers
183.0 cy Field
113.4 cy Stone



Pond Pr6: REAR Infiltration System



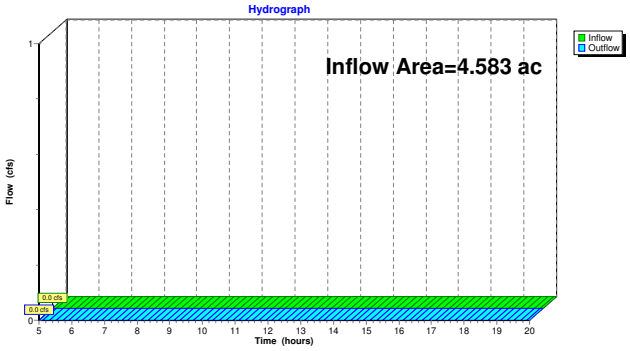
Summary for Reach Pr7: Proposed to Rear

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.583 ac, 16.67% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach Pr7: Proposed to Rear



Summary for Subcatchment E1: Existing to East

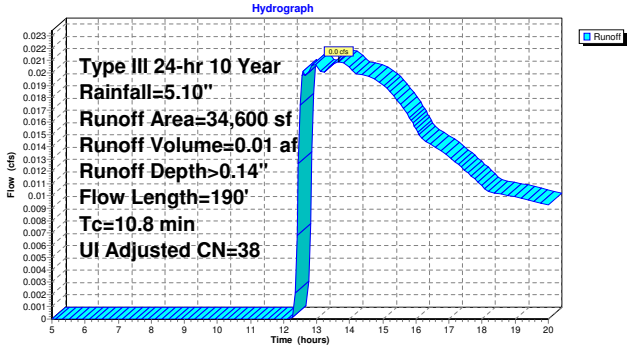
Runoff = 0.0 cfs @ 13.68 hrs, Volume= 0.01 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
22,120	39	>75% Grass cover, Good, HSG A
10,045	30	Woods, Good, HSG A
820	98	Unconnected pavement, HSG A
1,615	98	Unconnected roofs, HSG A
34,600	41	Weighted Average, UI Adjusted CN = 38
32,165		92.96% Pervious Area
2,435		7.04% Impervious Area
2,435		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment E1: Existing to East



Summary for Subcatchment E2: Existing to Rear

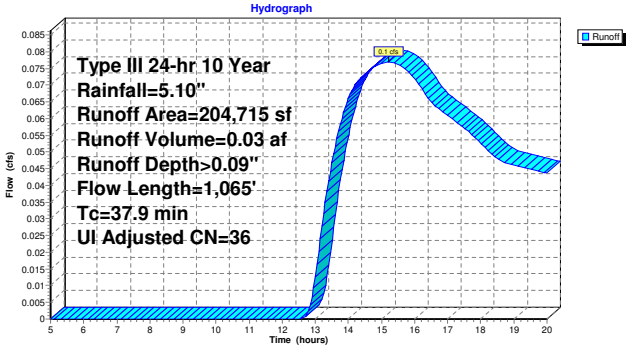
Runoff = 0.1 cfs @ 15.20 hrs, Volume= 0.03 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
39,650	39	>75% Grass cover, Good, HSG A
141,155	30	Woods, Good, HSG A
18,590	98	Unconnected pavement, HSG A
5,320	98	Unconnected roofs, HSG A
204,715	40	Weighted Average, UI Adjusted CN = 36
180,805		88.32% Pervious Area
23,910		11.68% Impervious Area
23,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
27.6	1,015	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	1,065	Total			

Subcatchment E2: Existing to Rear



Summary for Subcatchment Pr1: Proposed to East

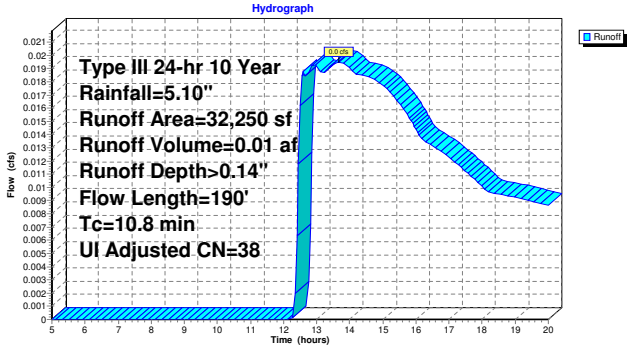
Runoff = 0.0 cfs @ 13.68 hrs, Volume= 0.01 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
10,045	30	Woods, Good, HSG A
1,615	98	Unconnected roofs, HSG A
20,590	39	>75% Grass cover, Good, HSG A
32,250	39	Weighted Average, UI Adjusted CN = 38
30,635		94.99% Pervious Area
1,615		5.01% Impervious Area
1,615		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment Pr1: Proposed to East



Summary for Subcatchment Pr2: Proposed to Front

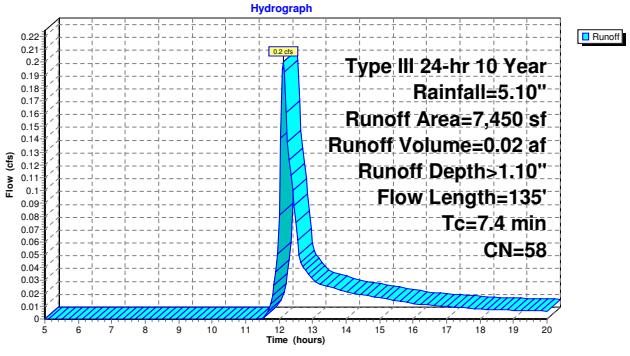
Runoff = 0.2 cfs @ 12.12 hrs, Volume= 0.02 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
5,050	39	>75% Grass cover, Good, HSG A
2,400	98	Paved roads w/curbs & sewers, HSG A
7,450	58	Weighted Average
5,050		67.79% Pervious Area
2,400		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	40	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.6	95	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.4	135	Total			

Subcatchment Pr2: Proposed to Front



Summary for Subcatchment Pr3: Proposed to Rear Low Point

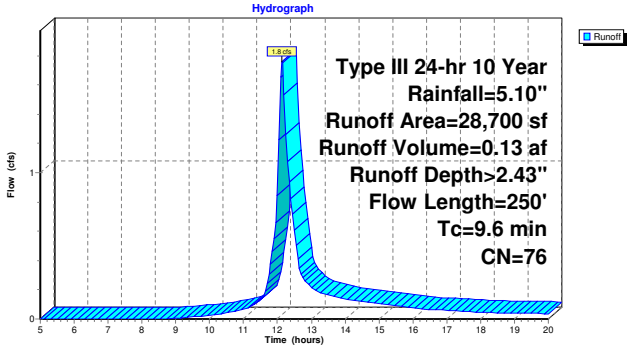
Runoff = 1.8 cfs @ 12.14 hrs, Volume= 0.13 af, Depth> 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
10,885	39	>75% Grass cover, Good, HSG A
1,505	98	Roofs, HSG A
11,600	98	Paved roads w/curbs & sewers, HSG A
4,710	98	Paved parking, HSG A
28,700	76	Weighted Average
10,885		37.93% Pervious Area
17,815		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
1.5	200	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	250	Total			

Subcatchment Pr3: Proposed to Rear Low Point



Summary for Subcatchment Pr4: Proposed to Rear Uncollected

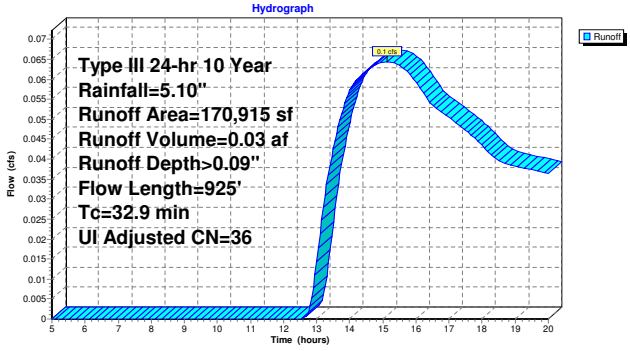
Runoff = 0.1 cfs @ 15.12 hrs, Volume= 0.03 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.10"

Area (sf)	CN	Description
61,290	39	>75% Grass cover, Good, HSG A
94,155	30	Woods, Good, HSG A
2,000	98	Unconnected pavement, HSG A
1,870	98	Unconnected roofs, HSG A
11,600	98	Unconnected roofs, HSG A
170,915	39	Weighted Average, UI Adjusted CN = 36
155,445		90.95% Pervious Area
15,470		9.05% Impervious Area
15,470		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0125	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
4.9	275	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	600	0.0120	0.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	925	Total			

Subcatchment Pr4: Proposed to Rear Uncollected



Summary for Pond Pr5: FRONT Infiltration System

Inflow Area = 0.171 ac, 32.21% Impervious, Inflow Depth > 1.10" for 10 Year event
Inflow = 0.2 cfs @ 12.12 hrs, Volume= 0.02 af
Outflow = 0.1 cfs @ 12.48 hrs, Volume= 0.02 af, Atten= 59%, Lag= 21.2 min
Discarded = 0.1 cfs @ 12.48 hrs, Volume= 0.02 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 162.71' @ 12.48 hrs Surf.Area= 312 sf Storage= 110 cf

Plug-Flow detention time= 8.2 min calculated for 0.02 af (100% of inflow)
Center-of-Mass det. time= 7.9 min (840.7 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	162.00'	317 cf	**13.00'W x 24.00'L x 3.54'H Field A** 1,105 cf Overall - 313 cf Embedded = 792 cf x 40.0% Voids
#2A	162.50'	313 cf	**Cultec R-330XL** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		630 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'

Discarded OutFlow Max=0.1 cfs @ 12.48 hrs HW=162.71' (Free Discharge)
↑**1=Exfiltration** (Controls 0.1 cfs)

Pond Pr5: FRONT Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

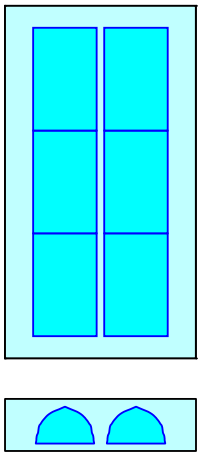
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 23.0" Side Stone x 2 = 13.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

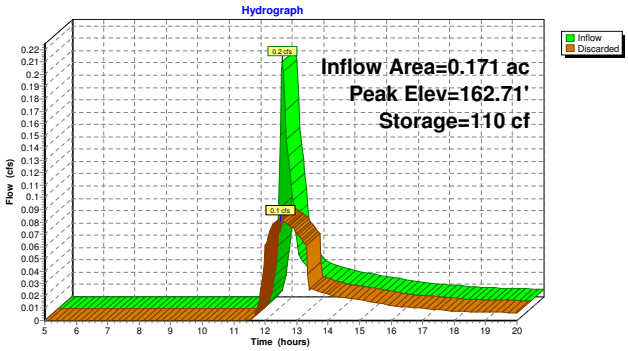
1,105.0 cf Field - 312.9 cf Chambers = 792.1 cf Stone x 40.0% Voids = 316.8 cf Stone Storage

Stone + Chamber Storage = 629.8 cf = 0.01 af

6 Chambers
40.9 cy Field
29.3 cy Stone



Pond Pr5: FRONT Infiltration System



Summary for Pond Pr6: REAR Infiltration System

Inflow Area = 0.659 ac, 62.07% Impervious, Inflow Depth > 2.43" for 10 Year event
Inflow = 1.8 cfs @ 12.14 hrs, Volume= 0.13 af
Outflow = 0.5 cfs @ 12.53 hrs, Volume= 0.13 af, Atten= 69%, Lag= 23.6 min
Discarded = 0.5 cfs @ 12.53 hrs, Volume= 0.13 af
Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.59' @ 12.53 hrs Surf.Area= 1,395 sf Storage= 1,516 cf

Plug-Flow detention time= 21.5 min calculated for 0.13 af (100% of inflow)
Center-of-Mass det. time= 21.0 min (818.6 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	160.00'	1,225 cf	**45.00'W x 31.00'L x 3.54'H Field A** 4,941 cf Overall - 1,878 cf Embedded = 3,063 cf x 40.0% Voids
#2A	160.50'	1,878 cf	**Cultec R-330XL** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
#3	163.00'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder** -Impervious
		3,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	160.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'
#2	Primary	163.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 163.20' / 162.20' S= 0.0100 '/' Cc= 0.900 n= 0.012

Discarded OutFlow Max=0.5 cfs @ 12.53 hrs HW=161.59' (Free Discharge)
↑**1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=160.00' (Free Discharge)
↑**2=Culvert** (Controls 0.0 cfs)

Pond Pr6: REAR Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

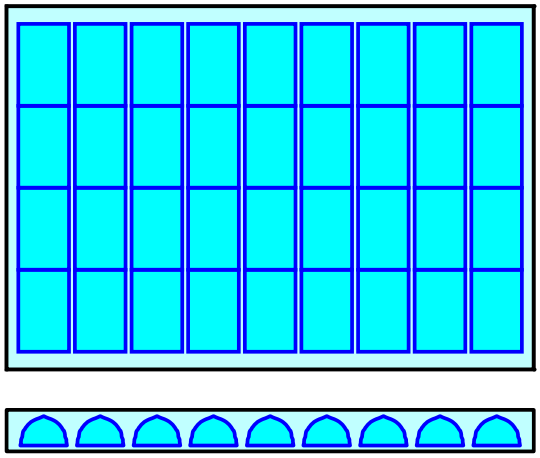
4 Chambers/Row x 7.00' Long = 28.00' + 18.0" End Stone x 2 = 31.00' Base Length
9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

36 Chambers x 52.2 cf = 1,877.7 cf Chamber Storage

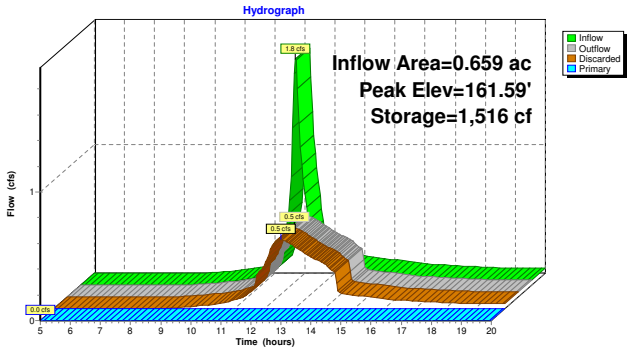
4,940.6 cf Field - 1,877.7 cf Chambers = 3,063.0 cf Stone x 40.0% Voids = 1,225.2 cf Stone Storage

Stone + Chamber Storage = 3,102.8 cf = 0.07 af

36 Chambers
183.0 cy Field
113.4 cy Stone



Pond Pr6: REAR Infiltration System



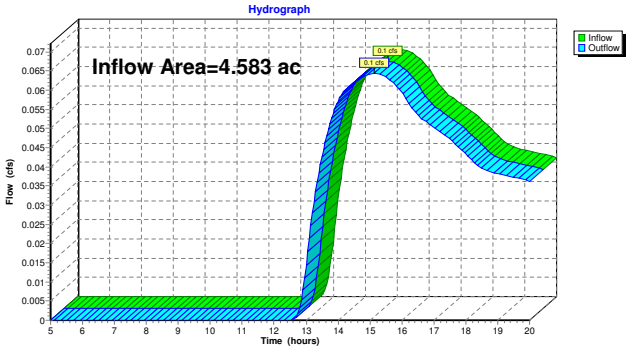
Summary for Reach Pr7: Proposed to Rear

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.583 ac, 16.67% Impervious, Inflow Depth > 0.07" for 10 Year event
Inflow = 0.1 cfs @ 15.12 hrs, Volume= 0.03 af
Outflow = 0.1 cfs @ 15.12 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach Pr7: Proposed to Rear



Summary for Subcatchment E1: Existing to East

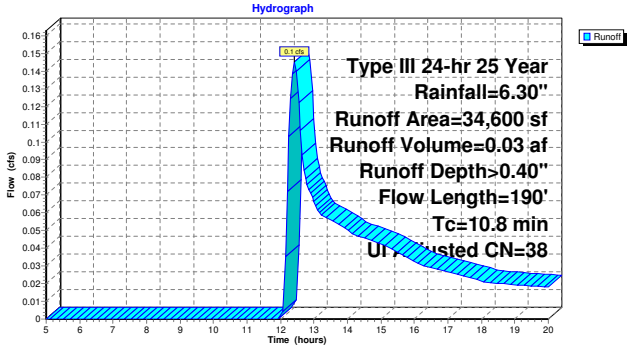
Runoff = 0.1 cfs @ 12.42 hrs, Volume= 0.03 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
22,120	39	>75% Grass cover, Good, HSG A
10,045	30	Woods, Good, HSG A
820	98	Unconnected pavement, HSG A
1,615	98	Unconnected roofs, HSG A
34,600	41	Weighted Average, UI Adjusted CN = 38
32,165		92.96% Pervious Area
2,435		7.04% Impervious Area
2,435		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment E1: Existing to East



Summary for Subcatchment E2: Existing to Rear

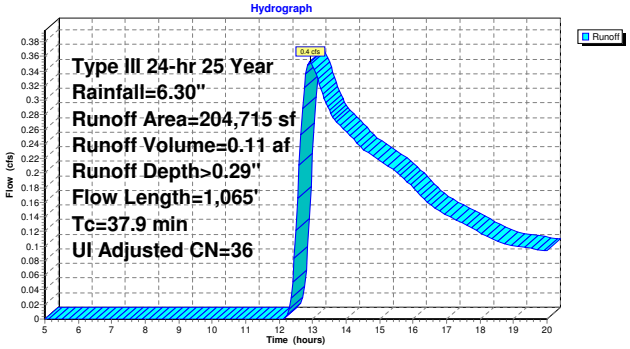
Runoff = 0.4 cfs @ 12.92 hrs, Volume= 0.11 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
39,650	39	>75% Grass cover, Good, HSG A
141,155	30	Woods, Good, HSG A
18,590	98	Unconnected pavement, HSG A
5,320	98	Unconnected roofs, HSG A
204,715	40	Weighted Average, UI Adjusted CN = 36
180,805		88.32% Pervious Area
23,910		11.68% Impervious Area
23,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
27.6	1,015	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	1,065	Total			

Subcatchment E2: Existing to Rear



Summary for Subcatchment Pr1: Proposed to East

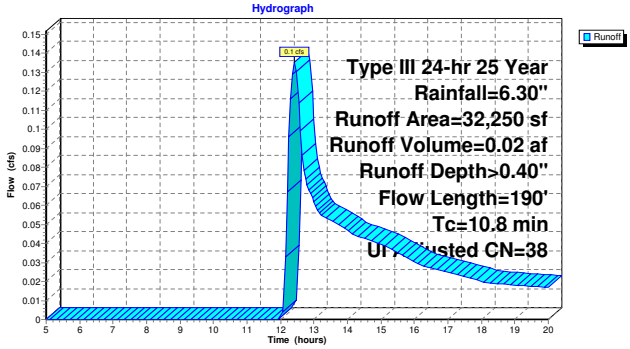
Runoff = 0.1 cfs @ 12.42 hrs, Volume= 0.02 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
10,045	30	Woods, Good, HSG A
1,615	98	Unconnected roofs, HSG A
20,590	39	>75% Grass cover, Good, HSG A
32,250	39	Weighted Average, UI Adjusted CN = 38
30,635		94.99% Pervious Area
1,615		5.01% Impervious Area
1,615		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment Pr1: Proposed to East



Summary for Subcatchment Pr2: Proposed to Front

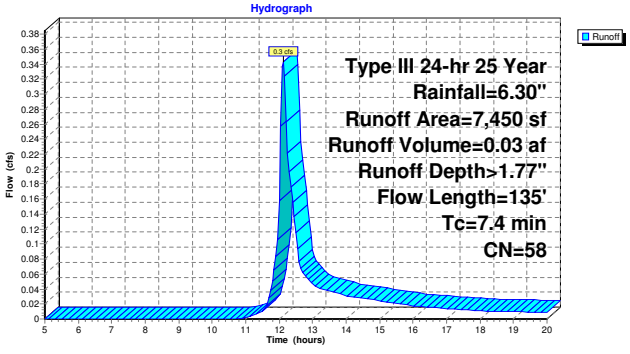
Runoff = 0.3 cfs @ 12.12 hrs, Volume= 0.03 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
5,050	39	>75% Grass cover, Good, HSG A
2,400	98	Paved roads w/curbs & sewers, HSG A
7,450	58	Weighted Average
5,050		67.79% Pervious Area
2,400		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	40	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.6	95	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.4	135	Total			

Subcatchment Pr2: Proposed to Front



Summary for Subcatchment Pr3: Proposed to Rear Low Point

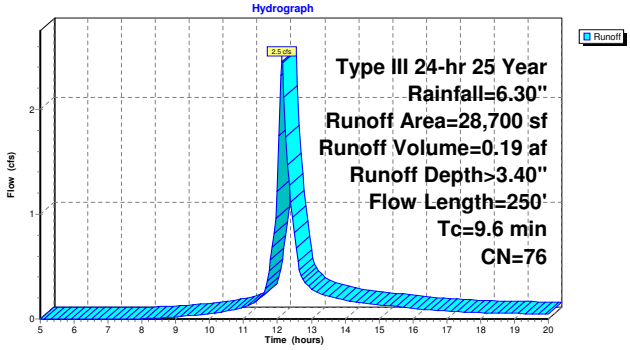
Runoff = 2.5 cfs @ 12.14 hrs, Volume= 0.19 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
10,885	39	>75% Grass cover, Good, HSG A
1,505	98	Roofs, HSG A
11,600	98	Paved roads w/curbs & sewers, HSG A
4,710	98	Paved parking, HSG A
28,700	76	Weighted Average
10,885		37.93% Pervious Area
17,815		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
1.5	200	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	250	Total			

Subcatchment Pr3: Proposed to Rear Low Point



Summary for Subcatchment Pr4: Proposed to Rear Uncollected

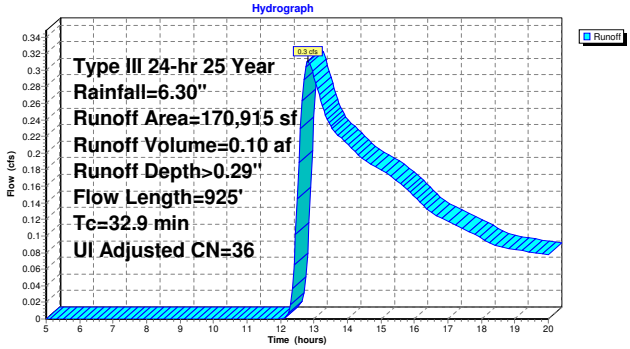
Runoff = 0.3 cfs @ 12.82 hrs, Volume= 0.10 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.30"

Area (sf)	CN	Description
61,290	39	>75% Grass cover, Good, HSG A
94,155	30	Woods, Good, HSG A
2,000	98	Unconnected pavement, HSG A
1,870	98	Unconnected roofs, HSG A
11,600	98	Unconnected roofs, HSG A
170,915	39	Weighted Average, UI Adjusted CN = 36
155,445		90.95% Pervious Area
15,470		9.05% Impervious Area
15,470		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0125	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
4.9	275	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	600	0.0120	0.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	925	Total			

Subcatchment Pr4: Proposed to Rear Uncollected



Summary for Pond Pr5: FRONT Infiltration System

Inflow Area = 0.171 ac, 32.21% Impervious, Inflow Depth > 1.77" for 25 Year event
Inflow = 0.3 cfs @ 12.12 hrs, Volume= 0.03 af
Outflow = 0.1 cfs @ 12.53 hrs, Volume= 0.03 af, Atten= 70%, Lag= 24.7 min
Discarded = 0.1 cfs @ 12.53 hrs, Volume= 0.03 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 163.39' @ 12.53 hrs Surf.Area= 312 sf Storage= 260 cf

Plug-Flow detention time= 18.3 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (839.6 - 821.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	162.00'	317 cf	**13.00'W x 24.00'L x 3.54'H Field A** 1,105 cf Overall - 313 cf Embedded = 792 cf x 40.0% Voids
#2A	162.50'	313 cf	**Cultec R-330XL** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		630 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'

Discarded OutFlow Max=0.1 cfs @ 12.53 hrs HW=163.39' (Free Discharge)
↑**1=Exfiltration** (Controls 0.1 cfs)

Pond Pr5: FRONT Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

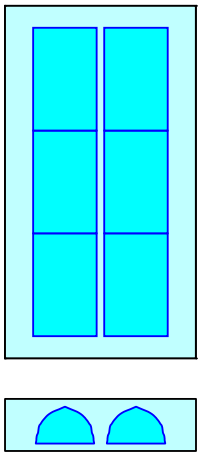
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 23.0" Side Stone x 2 = 13.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

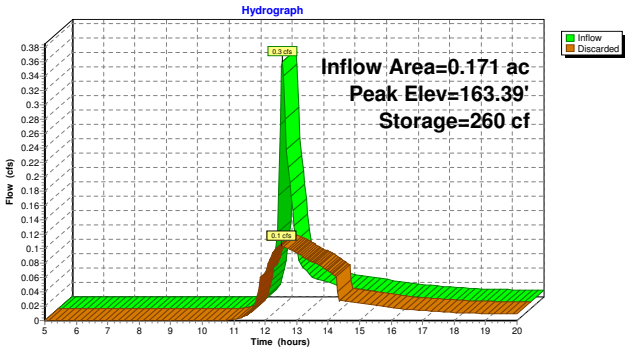
1,105.0 cf Field - 312.9 cf Chambers = 792.1 cf Stone x 40.0% Voids = 316.8 cf Stone Storage

Stone + Chamber Storage = 629.8 cf = 0.01 af

6 Chambers
40.9 cy Field
29.3 cy Stone



Pond Pr5: FRONT Infiltration System



Summary for Pond Pr6: REAR Infiltration System

Inflow Area = 0.659 ac, 62.07% Impervious, Inflow Depth > 3.40" for 25 Year event
Inflow = 2.5 cfs @ 12.14 hrs, Volume= 0.19 af
Outflow = 0.7 cfs @ 12.55 hrs, Volume= 0.19 af, Atten= 72%, Lag= 24.5 min
Discarded = 0.7 cfs @ 12.55 hrs, Volume= 0.19 af
Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.43' @ 12.55 hrs Surf.Area= 1,395 sf Storage= 2,367 cf

Plug-Flow detention time= 29.3 min calculated for 0.19 af (100% of inflow)
Center-of-Mass det. time= 28.8 min (818.7 - 789.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	160.00'	1,225 cf	**45.00'W x 31.00'L x 3.54'H Field A** 4,941 cf Overall - 1,878 cf Embedded = 3,063 cf x 40.0% Voids
#2A	160.50'	1,878 cf	**Cultec R-330XL** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
#3	163.00'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder** -Impervious
		3,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	160.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'
#2	Primary	163.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 163.20' / 162.20' S= 0.0100 '/' Cc= 0.900 n= 0.012

Discarded OutFlow Max=0.7 cfs @ 12.55 hrs HW=162.43' (Free Discharge)
↑**1=Exfiltration** (Controls 0.7 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=160.00' (Free Discharge)
↑**2=Culvert** (Controls 0.0 cfs)

Pond Pr6: REAR Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

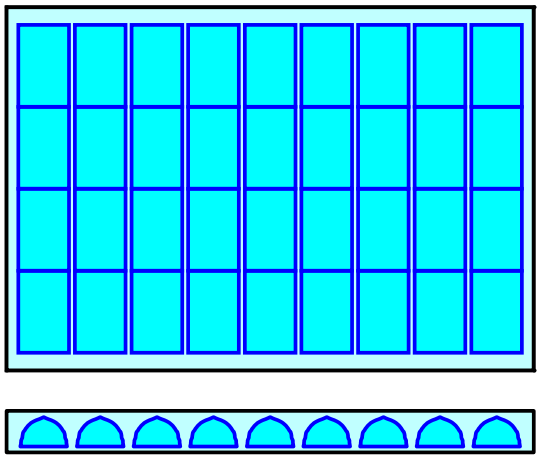
4 Chambers/Row x 7.00' Long = 28.00' + 18.0" End Stone x 2 = 31.00' Base Length
9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

36 Chambers x 52.2 cf = 1,877.7 cf Chamber Storage

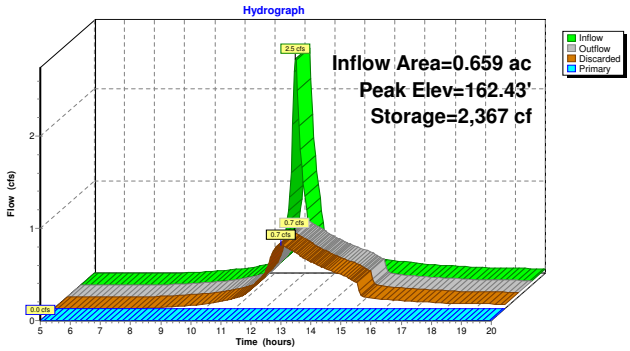
4,940.6 cf Field - 1,877.7 cf Chambers = 3,063.0 cf Stone x 40.0% Voids = 1,225.2 cf Stone Storage

Stone + Chamber Storage = 3,102.8 cf = 0.07 af

36 Chambers
183.0 cy Field
113.4 cy Stone



Pond Pr6: REAR Infiltration System



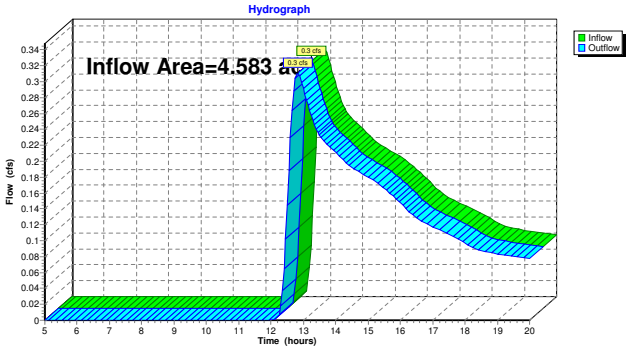
Summary for Reach Pr7: Proposed to Rear

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.583 ac, 16.67% Impervious, Inflow Depth > 0.25" for 25 Year event
Inflow = 0.3 cfs @ 12.82 hrs, Volume= 0.10 af
Outflow = 0.3 cfs @ 12.82 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach Pr7: Proposed to Rear



Summary for Subcatchment E1: Existing to East

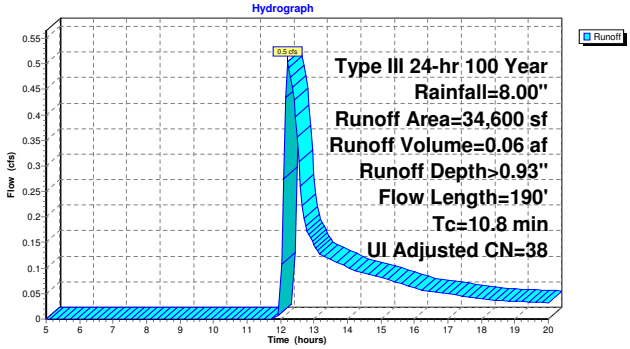
Runoff = 0.5 cfs @ 12.22 hrs, Volume= 0.06 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
22,120	39	>75% Grass cover, Good, HSG A
10,045	30	Woods, Good, HSG A
820	98	Unconnected pavement, HSG A
1,615	98	Unconnected roofs, HSG A
34,600	41	Weighted Average, UI Adjusted CN = 38
32,165		92.96% Pervious Area
2,435		7.04% Impervious Area
2,435		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment E1: Existing to East



Summary for Subcatchment E2: Existing to Rear

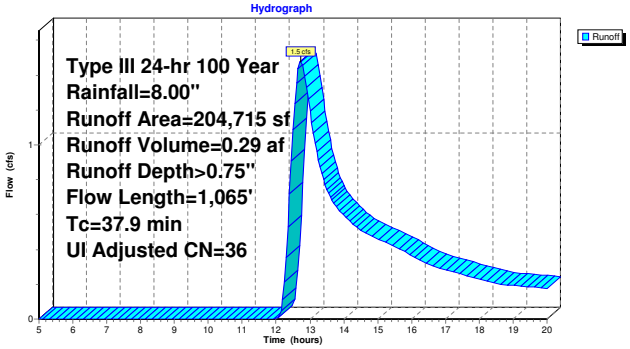
Runoff = 1.5 cfs @ 12.72 hrs, Volume= 0.29 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
39,650	39	>75% Grass cover, Good, HSG A
141,155	30	Woods, Good, HSG A
18,590	98	Unconnected pavement, HSG A
5,320	98	Unconnected roofs, HSG A
204,715	40	Weighted Average, UI Adjusted CN = 36
180,805		88.32% Pervious Area
23,910		11.68% Impervious Area
23,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
27.6	1,015	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	1,065	Total			

Subcatchment E2: Existing to Rear



Summary for Subcatchment Pr1: Proposed to East

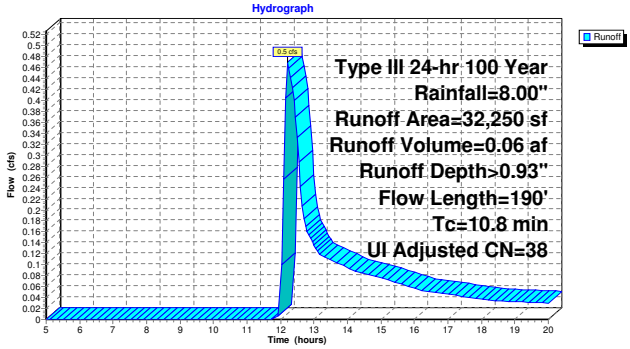
Runoff = 0.5 cfs @ 12.22 hrs, Volume= 0.06 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
10,045	30	Woods, Good, HSG A
1,615	98	Unconnected roofs, HSG A
20,590	39	>75% Grass cover, Good, HSG A
32,250	39	Weighted Average, UI Adjusted CN = 38
30,635		94.99% Pervious Area
1,615		5.01% Impervious Area
1,615		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.8	190	Total			

Subcatchment Pr1: Proposed to East



Summary for Subcatchment Pr2: Proposed to Front

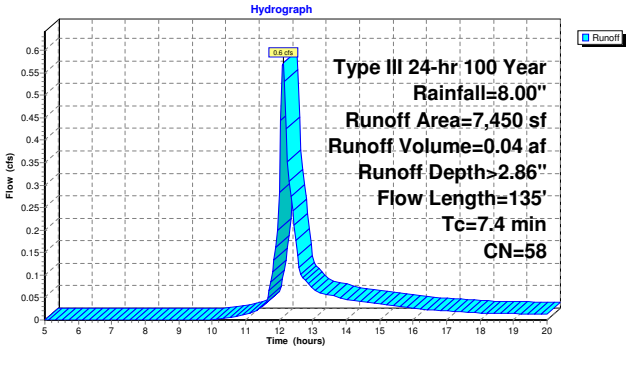
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 0.04 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
5,050	39	>75% Grass cover, Good, HSG A
2,400	98	Paved roads w/curbs & sewers, HSG A
7,450	58	Weighted Average
5,050		67.79% Pervious Area
2,400		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	40	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.6	95	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.4	135	Total			

Subcatchment Pr2: Proposed to Front



Summary for Subcatchment Pr3: Proposed to Rear Low Point

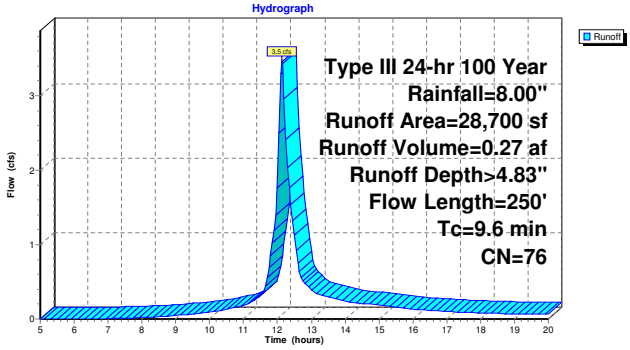
Runoff = 3.5 cfs @ 12.14 hrs, Volume= 0.27 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
10,885	39	>75% Grass cover, Good, HSG A
1,505	98	Roofs, HSG A
11,600	98	Paved roads w/curbs & sewers, HSG A
4,710	98	Paved parking, HSG A
28,700	76	Weighted Average
10,885		37.93% Pervious Area
17,815		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
1.5	200	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	250	Total			

Subcatchment Pr3: Proposed to Rear Low Point



Summary for Subcatchment Pr4: Proposed to Rear Uncollected

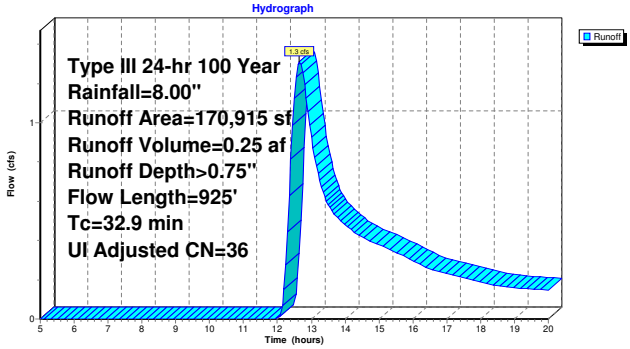
Runoff = 1.3 cfs @ 12.65 hrs, Volume= 0.25 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.00"

Area (sf)	CN	Description
61,290	39	>75% Grass cover, Good, HSG A
94,155	30	Woods, Good, HSG A
2,000	98	Unconnected pavement, HSG A
1,870	98	Unconnected roofs, HSG A
11,600	98	Unconnected roofs, HSG A
170,915	39	Weighted Average, UI Adjusted CN = 36
155,445		90.95% Pervious Area
15,470		9.05% Impervious Area
15,470		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0125	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
4.9	275	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	600	0.0120	0.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	925	Total			

Subcatchment Pr4: Proposed to Rear Uncollected



Summary for Pond Pr5: FRONT Infiltration System

Inflow Area = 0.171 ac, 32.21% Impervious, Inflow Depth > 2.86" for 100 Year event
Inflow = 0.6 cfs @ 12.11 hrs, Volume= 0.04 af
Outflow = 0.1 cfs @ 12.55 hrs, Volume= 0.04 af, Atten= 74%, Lag= 25.9 min
Discarded = 0.1 cfs @ 12.55 hrs, Volume= 0.04 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 164.69' @ 12.55 hrs Surf.Area= 312 sf Storage= 517 cf

Plug-Flow detention time= 31.4 min calculated for 0.04 af (100% of inflow)
Center-of-Mass det. time= 31.2 min (842.1 - 810.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	162.00'	317 cf	**13.00'W x 24.00'L x 3.54'H Field A** 1,105 cf Overall - 313 cf Embedded = 792 cf x 40.0% Voids
#2A	162.50'	313 cf	**Cultec R-330XL** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		630 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'

Discarded OutFlow Max=0.1 cfs @ 12.55 hrs HW=164.69' (Free Discharge)
↑**1=Exfiltration** (Controls 0.1 cfs)

Pond Pr5: FRONT Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

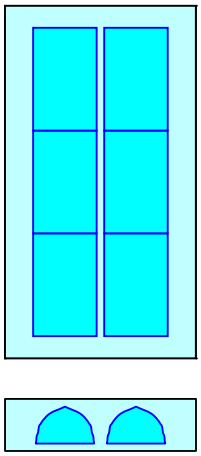
3 Chambers/Row x 7.00' Long = 21.00' + 18.0" End Stone x 2 = 24.00' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 23.0" Side Stone x 2 = 13.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

6 Chambers x 52.2 cf = 312.9 cf Chamber Storage

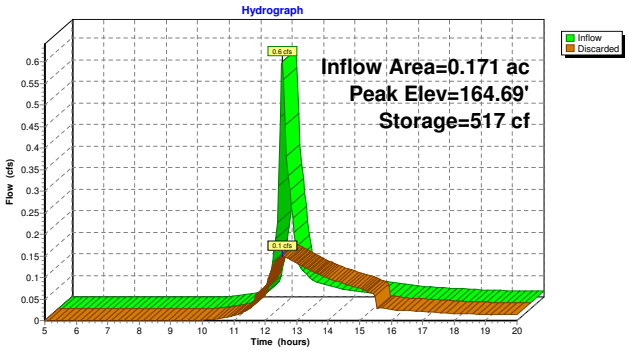
1,105.0 cf Field - 312.9 cf Chambers = 792.1 cf Stone x 40.0% Voids = 316.8 cf Stone Storage

Stone + Chamber Storage = 629.8 cf = 0.01 af

6 Chambers
40.9 cy Field
29.3 cy Stone



Pond Pr5: FRONT Infiltration System



Summary for Pond Pr6: REAR Infiltration System

Inflow Area = 0.659 ac, 62.07% Impervious, Inflow Depth > 4.83" for 100 Year event
Inflow = 3.5 cfs @ 12.14 hrs, Volume= 0.27 af
Outflow = 1.4 cfs @ 12.36 hrs, Volume= 0.26 af, Atten= 58%, Lag= 13.1 min
Discarded = 0.9 cfs @ 12.36 hrs, Volume= 0.25 af
Primary = 0.5 cfs @ 12.35 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.56' @ 12.36 hrs Surf.Area= 1,395 sf Storage= 3,110 cf

Plug-Flow detention time= 37.1 min calculated for 0.26 af (99% of inflow)
Center-of-Mass det. time= 32.0 min (813.8 - 781.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	160.00'	1,225 cf	**45.00'W x 31.00'L x 3.54'H Field A** 4,941 cf Overall - 1,878 cf Embedded = 3,063 cf x 40.0% Voids
#2A	160.50'	1,878 cf	**Cultec R-330XL** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
#3	163.00'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder** -Impervious
		3,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	160.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 158.00'
#2	Primary	163.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 163.20' / 162.20' S= 0.0100 '/' Cc= 0.900 n= 0.012

Discarded OutFlow Max=0.9 cfs @ 12.36 hrs HW=163.56' (Free Discharge)
↑**1=Exfiltration** (Controls 0.9 cfs)

Primary OutFlow Max=0.5 cfs @ 12.35 hrs HW=163.56' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.5 cfs @ 2.04 fps)

Pond Pr6: REAR Infiltration System - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

52.0" Wide + 6.0" Spacing = 58.0" C-C

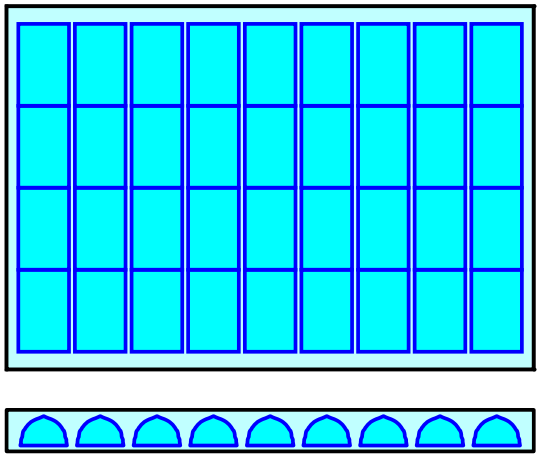
4 Chambers/Row x 7.00' Long = 28.00' + 18.0" End Stone x 2 = 31.00' Base Length
9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

36 Chambers x 52.2 cf = 1,877.7 cf Chamber Storage

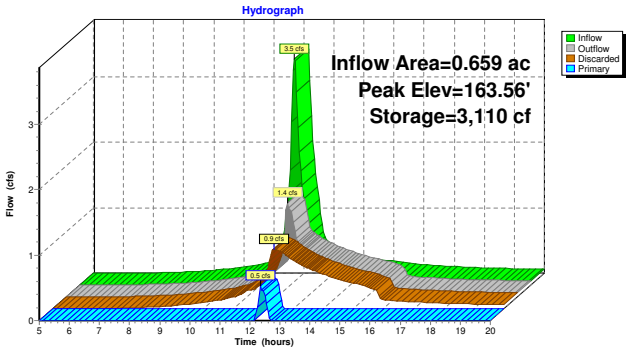
4,940.6 cf Field - 1,877.7 cf Chambers = 3,063.0 cf Stone x 40.0% Voids = 1,225.2 cf Stone Storage

Stone + Chamber Storage = 3,102.8 cf = 0.07 af

36 Chambers
183.0 cy Field
113.4 cy Stone



Pond Pr6: REAR Infiltration System



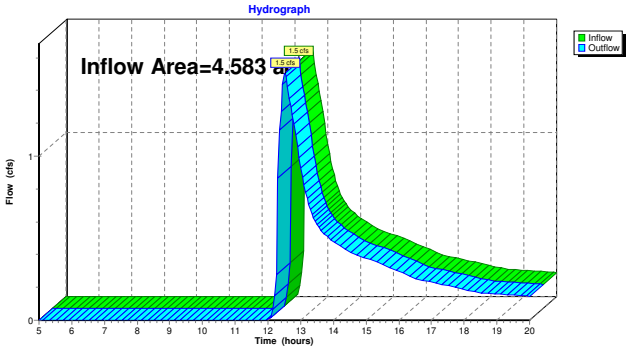
Summary for Reach Pr7: Proposed to Rear

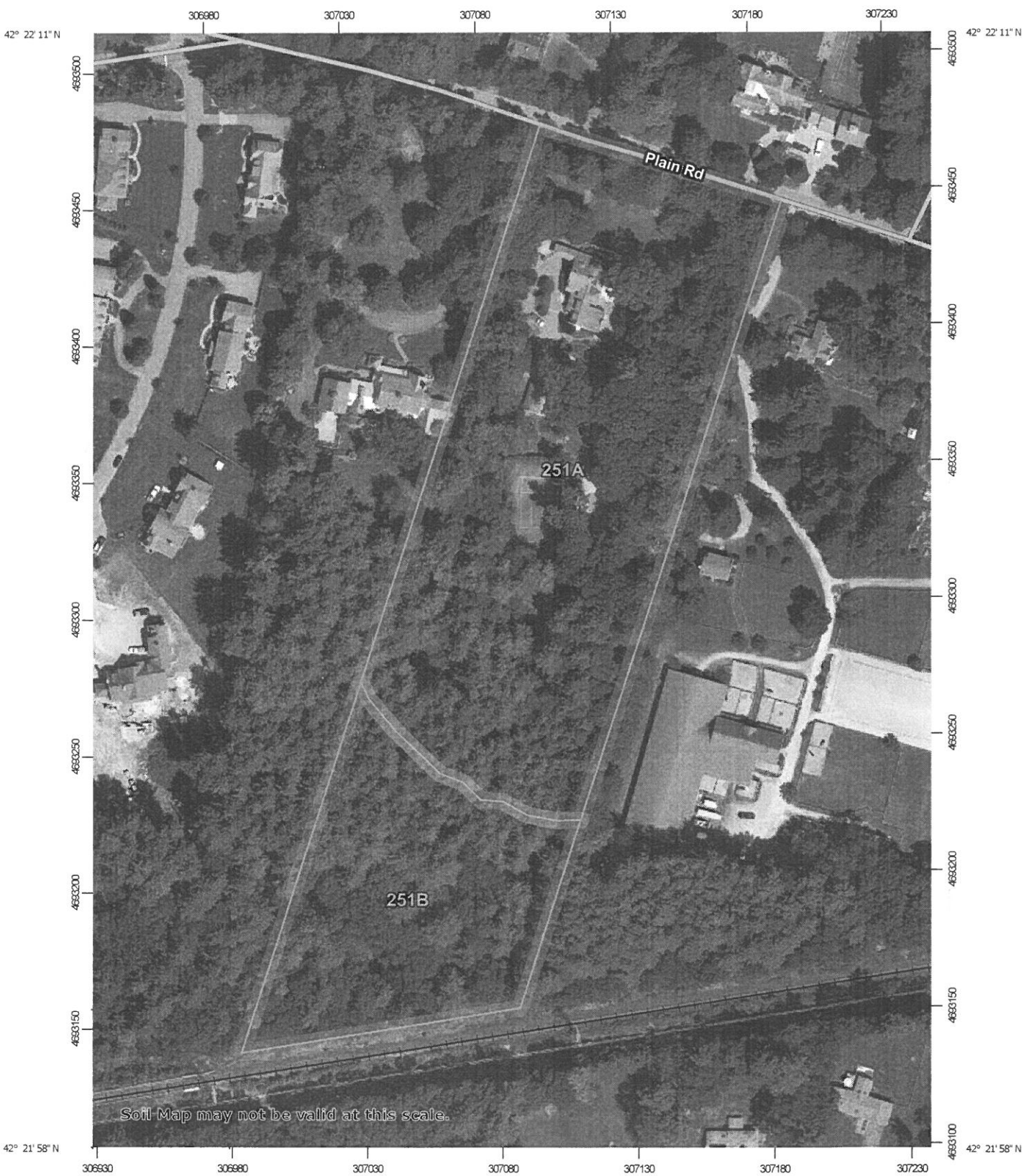
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.583 ac, 16.67% Impervious, Inflow Depth > 0.67" for 100 Year event
Inflow = 1.5 cfs @ 12.52 hrs, Volume= 0.26 af
Outflow = 1.5 cfs @ 12.52 hrs, Volume= 0.26 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach Pr7: Proposed to Rear





Map Scale: 1:1,990 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

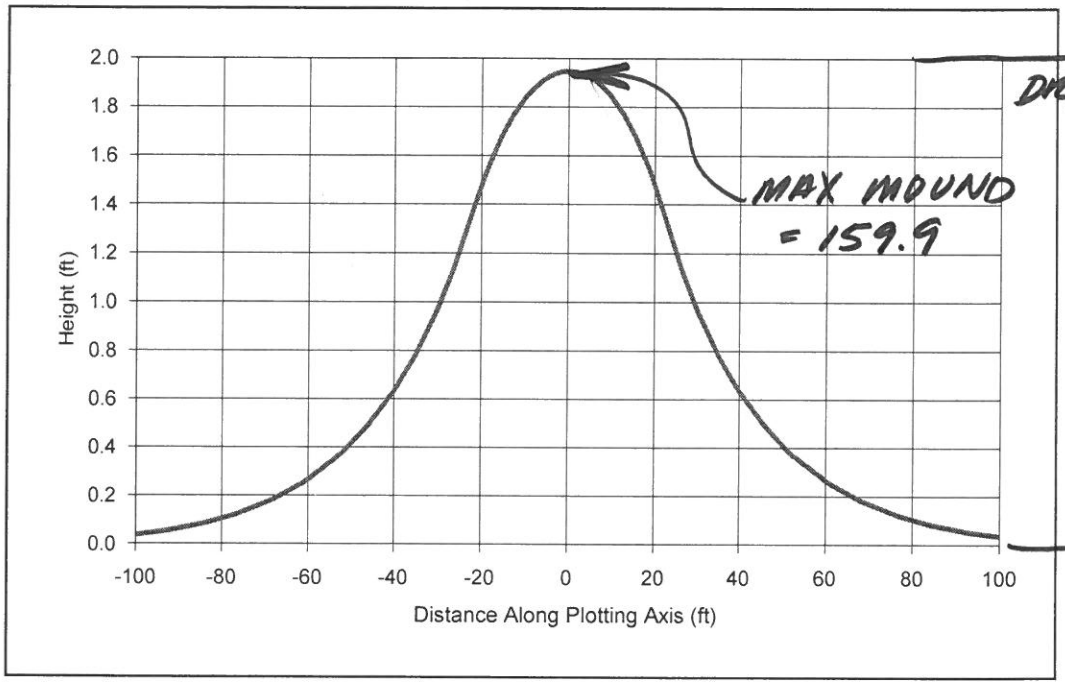
N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
251A	Haven silt loam, 0 to 3 percent slopes	5.4	70.3%
251B	Haven silt loam, 3 to 8 percent slopes	2.3	29.7%
Totals for Area of Interest		**7.7**	**100.0%**

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: SCA

PROJECT: PLAIN ROAD

ANALYST: VC

DATE: 1/14/2021 TIME: 4:43:49 PM

INPUT PARAMETERS

Application rate: 2.09 c.ft/day/sq. ft
Duration of application: 1 days
Fillable porosity: 0.28
Hydraulic conductivity: 16.54 ft/day (8.27 in/hr)
Initial saturated thickness: 20 ft
Length of application area: 31 ft
Width of application area: 45 ft
No constant head boundary used
Plotting axis from Y-Axis: 90 degrees
Edge of recharge area:
positive X: 22.5 ft
positive Y: 0 ft
Total volume applied: 2915.55 c.ft ✓

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-100	0	-100	0.04
-84.1	0	-84	0.08
-68.2	0	-68	0.18
-52.3	0	-52	0.37
-39.8	0	-40	0.64
-30.1	0	-30	0.97
-22.2	0	-22	1.36
-15.5	0	-15	1.68
-9.7	0	-10	1.84
-5.8	0	-6	1.91
-3.2	0	-3	1.94
0	0	0	1.95
3.2	0	3	1.94
5.8	0	6	1.91
9.7	0	10	1.84
15.5	0	15	1.68
22.2	0	22	1.36
30.1	0	30	0.97
39.8	0	40	0.64
52.3	0	52	0.37
68.2	0	68	0.18
84.1	0	84	0.08
100	0	100	0.04

Wayland Conservation Commission Meeting Minutes

Wednesday February 10, 2021
Approved:

Location: Commission members participated remotely
Present: Sean Fair (Chair), Barbara Howell (Vice Chair), John Sullivan, Kathy Schreiber, Tom Davidson, Joanne Barnett, Luke Legere, and Linda Hansen (Conservation Department Director)
Minutes: Ryan Brown

S. Fair opened the meeting at 6:37PM, noting that the meeting was being recorded by WayCam and a quorum was present consisting of Sean Fair, Barbara Howell, Tom Davidson, John Sullivan, Kathy Schreiber, Joanne Barnett, and Luke Legere.

6 Springhill Road DEP File # 322-XXX – Continued Public Hearing, Notice of Intent filed pursuant to the Wetland Protection Act (310 CMR 10.0) and a Chapter 194 application filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw, submitted by Hanbeeth Kim for the installation of the a 12 x 16 foot shed in the rear yard at 6 Springhill Road in Wayland, MA. The proposed work is within the 100-foot wetland buffer zone. Property is shown on Assessor's Map 24, Parcel 043.

L. Hansen stated that the application will be submitted electronically through eDEP in hopes of resolving the matter.

J. Sullivan moved, J. Barnett seconded the motion, to continue the hearing under the Wetlands Protection Act and Chapter 194 to March 3rd, 2021 at 6:30PM. S. Fair initiated a roll call vote. All in favor 7-0.

14 Rich Valley Road – DEP File # 322-966 – Public Hearing, Request for Determination filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw (Chapter 194) and the Wetlands Protection Act (310 CMR 10.0), submitted by Sean Ryan for the removal of existing structures, installation of a patio, and replacement of mitigation plantings at 14 Rich Valley Road in Wayland, MA. Property is shown on Assessor's Map 25, Parcel 2.

L. Hansen stated that an enforcement order was issued to this property for work done without a permit. L. Hansen also stated that this project is using the wetland delineation used for a previous filing for a septic replacement project.

S. Ryan described the work to the Commission, stating that the project to remove the patio from the buffer zone began without a permit. S. Ryan noted that the mitigation plantings from the previous filing in 2019 are still in place. Additional plantings will be installed for privacy and for delineation of the do not disturb. L. Hansen recommended contacting the Health Department for a copy of the as-built plan that will show the exact location of the septic system and the pump chamber.

B. Howell moved, L. Legere seconded the motion to close the hearing under the Wetlands Protection Act and Chapter 194. S. Fair initiated a roll call vote. All in favor 7-0.

B. Howell moved, K. Schreiber seconded the motion to issue an Order of Conditions under the Wetlands Protection Act and a permit under Chapter 194. S. Fair initiated a roll call vote. All in favor 7-0.

Request to extend permit for Dudley Pond invasive plant removal, DEP File No. 322-859

B. Howell moved, J. Barnett seconded the motion to extend the permit for Dudley Pond invasive plant removal, DEP File # 322-859, for an additional five years. S. Fair initiated a roll call vote. All in favor 7-0.

Certificate of Compliance Request: 19 Charena Road, D-927

L. Hansen noted that additional plantings were added to the property and the patio was relocated to the side of the house. All work done on existing lawn.

B. Howell moved, J. Barnett seconded the motion to issue a Certificate of Compliance for 19 Charena Road, D-927, under Chapter 194. S. Fair initiated a roll call vote. All in favor 7-0.

Approve an increase in the Community Garden rental fees for 2021

L. Hansen stated that the funds generated by the increase in rental fees would go toward garden related projects, such as, but no limited to, renting a dumpster for trash removal, reseeding portions of the garden to improve habitat for pollinators and wildlife, etc.

L. Hansen is proposing the following increase in garden rental fees for 2021.

Wayland Seniors: From $12.00 to $15.00
Wayland Residents: From $16.00 to $20.00
Non-Resident Seniors: From $16.00 to $20.00
Non-Resident: From $20.00 to $25.00

J. Barnet moved, K. Schreiber seconded the motion to approve the proposed increase in Community Garden rental fees for 2021. S. Fair initiated a roll call vote. All in favor 7-0.

Approve Minutes: 01.27.2021
T. Davidson moved, J. Sullivan seconded the motion to approve the meeting minutes of 01.27.2021 as amended. S. Fair initiated a roll call vote. All in favor 7-0.

53 Concord Road DEP File # 322-967 – Public Hearing. Notice of Intent filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw (Chapter 194) and the Wetlands Protection Act (310 CMR 10.0), submitted by Mohammad Bilal for the paving of an existing gravel driveway and installation of culverts within the Buffer Zone and Riverfront Area at 53 Concord Road in Wayland, MA. Property is shown on Assessor's Map 18, Parcel 86.

Scott Jordan and Carl Hultgren, project representatives, described the proposed work to the Commission. Existing gravel driveway runs from Concord Road through the wetlands to the dwelling. Driveway is composed of compacted gravel that is periodically topped with pea stone, driveway is riddled with potholes. Crushed PBC pipe running between wetlands underneath driveway for equilibrium purposes. Concerned that pipe might fill with gravel if current practices continue. Proposing

to pave driveway to prevent debris from entering the wetlands from plowing and general erosion. Proposing to install two additional iron culverts for equilibrium and replace existing PBC pipe. Proposed plan will reduce impervious area by about 300 square feet. Also planning to remove pea stone that has scattered into the wetlands.

B. Howell moved, J. Sullivan seconded the motion to close the hearing under the Wetlands Protection Act and Chapter 194. S. Fair initiated a roll call vote. All in favor 7-0.

B. Howell moved, J. Sullivan seconded the motion to issue Order of Conditions under the Wetlands Protection Act and to issue a permit under Chapter 194. S. Fair initiated a roll call vote. All in favor 7-0.

16 Linn Lane D-969 – Public Meeting, Request for Determination filed pursuant to Wayland's Wetlands and Water Resource Protection Bylaw (Chapter 194) and the Wetlands Protection Act (310 CMR 10.0), submitted by Robert McInturff for the replacement of a failed septic system at 16 Linn Lane in Wayland, MA. Property is shown on Assessor's Map 49 Parcel 17.

Dan McIntyre, project representative, stated that the homeowners are preparing their home for sale, but the septic system failed the Title Five inspection. New system will be an improvement, being further away from the groundwater levels.

L. Hansen noted that she would like to review the wetland delineation information. No permit from Health Department has been issued for this septic replacement. L. Hansen stated that she would like to continue this hearing until the Health Department approves the septic replacement.

J. Sullivan moved, J. Barnett seconded the motion to continue the meeting under the Wetlands Protection Act and Chapter 194 to March 3rd, 2021 at 6:35PM. S. Fair initiated a roll call vote. All in favor 7-0.

Stormwater and Land Disturbance Permit Application: Five Paths subdivision, 57A Shaw Drive (Map 39, Parcel 15A)

Kyle Burchard (representative), Michael Levy (attorney), Cal Goldsmith, and Ross Wilkinson (property owner) present for meeting. K. Buchard described the proposed three lot subdivision to the Commission, stating that the project has been reviewed and approved by the Planning Board. K. Burchard requested that the project be exempt from the tree replanting requirements of the Chapter 193 permit given the amount of open space being preserved, such as the portion of the subdivision being given to Sudbury Valley Trustees. L. Hansen stated that the tree replanting requirements are specific to areas subject to the wetlands jurisdiction, those under Chapter 193 are less restrictive. M. Levy noted that there was no specific reason for why the open space parcel was given to SVT. L. Hansen recommended that a proportion of the replacement plantings be native plants.

J. Sullivan moved, J. Barnett seconded the motion to authorize L. Hansen to issue a Chapter 193 Permit for the Five Paths Subdivision with the conditions discussed. S. Fair initiated a roll call vote. All in favor 7-0.

24 School Street DEP File # 322-965 – Public Hearing, Notice of Intent filed pursuant to the Wetlands Protection Act (310 CMR 10.0), submitted by Chris D'Antonio for the construction of twelve new townhouses, driveway and parking areas, subsurface sewage disposal system, stormwater management system, and supporting utilities at 24 School Street in Wayland, MA. Property is shown on Assessor's Map 52, Parcel 189.

L. Hansen stated that the applicant requested that the hearing be continued to March 3rd at a time after 7:00PM

J. Sullivan moved, J. Barnett seconded the motion to continue the hearing under the Wetlands Protection Act to March 3rd at a time after 7:00PM. S. Fair initiated a roll call vote. All in favor 7-0.

Stormwater and Land Disturbance Permit Application: 3 Amey Road, (Map 50, Parcel 025), renovations to house and bungalow, new septic.

Bill Rodenhiser, representative, presented the proposed project to the Commission. B. Rodenhiser stated that 27 trees must be removed in order to accommodate the installation of the septic system. L. Hansen noted that she will not issue a permit until the Board of Health approves the septic.

B. Howell moved. T. Davidson seconded the motion to authorize L. Hansen to issue a Chapter 193 Permit for 3 Amey Road once the discussed conditions are met. S. Fair initiated a roll call vote. All in favor 6-0.

Adjournment

J. Barnett moved, L. Legere seconded the motion to adjourn the meeting at 8:36PM. S. Fair initiated a roll call vote. All in favor 5-0.

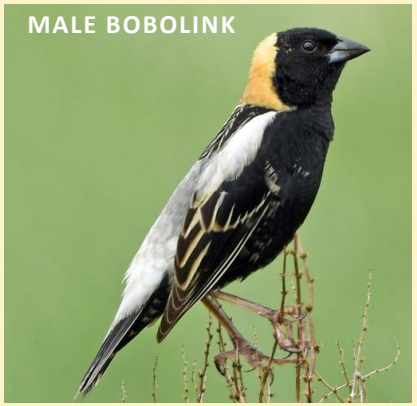
The next meeting of the Wayland Conservation Commission is scheduled for Wednesday March 3rd, 2021 at 6:30PM.

GRASSLAND HABITAT

Grasslands in Massachusetts provide habitat to a range of species, from meadow voles and monarch butterflies, to kestrels and white-tailed deer. Beginning in the early 20th century, land use practices began to change. The increasing human population of New England caused a decline in available grasslands. Farm fields were replaced with housing and business developments, while abandoned fields transitioned back to woodlands.

While fragmented and smaller in overall size, the remaining grasslands in Massachusetts provide critical habitat for Bobolinks (*Dolichonyx oryzivorus*). Bobolinks make an annual migration from South America where they overwinter, to their breeding grounds in North America each spring, a journey of approximately 12,500 miles each year.

Able to nest in fields as small as five acres, Bobolinks prefer to nest in contiguous fields that are a mix of grasses and wildflowers that are not uniformly mowed. Proper management of the remaining grasslands is essential to the survival of Bobolinks in Massachusetts. Visitors to these unique habitats are required to keep their dogs leashed and on the trail during Bobolink nesting season, May through July. For more information on Bobolinks, please scan the QR code.



Photos by Brian Harris and Douglas Gimler. For more information, please contact the Wayland Conservation Department at conservation@wayland.ma.us.

Funding provided by the Sudbury, Assabet, and Concord Wild and Scenic River Stewardship Council.

DEEP HOLE NO. 1 LOG
ELEVATION 99.5

Date: December 4, 2020
Evaluator: Daniel McIntyre, P.E.
Witness: D. MacCaughey, BOH Agent

Depth from Surface (inches)	Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Consistence	General Description
0 - 48"	^C	HTM				Topsoil on fill
48" - 72"	A	Silt Loam	10YR 4/1		Friable	Buried A layer
72" - 120"	C	Sand	2.5Y 5/2		Loose	Coarse sand
No Refusal						
Collapsing						

Standing Water:	72"	Observed Mottles:	None	Elevation:	
Weeping:	72"	Frimpter Adjustment:	N/A	USGS Well:	
Refusal:	None	Est. Groundwater:	72"	Elevation:	93.5

Notes: Sample taken at 90"for sieve test for perc rate

DEEP HOLE NO. 2 LOG
ELEVATION 100.0

Date: December 4, 2020
Evaluator: Daniel McIntyre, P.E.
Witness: D. MacCaughey, BOH Agent

Depth from Surface (inches)	Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Consistence	General Description
0 - 4"	^C	HTM				Imported topsoil
4" - 100"	^C	HTM/Sand (1)	2.5Y 5/2		Friable	Coarse sand
No Refusal	(1) Could not make distinction between strata change between imported					
Collapsing	Title 5 sand and native "C" layer					

Standing Water:	80"	Observed Mottles:	None	Elevation:	
Weeping:	80"	Frimpter Adjustment:	N/A	USGS Well:	
Refusal:	None	Est. Groundwater:	80"	Elevation:	93.4

Notes: Sample taken at 50"for sieve test for sand re-use

DEEP HOLE NO. 3 LOG
ELEVATION 95.5

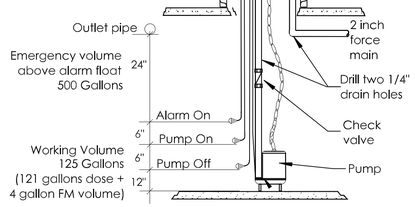
Date: December 4, 2020
Evaluator: Daniel McIntyre, P.E.
Witness: D. MacCaughey, BOH Agent

Depth from Surface (inches)	Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Consistence	General Description
0 - 50"	^C	HTM		24"		Disturbed/Fill
50" -80"	C	Sand	2.5Y 5/2	10YR 5/8	Loose	Coarse grained

Standing Water:	None	Observed Mottles:	24"	Elevation:	93.5
Weeping:	None	Frimpter Adjustment:	N/A	USGS Well:	
Refusal:	None	Est. Groundwater:	24"	Elevation:	93.5

Notes: Test pit adjacent to wetlands

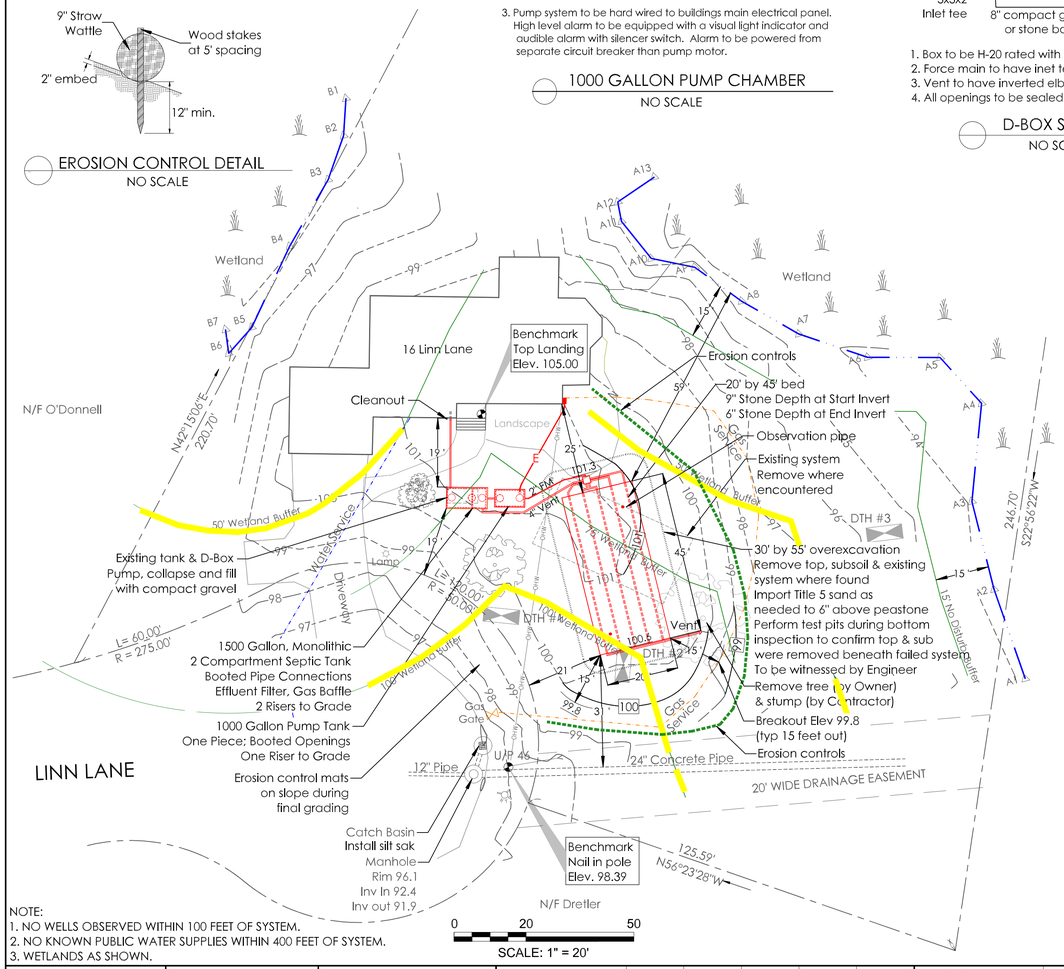
EROSION CONTROL DETAIL
NO SCALE



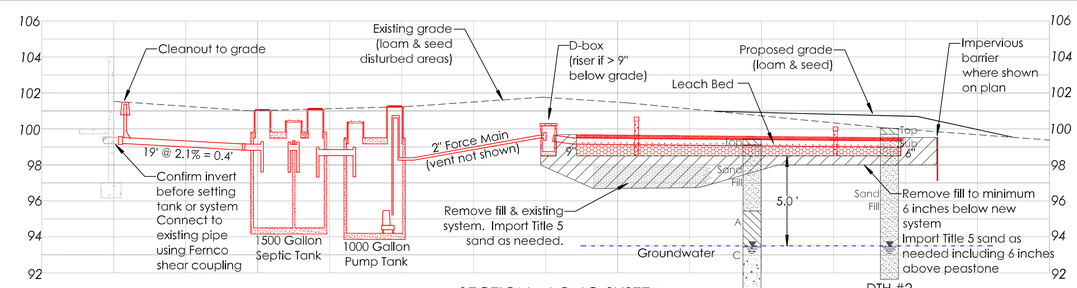
PUMP NOTES

1. Pump system shall be a complete package consisting of a submersible pump and motor, level switch controls, high water alarm, control panel with operation counter and any other equipment required for a safe operation.
2. Equipment to be installed per Manufacturer's specifications and in conformance with the Massachusett's Electric Code.
3. Pump system to be hard wired to buildings main electrical panel. High level alarm to be equipped with a visual light indicator and audible alarm with silencer switch. Alarm to be powered from separate circuit breaker than pump motor.

1000 GALLON PUMP CHAMBER
NO SCALE

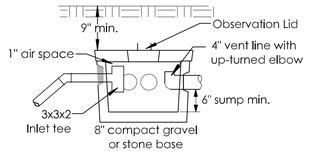


NOTE:
1. NO WELLS OBSERVED WITHIN 100 FEET OF SYSTEM.
2. NO KNOWN PUBLIC WATER SUPPLIES WITHIN 400 FEET OF SYSTEM.
3. WETLANDS AS SHOWN.



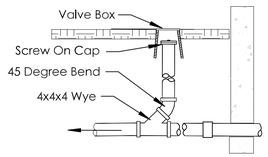
SECTION ALONG SYSTEM
HORZ. 1" = 10'
VERT. 1" = 4'

NOTE:
Add riser within 6 inches of grade if depth to top of box exceeds 9 inches

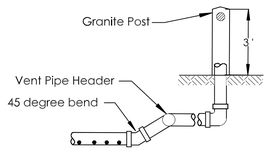


1. Box to be H-20 rated with inspection lid.
2. Force main to have inet tee (3" x 3" x 2")
3. Vent to have inverted elbow to prevent flowback.
4. All openings to be sealed with hydraulic cement.

D-BOX SECTION
NO SCALE



CLEANOUT DETAIL
NO SCALE



SYSTEM VENT DETAIL
NO SCALE

MATERIAL SPECIFICATIONS

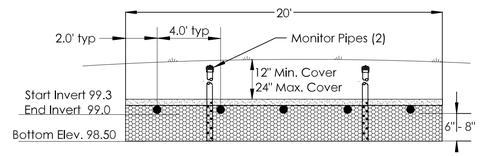
Sewer Pipe	4 inch solid P.V.C. Schedule 40
Distribution Pipe	4 inch Perforated P.V.C. Schedule 40
Force Main	SDR 21 PVC
Base Aggregate	¾" to 1½" Double Washed Stone per Title 5 Section 15.247 (1)
Filter Aggregate	1/8" to 1/2" Double Washed Stone per Title 5 Section15.247 (2)
Septic Tank	Precast concrete, 1500 gallon, 2 compartment, monolithic tank. with rubber booted connections (Shea M-1500-2C or equal)
Pump Tank	Precast concrete 1000 gallon monolithic tank with rubber booted connections (Shea M-1000 or equal)
Distribution Box	Precast concrete, H-20 rated Cover to have inspection lid Riser to within 6" of grade if depth greater than 9" 24 inch diameter H.D.P.E. covers screwed onto 24 inch diameter corrugated H.D.P.E. pipe. Risers to be watertight to tank.
Tank Risers	
Outlet Tee Filter	Zabel Model A1800
Outlet Tee Baffle	"Tuf-Tite" Model "GB-1"
Septic Sand	Clean Coarse Sandy Gravel per Title 5

Sieve No.	% Passing
No. 4	100%
No. 50	10% - 100%
No. 100	0% - 20%
No. 200	0% - 5%

Pump System	Single Pump System and Controls by Myers or equal

Manufacturer	Myers
Model	SRM-4
Rated Capacity	56 GPM
Total Dynamic Head	11 Feet

Impervious barrier	40 mil HDPE
Erosion Blanket	DS 75 by North American Green Photodegradable straw blanket
Vent	Granite Post



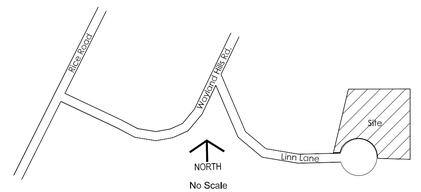
BED SECTION
NO SCALE

CONSTRUCTION SPECIFICATIONS

1. Leaching area shall be flagged from start of construction until certificate of compliance is issued. Parking of vehicles/equipment and stockpiling materials over leach area is prohibited.
2. Sewer pipe at foundation to be verified by Contractor prior to setting any tanks. If any discrepancies, contact Engineer. Piping to be set to ensure a minimum 2% pipe slope (¼ inch drop per foot of pipe).
3. Existing septic tank to be pumped and filled.
4. Leach system construction procedures:
   - Remove topsoil, subsoil and existing system to 5 feet around new system. Existing sand may remain if not contaminated but must be removed to a minimum of 6 inches below bottom of system. Replace with Title 5 sand as required to top of peastone.
   - Excavate 20 foot by 45 foot bed. Rake and level bottom.
   - Install ¾" – 1½" double washed base aggregate up to bottom of 4 inch perforated pipe.
   - Install perforated pipe along length of bed and cover to top with ¾" – 1½" double washed base aggregate.
   - Install two observation pipes in bed. Wrap with magnetic marking tape. Pipes to have screw on caps and buried 4 to 6 inches below final grade.
   - Cover bed with 2 inch layer of double washed filter peo stone. Cover bed with a minimum of 6 inches of sand before final grading with ordinary fill and 4 to 6 inches of screened topsoil. Cover over top of system to be at least 12 inches but no more than 24 inches. System to be backfilled without driving heavy equipment over leach area.
   - Seed to establish grass in all disturbed areas.
5. Tank and distribution box to be set on a minimum 8 inch layer of compact gravel or stone to prevent settlement.
6. Tanks to be backfilled to minimize settlement. Settled areas to be restored by Contractor.
7. Solid piping to be set in compacted sand bedding. All joints to be glued.
8. Pipe penetrations in tanks (unless specified to have rubber boot connections) and distribution box, including un-used knockouts, shall be sealed with hydraulic cement and made watertight.
9. Install magnetic marking tape over piping and all system components (tank, piping, D-box and leach system).

INSPECTIONS & AS-BUILT PLANS

1. The following inspections shall be done by the design engineer and Board of Health. The Board of Health may require additional inspections. No system component to be concealed without inspection.
   A. Bottom of over-excavation prior to placing any Title 5 sand backfill. Test pits to be witnessed by Engineer to confirm no buried top or subsoil
   B. Leaching system, piping, septic tank, pump operation and d-box prior to covering.
   C. Final grading.
2. Contractor and engineer to sign construction certification.
3. Design Engineer to sign certification and prepare and submit as-built plan.



LOCUS MAP

CAPACITY:

Facility Use:	Residential
No. of Bedrooms:	4 (Assessor's record)
No. of Rooms:	10
Garbage Grinder:	Yes (not recommended)
Flow Title 5:	110 GPD x 4 = 440 GPD
Flow Wayland:	165 GPD x 4 = 660 GPD

SOIL TESTING:

USDA Type: Sand
Title 5 Class: I
Perc #1: N/A (high groundwater)

LTAR = 0.74 GPD/SF per DEP sieve test policy dated May 3, 2006

SOIL ABSORPTION DESIGN CRITERIA

Soil Classification:	I
LTAR per Title 5:	0.74 gpd/sq. ft.
Leaching Area Req'd.:	892 Square Feet (440 GPD x 1.5)/0.74
Town Minimum Area:	900 Square Feet
Garbage Grinder:	Yes
Groundwater Offset:	5 feet (Title 5)

SOIL ABSORPTION AREA DESCRIPTION

Use stone and pipe in a bed design.

SOIL ABSORPTION AREA SIZING:

Bed Width:	20.0 feet
Bed Length:	45.0 feet
Leaching Area:	900 SF

Area provided = 900 SF = 900 SF required -O.K.-

GROUNDWATER

DTH No.	Surface Grade	Hole Depth	Refusal	Weeps	Mottles	Estimated Seasonal High Groundwater
1	El. 99.5	120"	None	72"	None	El. 93.5 (weeps)
2	El. 100.0	100"	None	80"	None	El. 93.4 (weeps)
3	El. 95.5	80"	None	24"	24"	El. 93.5 (mottles)

Use level of weeps as seasonal high groundwater based on no evidence of redox above weeps and USGS Wayland well being above normal during testing period

Bed	E.S.H.G	System Bottom	E.S.H.G. Offset	Breakout (top peastone)	Finish Grade	System Cover
1	El. 93.5	El. 98.5	5.0'	El. 99.5 - 99.8	El. 100.6 to 101.3	13" to 18"

SEPTIC TANK SIZING

Use 1500 gallon; 2 compartment tank

First Compart.: 200% of Design Flow
1000 gallons provided > 880 gallons

Second Compart.: 100% of Design Flow
500 gallons provided > 440 gallons

NITROGEN LOADING LIMITATIONS

Lot is served by town water and is not in a Nitrogen Sensitive Area.

LOCAL UPGRADE WAIVER REQUESTS (TITLE 5)

15.405 (1)(i) Use of sieve test in lieu of perc test

TOWN VARIANCE REQUESTS

Section II D. 1. - 75 foot offset to wetlands (59 feet provided)

SPECIAL REQUIREMENTS

None

GENERAL NOTES:

1. All construction to conform to Title 5 of the State Environmental Code and local Board of Health Regulations.
2. The system installer shall be licensed by the Town and obtain all permits (trench, plumbing, electrical) as necessary prior to construction.
3. Installer shall verify existing conditions and immediately report any discrepancies to the Engineer. No change in plan elevations, locations or materials shall be done without approval of the Engineer and Board of Health Agent.
4. Prior to any excavation, Contractor to notify utility companies by calling Dig-Safe at 1-888-344-7233. Certain utilities such as municipal water suppliers are not part of Dig-Safe and must be notified by the Contractor separately. Underground utilities shown on the plan are approximate only.
5. Soil quantity estimates are approximate and can vary depending on site conditions and size and/or depth of existing system being removed.

REFERENCE NOTES:

1. Property lines and topography by Tauper Land Survey dated January 2021. This septic design plan not to be relied on to stake property lines.
2. Wetlands delineated by Williams & Sparages; November 6, 2020.
3. Soil testing by Daniel McIntyre, P.E., (SE #1562) dated December 4, 2020.

NORTH

LEGEND
- Existing Grades
- Proposed Grades
- Deep Hole Test Pit
- Perc Tests
- 100x0 Finish Spot Grade
- Overexcavation
- Trees
- Stone Wall

AS-BUILT TIES

	Ⓐ	Ⓑ
TANK INLET		
TANK OUTLET		
PUMP		
D- BOX		
OBS. PIPE 1		
OBS. PIPE 2		

AS-BUILT	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5
BOTTOM STONE					
INVERT END					
INVERT START					
D-BOX OUTLET					
D-BOX INLET					
PUMP OUT					
PUMP IN					
SEPTIC TANK OUT					
SEPTIC TANK IN					
FOUNDATION					

DESIGN INV.	Bed
BOTTOM STONE	98.50
INVERT END	99.00
INVERT START	99.30
D-BOX OUTLET	99.53
D-BOX INLET	99.70
PUMP OUT	98.25
PUMP IN	98.50
SEPTIC TANK OUT	98.55
SEPTIC TANK IN	98.80
FOUNDATION	99.2+/-

2' @ 2.5% = 0.05'

19' @ 2.1% = 0.4'
Confirm invert before setting tank

ADVICE TO OCCUPANTS

1. System is designed for domestic sanitary sewage only.
2. An annual inspection of the septic tank by a qualified service provider is recommended.
3. Septic tank has 2 compartments which both need pumping.
4. The septic tank is equipped with an outlet tee filter that requires regular cleaning by a qualified septic tank pumper.
5. System is equipped with and effluent pump and alarm. If alarm sounds or lights up, system should be inspected immediately by a qualified septic contractor.
6. The leaching system is NOT sized for a garbage grinder and it's installation and use is prohibited.
7. Washing machine must discharge to septic system.
8. No trees should be planted over or near the septic system.
9. If water softener installed, it cannot discharge to system.

I certify that on July 27, 1995, I passed the examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the training, expertise and experience described in 310 CMR 15.017.

Daniel McIntyre SE #1562

REV	DATE	DESCRIPTION
01	2/24/21	Added BOH comments

2-24-2021

TITLE
SEPTIC SYSTEM DESIGN PLAN

PROJECT
16 LINN LANE
Applicant
MCINTURFF

TOWN WAYLAND, MA | MAP 49 | BLOCK 0 | LOT 17

SCALE 1" = 20'
DATE 1/14/2021
SHEET 1 of 1

MCINTYRE ENGINEERING & SEPTIC SERVICES, INC.
30 Elm Street
Hopkinton, Massachusetts 01748
508-497-2374