



November 19, 2018

Amanda Lessard, Town Planner  
Town of Windham  
8 School Road  
Windham, ME 04062

**Re: Resubmission – Preliminary Subdivision Review  
Gray Road Retirement Community  
Weld, LLC - Applicant**

Dear Amanda:

On behalf of Weld, LLC we have prepared the enclosed plans and supporting material reflecting the revisions to the Gray Road Retirement Community at the intersection of Gray Road (Route 202) and Swett Road. We have made several plan revisions to mitigate concerns raised about the placement of septic systems and the preservation of buffer areas adjacent to the wetlands.

The number of proposed dwelling units has been increased from 12 to 14, and we have “flipped” the alignment of the roadway and units on the back half of the project so that the buildings are located adjacent to the wetlands. This was done to accommodate the neighbors’ concerns about roadway snow being plowed into the wetland area and the elimination of all buffers to the wetland. The revised plans show a forested buffer maintained along the wetland area and we have eliminated the previously proposed wetland impact. The area that will be graded for the downslope of the wastewater disposal field will be allowed to revert back to natural conditions after development to further increase the buffer length over time.

The previous plans included one small leach field providing wastewater disposal for two units and one larger leach field that accommodated wastewater disposal for 10 units. The revised plan proposes four leach fields to better distribute the wastewater over the project’s land area. Additionally, two of the septic systems have been designed with Advanced Treatment to reduce the concentration of Nitrates prior to entering the disposal fields. A Nitrate-Nitrogen Assessment Report prepared by Summit Geoengineering Services is enclosed which provides more detailed information on the design of the wastewater disposal systems and advanced treatment units.

Upon your review of this information, please let us know if you have any questions or require any additional information.

Sincerely,

DM ROMA CONSULTING ENGINEERS

*Dustin Roma*

Dustin M. Roma, P.E.  
President

November 16, 2018

Summit #18323

Dustin Roma, P.E.  
DM Roma Consulting Engineers  
PO Box 1116  
Windham, ME 04062

Reference: Nitrate-Nitrogen Assessment  
Proposed Gray Road Retirement Community - Gray Road, Windham, Maine

Dear Dustin:

Summit Geoengineering Services (SGS) performed this nitrate-nitrogen assessment to estimate the groundwater quality impact caused by the proposed subsurface wastewater disposal systems for the Gray Road Retirement Community. The proposed development consists of fourteen two-bedroom retirement home units on approximately 11.4-acres of forestland located on the west side of Gray Road in Windham, Maine. A site location map showing the site and vicinity is provided as Attachment 1.

Information used for our evaluation includes a development plan provided by DM Roma Consulting Engineers (DM Roma), subsurface wastewater disposal system applications (HHE-200s) prepared by SGS, and published soil maps, geologic maps and literature.

### **Site Setting**

The site is located on a north-south trend ridge on the west side of Gray Road (Route 202) as shown on Figure 1 in Attachment 1. A surface water drainage divide is located in the approximate center of the site. The eastern portion of the site drains easterly toward Gray Road. The western portion of the site drains westerly to a large wetland area located partially on the property, and partially on adjoining properties on Swett Road.

Review of Maine Geological Survey maps<sup>1</sup> indicate the surficial geology at the site and vicinity is mapped as glacial till with areas of exposed or shallow bedrock. No mapped significant sand and gravel aquifers are located within approximately 1 mile of the property. Glacial till consist of moderate compact, poorly sorted, weakly to non-stratified mixture of silt, sand, pebble, cobbles and boulders deposited by glacial ice, and is generally deposited directly on top of bedrock.

SGS observed soils on-site during field explorations for siting the proposed subsurface wastewater disposal fields. Soils at the proposed disposal field locations consist predominately of sandy loam to fine sandy loam with trace to some cobbles and gravel over bedrock. Sandy loam overlying silt loam soils (glaciolacustrine deposits) were observed in the low-lying areas near the wetlands on the western portion of the site. Depths to bedrock at the proposed disposal field locations range from approximately 1 foot to more than 3 feet below the ground surface. Bedrock outcrops are visible in some area of the property.

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<sup>1</sup> <https://www.maine.gov/dacf/mgs/pubs/index.shtml>

## **Water Supply**

The proposed development will be served by public water via a Portland Water District water main on Gray Road (Route 202). Properties on Gray Road in the site vicinity are served by public water. Adjoining properties to the south and west on Swett Road are served by on-site wells.

Wells located within 100 feet of the proposed disposal fields were field located by SGS using tape measurements to nearby property boundary markers and are shown on plans prepared by DM Roma. The proposed disposal fields are located more than 100 feet from existing water supply wells.

## **Subsurface Wastewater Disposal Fields**

The proposed development will be served by four subsurface wastewater disposal systems, as shown on the HHE-200 applications provided as Attachment 1. Design information for the proposed subsurface wastewater disposal systems are summarized in the table below.

**Subsurface Wastewater Disposal Systems**

System Designation	Units Served	Design Flow (GPD)	Subsurface Wastewater Disposal System Description
A	1 thru 4	720	Fuji Clean CEN10 Advanced Treatment System <sup>2</sup> Plastic chamber disposal field
B	5 and 6	360	Eljen GSF disposal field
C	7 thru 10	720	Fuji Clean CE10 Advance Treatment System <sup>3</sup> Stone bed disposal field
D	11 thru 14	720	Eljen GSF disposal field

**Notes:**

1. GPD = gallons per day; mg-N/L = milligrams nitrogen per liter
2. Fuji Clean CEN10 treats septic tank effluent to 10 mg-N/L total nitrogen
3. Fuji Clean CE10 treats septic tank effluent to 20 mg-N/L total nitrogen

## **Nitrate-Nitrogen Assessment**

A nitrate-nitrogen assessment was performed to estimate the distance from the disposal fields at which the concentration in groundwater would reach the Federal National Primary Drinking Water Standard and the Maine Maximum Exposure Guideline of 10 milligrams nitrogen per liter (mg-N/L). The average concentration of nitrate in septic tank effluent discharged from the disposal field used in this assessment is 40 mg-N/L.<sup>2</sup>

The concentration of nitrate-nitrogen in groundwater downgradient of the disposal fields will reduce as it flows away from the disposal field and mixes with groundwater, is removed by vegetation, or is converted to nitrogen gas by soil microbes in wetland areas (denitrification).

<sup>2</sup> MEDEP, Site Location of Development Permit Application (October 2015) Section 17.B.2.(a).

Based on our understanding of site geology, treated septic tank effluent will drain to the disposal field and infiltrate downward through unsaturated soil until a seasonally perched water table above the bedrock surface is encountered. Thereupon flow is lateral and hydraulically downgradient. The direction of shallow groundwater flow for the subsurface conditions observed at this site is downhill (topographically downgradient).

The distance at which groundwater downgradient of disposal fields reaches 10 mg-N/L (plume length) was estimated using a three-dimensional analytical solution<sup>3,4</sup> for a point source in a uniform flow field. Variables used for the calculations include the permeability and effective porosity of soils, hydraulic gradient, and the daily mass of nitrate-nitrogen applied to groundwater. The analytical solution does not consider nitrogen removal by soil microbes, vegetation or sorption. Input parameters for the analytical point source solution are summarized in the table below.

**Analytical Solution Input Parameters**

Parameter	Value	Source Reference
Permeability	1.2 feet/day	Estimated based on the range of permeabilities for Paxton fine sandy loam (1.2 to 4.0 ft/day) listed in the Cumberland County Soil Survey <sup>5</sup>
Effective Porosity	0.18	Published average value for silt <sup>6</sup>
Hydraulic Gradient	Varies	Half of the average topographic gradient upgradient/downgradient of the disposal field.

The treatment capacity of wetlands<sup>7</sup> to remove nitrogen from shallow groundwater through plant uptake and microbial activity is significant. In instances where the nitrate plume for a disposal field intersects a mapped wetland area on the property prior the reaching 10 mg-N/L, the wetland's capacity to provide nitrate removal was evaluated. Research into the capacity of planted and unplanted wetlands to remove nitrogen at concentration similar to those in treated septic system effluent show nitrogen removal rates in excess of 95% for planted wetlands and removal rates of 25% to 36% in unplanted (natural) wetlands. Using the 25% nitrate removal rate in Lin et. al. (2002) <sup>8</sup> a wetland area nitrate removal rate of 0.0825 grams per square meter is calculated.

Results of our nitrate-nitrogen assessment are summarized in the table below. The table includes the methodology of evaluation used for each of the four proposed subsurface wastewater disposal systems and the estimated 10 mg-N/L plume length.

<sup>3</sup> Baetsle, L.H. (1969), Migration of Radionuclides in Porous Media; Progress in Nuclear Energy, Series SIL, Health Physics. Pergamon Press, pp. 707-730.

<sup>4</sup> Chang, et al. (1998). Utilizing Baetsle's Equation to Model the Fate and Transport of MTBE in Groundwater, Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water Prevention, Detection, and Remediation Conference, Houston, TX.

<sup>5</sup> USDA Soil Conservation Services (1974), Soil Survey of Cumberland County, Maine.

<sup>6</sup> Fetter, C.W. (1994). Applied Hydrogeology, 3<sup>rd</sup> Edition, Prentice Hall

<sup>7</sup> US EPA (2005), Riparian Buffer Width, Vegetative Cover, and Nitrogen Removal Effectiveness: A review of Current Science and Regulations. EPA/600/R-05/118.

<sup>8</sup> Lin, et. al. (2002), Effects of macrophytes and external carbon sources on nitrate removal from groundwater in constructed wetlands. Environmental Pollution, v. 119, pp. 413-420.

### Nitrate-Nitrogen Assessment Summary

System Designation	10 mg-N/L Plume Length	Methodology of Evaluation
A	0 Feet	Total nitrogen concentration in treated effluent from the Fuji Clean CEN10 unit is 10 mg-N/L.
B	200 feet extending easterly towards Gray Road	Three-dimensional analytical point source solution using input parameters noted above.
C	Terminates in on-site wetlands	Nitrate-nitrogen in groundwater downgradient of the subsurface wastewater disposal fields will flow into the wetland area downgradient of the disposal fields, and be treated to less than 10 mg-N/L. Refer to calculations provided in Attachment 3.
D		

#### Conclusion:

Proposed subsurface wastewater disposal systems B, C and D will not result in an increase of nitrate-nitrogen above 10 mg/L in groundwater at the property boundary.

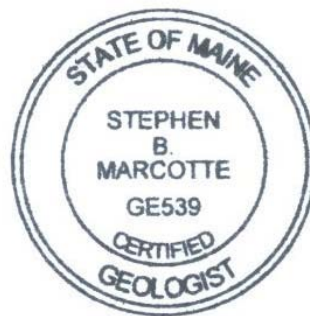
Results of our analysis indicate the proposed subsurface wastewater disposal system A will result in an increase of nitrate-nitrogen above 10 mg/L in groundwater at the property boundary along Gray Road. Given that public water is available to future developments in the area of the plume from disposal field A and there are no known water supply wells near the plume, we proposed that the applicant request a waiver to the Town of Windham Land Use Ordinance for meeting the nitrate-nitrogen drinking water standard requirement this disposal field.

Our findings are based on our interpretation of site conditions and the information provided to us. If there are changes in lot layout, proposed septic system design flows, or significant changes in disposal field size, we request the opportunity to review the changes and conduct further analysis as necessary to confirm the changes do not alter our conclusions.

Sincerely yours,  
**Summit Geoengineering Services**



Stephen B. Marcotte, C.G., L.S.E.  
Senior Geologist



Enclosures

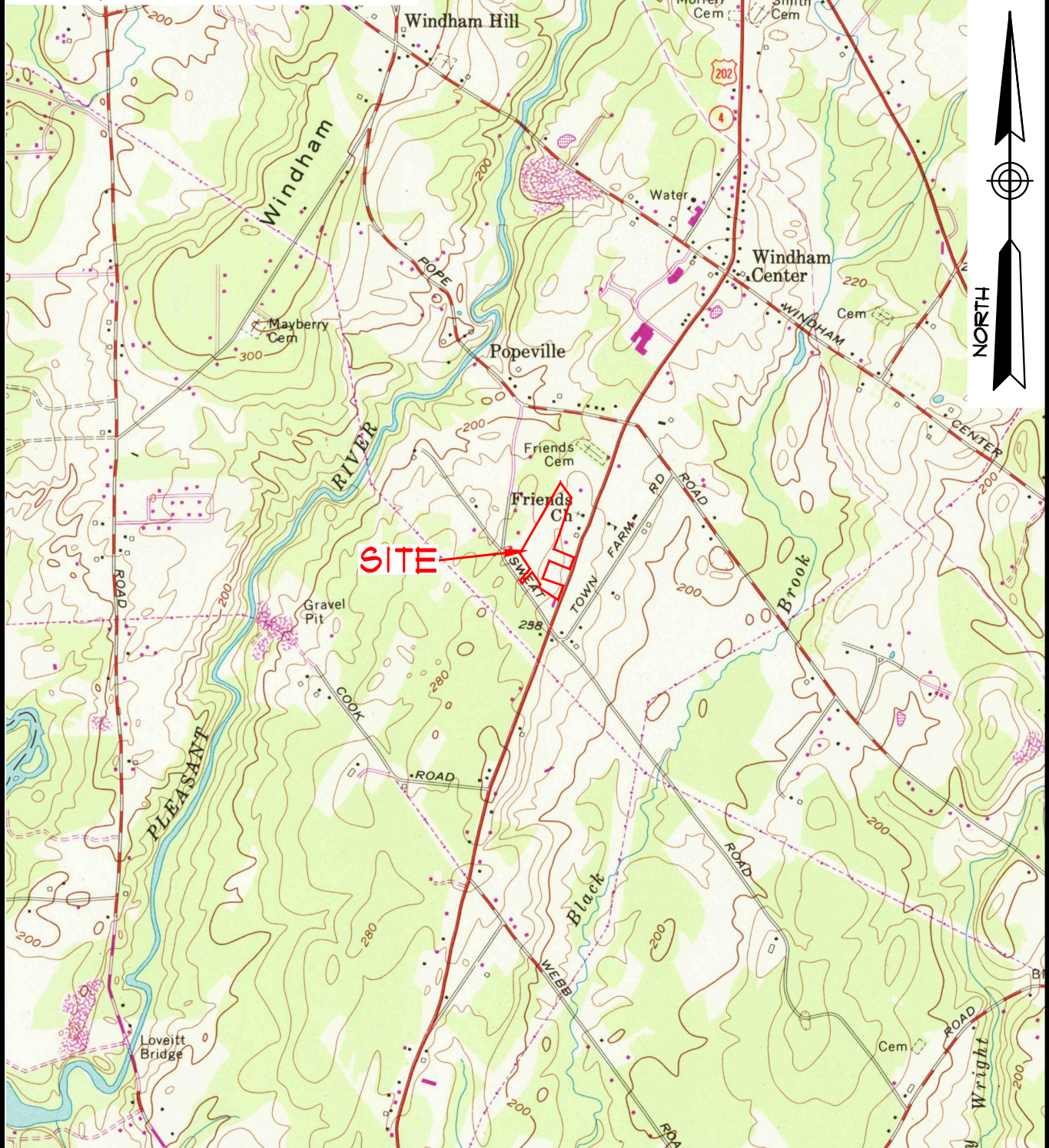
## **Attachment 1**

### Site Location Map



# PLAN REFERENCE

USGS TOPOGRAPHIC MAP FOR NORTH  
WINDHAM, MAINE 15-MINUTE QUADRANGLE



## FIGURE 1: SITE LOCATION PLAN GRAY ROAD RETIREMENT COMMUNITY

GRAY ROAD - WINDHAM, ME

PREPARED FOR

DM ROMA CONSULTING ENGINEERS

DATE: 11-13-2018	DRAWN BY: SBM	CHECKED BY: SBM
JOB: 18323	SCALE: 1" = 2000'	FILE: 18323 MAP

145 LISBON ST. - SUITE 101  
LEWISTON, ME 04240  
Tel.: (207) 576-3313

173 PLEASANT STREET  
ROCKLAND, ME 04841  
Tel.: (207) 318-7761

**SUMMIT**  
GEOENGINEERING SERVICES  
[www.summitgeoeng.com](http://www.summitgeoeng.com)

## **Attachment 2**

### **Subsurface Wastewater Disposal System Applications (HHE-200s)**



SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION				Maine Department of Human Services Division of Health Engineering, 10 SHS (207) 287-5672 Fax: (207) 287-3165	
<b>PROPERTY LOCATION</b>				<b>&gt;&gt; CAUTION: LPI APPROVAL REQUIRED &lt;&lt;</b>	
City, Town, or Plantation	Windham			Town/City _____	Permit # _____
Street or Road	Gray Rd (Map 9 / Lot 27K)			Date Permit Issued ____/____/____	Double Fee Charged <input type="checkbox"/>
Subdivision, Lot #	Gray Road Retirement Community			<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>For Permitting Only Not for Construction</b> </div>	
<b>OWNER/APPLICANT INFORMATION</b>				L.P.I. # _____	
Name (last, first, MI) <input checked="" type="checkbox"/> Owner <input type="checkbox"/> Applicant <b>WELD, LLC</b>				The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. This Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.	
Mailing Address of Owner/Applicant <b>PO Box 1361 Windham, ME 04062</b>					
Daytime Tel. # _____					
<b>OWNER OR APPLICANT STATEMENT</b> I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a Permit.				<b>CAUTION: INSPECTION REQUIRED</b> I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.	
Signature of Owner or Applicant _____ Date _____				Local Plumbing Inspector Signature _____ (1st) date approved _____ (2nd) date approved _____	
<b>PERMIT INFORMATION</b>					
<b>TYPE OF APPLICATION</b> <input checked="" type="checkbox"/> 1. First Time System <input type="checkbox"/> 2. Replacement System Type replaced: _____ Year installed: _____ <input type="checkbox"/> 3. Expanded System <input type="checkbox"/> a. <25% Expansion <input type="checkbox"/> b. >= 25% Expansion <input type="checkbox"/> 4. Experimental System <input type="checkbox"/> 5. Seasonal Conversion		<b>THIS APPLICATION REQUIRES</b> <input checked="" type="checkbox"/> 1. No Rule Variance <input type="checkbox"/> 2. First Time System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 3. Replacement System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 4. Minimum Lot Size Variance <input type="checkbox"/> 5. Seasonal Conversion Permit		<b>DISPOSAL SYSTEM COMPONENTS</b> <input checked="" type="checkbox"/> 1. Complete Non-engineered System <input type="checkbox"/> 2. Primitive System (graywater & alt. toilet) <input type="checkbox"/> 3. Alternative Toilet, specify: _____ <input type="checkbox"/> 4. Non-engineered Treatment Tank (only) <input type="checkbox"/> 5. Holding Tank, _____ gallons <input type="checkbox"/> 6. Non-engineered Disposal Field (only) <input type="checkbox"/> 7. Separated Laundry System <input type="checkbox"/> 8. Complete Engineered System (2000 gpd or more) <input type="checkbox"/> 9. Engineered Treatment Tank (only) <input type="checkbox"/> 10. Engineered Disposal Field (only) <input checked="" type="checkbox"/> 11. Pre-treatment, specify: <b>Fuji Clean CEN10</b> <input type="checkbox"/> 12. Miscellaneous Components	
<b>SIZE OF PROPERTY</b> <div style="display: flex; justify-content: space-between;"> <span><b>±11.4</b></span> <span><input type="checkbox"/> SQ. FT. <input checked="" type="checkbox"/> ACRES</span> </div>		<b>DISPOSAL SYSTEM TO SERVE</b> <input type="checkbox"/> 1. Single Family Dwelling Unit, No. of Bedrooms: _____ <input checked="" type="checkbox"/> 2. Multiple Family Dwelling, No. of Units: <b>(4) 2-Bedroom</b> <input type="checkbox"/> 3. Other: _____ (specify) Current Use <input type="checkbox"/> Seasonal <input type="checkbox"/> Year Round <input checked="" type="checkbox"/> Undeveloped		<b>TYPE OF WATER SUPPLY</b> <input type="checkbox"/> 1. Drilled Well <input type="checkbox"/> 2. Dug Well <input type="checkbox"/> 3. Private <input checked="" type="checkbox"/> 4. Public <input type="checkbox"/> 5. Other	
<b>DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)</b>					
<b>TREATMENT TANK</b> <input checked="" type="checkbox"/> 1. Concrete <input checked="" type="checkbox"/> a. Regular <input type="checkbox"/> b. Low Profile <input type="checkbox"/> 2. Plastic <input type="checkbox"/> 3. Other: _____ CAPACITY: <b>1,000</b> GAL		<b>DISPOSAL FIELD TYPE &amp; SIZE</b> <input type="checkbox"/> 1. Stone Bed <input type="checkbox"/> 2. Stone Trench <input checked="" type="checkbox"/> 3. Proprietary Device <input type="checkbox"/> a. cluster array <input type="checkbox"/> c. Linear <input checked="" type="checkbox"/> b. regular load <input type="checkbox"/> d. H-20 load <input type="checkbox"/> 4. Other: _____ SIZE: <b>800 sf stone bed equivalent</b>		<b>GARBAGE DISPOSAL UNIT</b> <input checked="" type="checkbox"/> 1. No <input type="checkbox"/> 2. Yes <input type="checkbox"/> 3. Maybe If Yes or Maybe, specify one below: <input type="checkbox"/> a. multi-compartment tank <input type="checkbox"/> b. _____ tanks in series <input type="checkbox"/> c. increase in tank capacity <input type="checkbox"/> d. Filter on Tank Outlet	
<b>SOIL DATA</b> PROFILE <b>2</b> CONDITION <b>AIII</b> at Observation Hole # <b>TB-3</b> Depth <b>12</b> " of Most Limiting Soil Factor <b>Bedrock</b>		<b>DISPOSAL FIELD SIZING</b> <input type="checkbox"/> 1. Medium---2.6 sq. ft. / gpd <input checked="" type="checkbox"/> 2. Medium---Large 3.3 sq. ft. / gpd <input type="checkbox"/> 3. Large---4.1 sq. ft. / gpd <input type="checkbox"/> 4. Extra Large---5.0 sq. ft. / gpd		<b>EFFLUENT/EJECTOR PUMP</b> <input type="checkbox"/> 1. Not Required <input checked="" type="checkbox"/> 2. May Be Required <input type="checkbox"/> 3. Required Specify only for engineered systems: DOSE: _____ gallons	
<b>DESIGN FLOW</b> <div style="display: flex; justify-content: space-between;"> <span><b>720</b> gallons per day</span> <span>BASED ON:</span> </div> <input checked="" type="checkbox"/> 1. Table 4A (dwelling unit(s)) <input type="checkbox"/> 2. Table 4C (other facilities) <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <b>Fuji Clean CEN10 approved for 75% reduction in disposal field area - see attached 67% reduction proposed</b> </div> <input type="checkbox"/> 3. Section 4G (meter readings) ATTACH WATER METER DATA					
<b>LATITUDE AND LONGITUDE at center of disposal area</b> Lat. <b>N43</b> d <b>46</b> m <b>39.66</b> s Lon. <b>W70</b> d <b>25</b> m <b>0.60</b> s if g.p.s. state margin of error: <b>20'</b>					
<b>SITE EVALUATOR STATEMENT</b>					
I certify that on <b>11/5/2018</b> (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).					
<div style="display: flex; align-items: center;"> <div style="margin-left: 20px;"> <b>387</b> SE #         </div> <div style="margin-left: 20px;"> <b>11/12/18</b> Date         </div> </div>					
<b>Stephen B. Marcotte</b> Site Evaluator Name Printed				<b>(207) 939-2600</b> Telephone Number	
				<b>smarcotte@summitgeoeng.com</b> Email Address	
Designed with SeptiCAD v5 Note: Changes to or deviations from the design should be confirmed with the Site Evaluator.					

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION				Maine Department of Human Services Division of Health Engineering, Station 10 (207) 287-5672 Fax: (207) 287-3165	
Town, City, Plantation <b>Windham</b>		Street, Road, Subdivision <b>Gray Rd (Map 9 / Lot 27K)</b>		Owner or Applicant Name <b>WELD, LLC</b>	
<div style="border: 1px solid black; padding: 2px; width: fit-content;">For Permitting Only Not for Construction</div>		<b>SITE PLAN</b> Scale 1" = <u>150</u> ft.		<b>SITE LOCATION PLAN</b>	
<div style="position: absolute; top: 10%; right: 10%; border: 1px solid black; padding: 5px;"> <b>SITE LOCATION PLAN</b>        Proposed Road        Swett Rd        Gray Rd (Rt 202)        FIRE DEPT.        N     </div> <div style="position: absolute; top: 40%; left: 20%;">       100' Well Setback        Drilled Well        Serves Four 2-Bedroom Units     </div> <div style="position: absolute; top: 40%; right: 20%;">       Nearby Proposed Disposal Field        (min. 100 ft between field)     </div> <div style="position: absolute; top: 50%; right: 20%;">       Proposed Disposal Field        16 ADS BioDiffuser Hi-Capacity Chambers        With Fuji Clean CEN10 Adv. Treatment Unit     </div>					
<b>NOTES:</b> 1. Site plan based on draft digital plans provided by DM Roma Consulting Engineers.					
SOIL PROFILE DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)					
Observation Hole # <u>TP-1</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring			Observation Hole # <u>TB-4 (TB-2 &amp; 3)</u> <input type="checkbox"/> Test Pit <input checked="" type="checkbox"/> Boring		
<u>1</u> "      Depth of organic horizon above mineral soil			<u>1</u> "      Depth of organic horizon above mineral soil		
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
0					
6			Dark Brown (Ap)		
12	Sandy Loam with some gravel and cobbles	Friable	~		
18					
24			Yellowish Brown		
30					
36			Olive Brown	Few & Faint	
42	Refusal in Stones at 42 inches / Possible Bedrock or Hardpan				
48					
	Soil Profile <u>2/4</u>	Classification Condition <u>C</u>	Slope Percent <u>3-5</u>	Limiting Factor Depth <u>38/42"</u>	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
Depth below mineral soil surface (inches)					
0					
6			Dark Brown (Ap)		
12	Sandy Loam with some gravel and cobbles	Friable	~		
18					
24			Yellowish Brown		
30					
36	Refusal on Bedrock at 32 inches				
42	TB-2: Same profile as TB-4 - Bedrock at 18"				
48	TB-3: Same profile as TB-4 - Bedrock at 12"				
	Soil Profile <u>2</u>	Classification Condition <u>All</u>	Slope Percent <u>3-5</u>	Limiting Factor Depth <u>38"</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock

Site Evaluator Signature

**387**

SE #

**11/12/18**

Date

Page 2 of 3

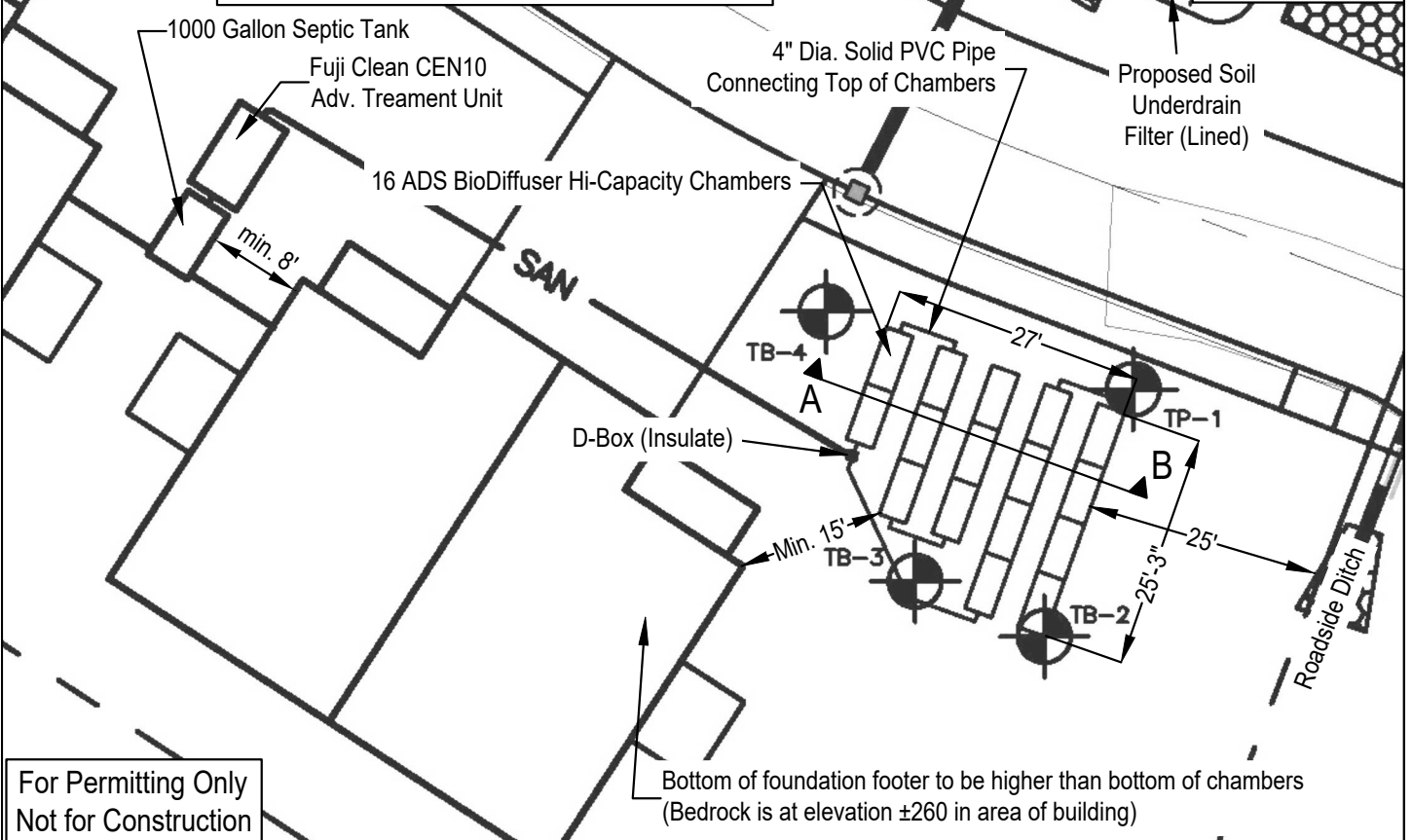
HHE-200 Rev. 10/02

Maine Department of Human Services  
Division of Health Engineering, Station 10  
(207) 287-5672 Fax: (207) 287-3165

Owner or Applicant Name
-------------------------

WELD, LLC

Scale: 1" = 20 ft



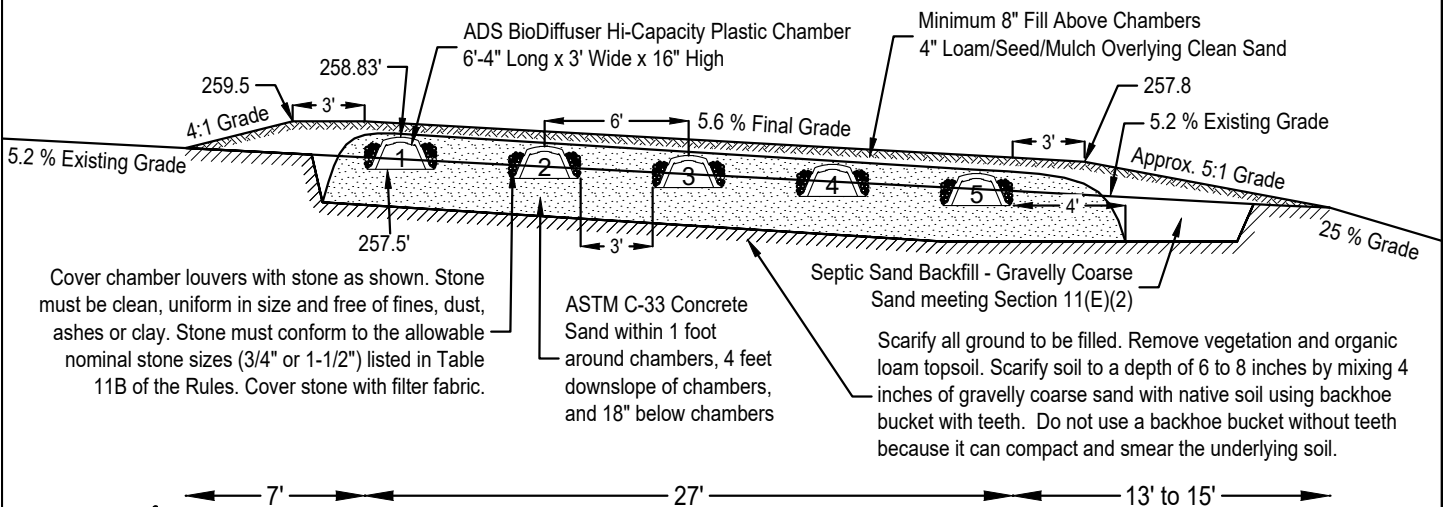
ELEVATION REFERENCE POINT  
Location & Description: For Permitting Only

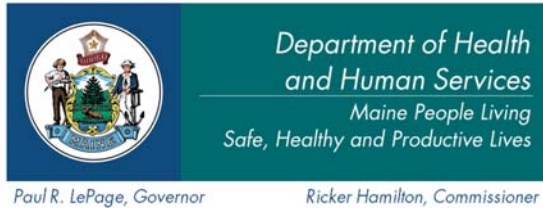
Reference Elevation: 0.0"

Scales:

Horizontal: 1" = 8

ROW #	1	2	3	4	5
TOP	258.83'	258.45'	258.07'	257.7'	257.32'
BOTTOM	257.5'	257.12'	256.74'	256.37'	255.99'
TOP OF ROW #1 INLET AT 258.69'					

Page 3 of 3  
HHE-200 Rev. 10/02



Department of Health and Human Services  
Maine Center for Disease Control and Prevention  
286 Water Street  
11 State House Station  
Augusta, Maine 04333-0011  
Tel.: (207) 287-8016; Fax: (207) 287-9058  
TTY Users: Dial 711 (Maine Relay)  
Fax (207) 287-4172

Tel. (207) 287-2070

Drinking Water Program

April 9, 2018

Fuji Clean USA, LLC  
Attn.: Scott Samuelson, Managing Director  
41-2 Greenwood Road  
Brunswick, ME 04011

Subject: Disposal Field Size Reduction, Fuji Clean Models CEN5, CEN7, CEN10, and CEN21

Dear Mr. Samuelson:

The Division of Environmental and Community Health has reviewed your proposal for 75 percent reductions in disposal field sizing compared to the standard sizing requirements in the Maine Subsurface Wastewater Disposal Rules for systems which incorporate Fuji Clean Models CEN5, CEN7, CEN10, and CEN21 wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each as verified in the NSF report dated April 2015.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 75 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers; and
5. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

This letter supersedes the letter dated October 12, 2016.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system.

Should you have any questions, please feel free to contact me at (207) 287-5695, or by fax at (207) 287-4172.

Sincerely,



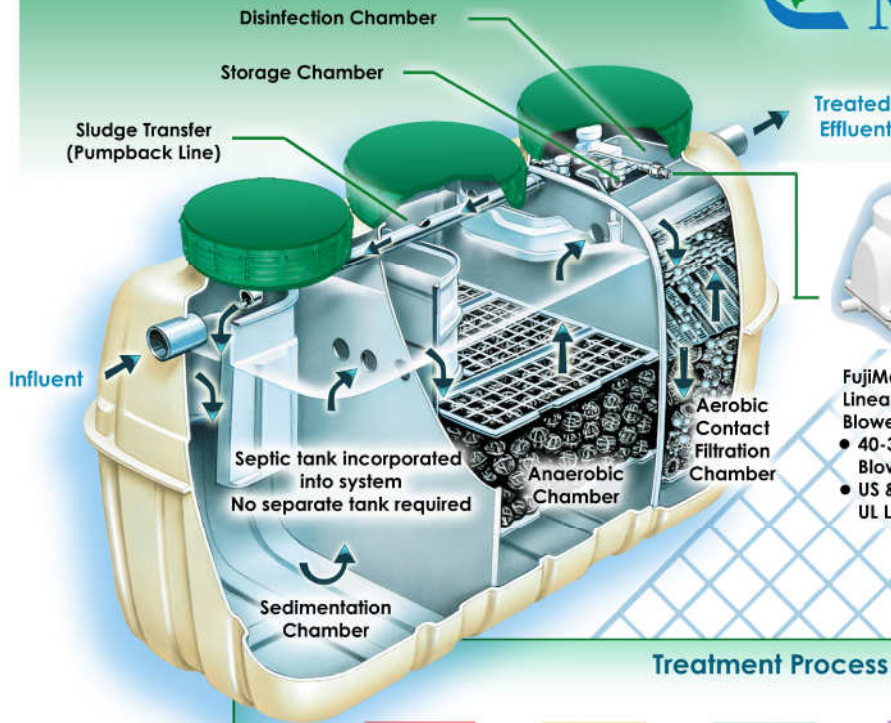
James A. Jacobsen, Environmental Specialist IV  
Division of Environmental and Community Health  
Drinking Water Program  
Engineering Review Team  
286 Water Street, Augusta, ME 04333  
e-mail: [james.jacobsen@maine.gov](mailto:james.jacobsen@maine.gov)

xc: File

/jaj



# MODEL CE & CEN SERIES *Technical Specification Sheet*



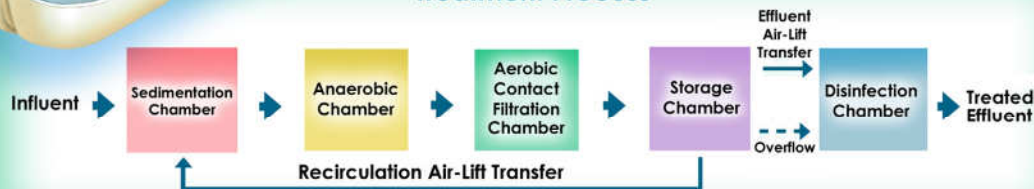
**FujiMac RII  
Linear Diaphragm  
Blower**

- 40-300L/min Blower Options
- US & CAN UL Listed

## Fuji Clean Advantages

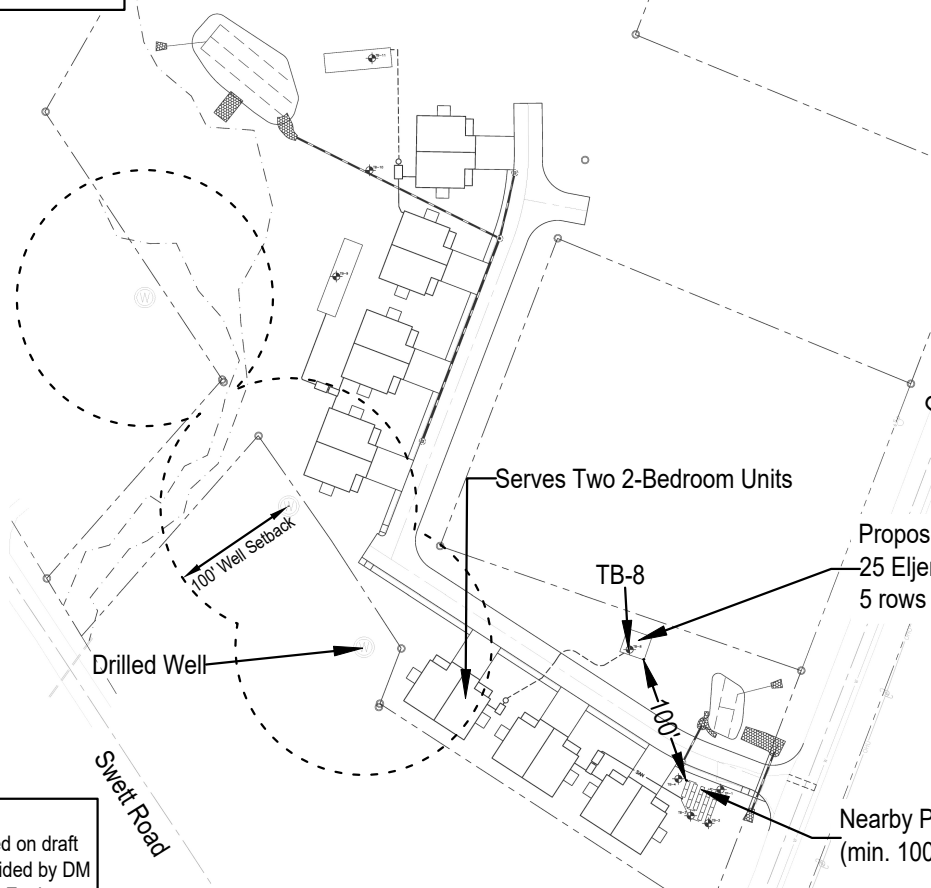
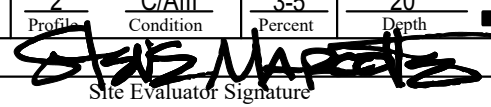
- Over 2 million installed systems worldwide
- 1-tank system – no septic tank necessary
- No moving parts in tank
- Built-in equalization - levels variable inflow
- NSF 40 and 40/245 certified
- TN removal to 70+% with CEN models
- Phosphorous reduction technology
- Smallest footprint vs. competitors
- Lowest power use vs. competitors
- Lightweight tank - easy installation
- Quick and easy O&M - no mess
- Rapid startup and restart for seasonal homes

## Treatment Process



Design Specification Table	CE Series BOD, TSS, TN							CEN Series BOD, TSS, Enhanced TN			
MODEL:	CE5	CE7	CE10	CE14	CE21	CE30	CE6KG	CEN5	CEN7	CEN10	CEN21
Load Hydraulic (GPD)	360	540	720	1,000	1,900	2,700	6,000	360	540	720	1,900
EFFLUENT (assumes domestic strength influent):											
BOD – Effluent (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BOD (removal pounds/day)	.52	.73	1.04	1.46	2.08	3.12	6.93	.69	.97	1.38	2.9
TSS (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
TN (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BLOWER DETAIL:											
Blower Model	MAC80R	MAC80R	MAC100R	MAC100R	MAC150R	MAC200R	MAC200R (3)	MAC80R	MAC100R	MAC100R	MAC200R
Normal Pressure (kPa)	15	15	18	18	20	20	20	15	18	18	20
Airflow Volume (CFM; L/Min.)	2.8 CFM 80 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	5.3 CFM 150 L/MIN	7.0 CFM 200 L/MIN	21.0 CFM 600 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	7.0 CFM 200 L/MIN
Power Use (kWh/day)	1.1	1.1	1.6	1.6	2.4	3.4	10.2	1.1	1.6	1.6	3.4
Weight (lbs.)	11	11	11	11	13	13	13 x 3	11	11	11	13
Outlet Diameter (OD, inches)	0.70	0.70	0.70	0.70	1.0	1.0	1.0 x 3	.070	0.70	0.70	1.0
TANK DETAIL:											
Material	Fibre-Reinforced Plastic							Fibre-Reinforced Plastic			
Height (inches)	61.8	65.7	73.6	77.4	81.3	87.2	87.2	65.7	73.6	77.4	87.2
Length (inches)	85	95.7	98.8	118.9	152.8	183.7	434.7	95.7	98.8	118.9	183.7
Width (inches)	43.7	49.2	56.7	68.9	72.4	78.3	115.3	49.2	56.7	68.9	78.3
Weight (lbs.)	397	463	705	926	1,168	1,543	2,900	463	705	926	1,543
Inlet Invert (inches)	49	53	61	62	65	71	67	53	61	62	71
Outlet Invert (inches)	47	51	59	59.5	63	69	64	51	59	59.5	69
Access Ports		2@20"	2@20"	2@20"	2@20"	2@20"	4@24"x24"	2@20"	2@20"	2@20"	2@20"
Quantity & Diameter (inches)	3@20"	1@24"	1@24"	1@24"	1@24"	1@24"	3@24"x48"	1@24"	1@24"	1@24"	1@24"
Tank Volume Total (gallons)	545	749	1,069	1,498	2,252	3,199	7,267	749	1,069	1,498	3,199

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION				Maine Department of Human Services Division of Health Engineering, 10 SHS (207) 287-5672 Fax: (207) 287-3165	
<b>PROPERTY LOCATION</b>				>> CAUTION: LPI APPROVAL REQUIRED <<	
City, Town, or Plantation	Windham			Town/City _____	Permit # _____
Street or Road	Gray Rd (Map 9 / Lot 27K)			Date Permit Issued ____/____/____	<div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 0 auto;"> <b>For Permitting Only Not for Construction</b> </div>
Subdivision, Lot #	Gray Road Retirement Community			Local Plumbing Inspector Signature _____	L.P.I. # _____
<b>OWNER/APPLICANT INFORMATION</b>				<input type="checkbox"/> Owner <input type="checkbox"/> Town <input type="checkbox"/> State	
Name (last, first, MI) <span style="float: right;"><input checked="" type="checkbox"/> Owner <input type="checkbox"/> Applicant</span> <b>WELD, LLC</b>				The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. This Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.	
Mailing Address of Owner/Applicant <b>PO Box 1361 Windham, ME 04062</b>					
Daytime Tel. # _____					
<b>OWNER OR APPLICANT STATEMENT</b> I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a Permit.				<b>CAUTION: INSPECTION REQUIRED</b> I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.	
Signature of Owner or Applicant _____ Date _____				Local Plumbing Inspector Signature _____ (1st) date approved _____ (2nd) date approved _____	
<b>PERMIT INFORMATION</b>					
<b>TYPE OF APPLICATION</b> <input checked="" type="checkbox"/> 1. First Time System <input type="checkbox"/> 2. Replacement System Type replaced: _____ Year installed: _____ <input type="checkbox"/> 3. Expanded System <input type="checkbox"/> a. <25% Expansion <input type="checkbox"/> b. >= 25% Expansion <input type="checkbox"/> 4. Experimental System <input type="checkbox"/> 5. Seasonal Conversion		<b>THIS APPLICATION REQUIRES</b> <input checked="" type="checkbox"/> 1. No Rule Variance <input type="checkbox"/> 2. First Time System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 3. Replacement System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 4. Minimum Lot Size Variance <input type="checkbox"/> 5. Seasonal Conversion Permit		<b>DISPOSAL SYSTEM COMPONENTS</b> <input checked="" type="checkbox"/> 1. Complete Non-engineered System <input type="checkbox"/> 2. Primitive System (graywater & alt. toilet) <input type="checkbox"/> 3. Alternative Toilet, specify: _____ <input type="checkbox"/> 4. Non-engineered Treatment Tank (only) <input type="checkbox"/> 5. Holding Tank, _____ gallons <input type="checkbox"/> 6. Non-engineered Disposal Field (only) <input type="checkbox"/> 7. Separated Laundry System <input type="checkbox"/> 8. Complete Engineered System (2000 gpd or more) <input type="checkbox"/> 9. Engineered Treatment Tank (only) <input type="checkbox"/> 10. Engineered Disposal Field (only) <input type="checkbox"/> 11. Pre-treatment, specify: _____ <input type="checkbox"/> 12. Miscellaneous Components	
<b>SIZE OF PROPERTY</b> <div style="display: flex; justify-content: space-between;"> <span><b>±11.4</b></span> <span><input type="checkbox"/> SQ. FT. <input checked="" type="checkbox"/> ACRES</span> </div>		<b>DISPOSAL SYSTEM TO SERVE</b> <input type="checkbox"/> 1. Single Family Dwelling Unit, No. of Bedrooms: _____ <input checked="" type="checkbox"/> 2. Multiple Family Dwelling, No. of Units: <b>(2) 2-Bedroom</b> <input type="checkbox"/> 3. Other: _____ (specify) Current Use <input type="checkbox"/> Seasonal <input type="checkbox"/> Year Round <input checked="" type="checkbox"/> Undeveloped		<b>TYPE OF WATER SUPPLY</b> <input type="checkbox"/> 1. Drilled Well <input type="checkbox"/> 2. Dug Well <input type="checkbox"/> 3. Private <input checked="" type="checkbox"/> 4. Public <input type="checkbox"/> 5. Other	
<b>DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)</b>					
<b>TREATMENT TANK</b> <input checked="" type="checkbox"/> 1. Concrete <input checked="" type="checkbox"/> a. Regular <input type="checkbox"/> b. Low Profile <input type="checkbox"/> 2. Plastic <input type="checkbox"/> 3. Other: _____ CAPACITY: <b>1,000</b> GAL		<b>DISPOSAL FIELD TYPE &amp; SIZE</b> <input type="checkbox"/> 1. Stone Bed <input type="checkbox"/> 2. Stone Trench <input checked="" type="checkbox"/> 3. Proprietary Device <input type="checkbox"/> a. cluster array <input type="checkbox"/> c. Linear <input checked="" type="checkbox"/> b. regular load <input type="checkbox"/> d. H-20 load <input type="checkbox"/> 4. Other: _____ SIZE: <b>1200 sf stone bed equivalent</b>		<b>GARBAGE DISPOSAL UNIT</b> <input checked="" type="checkbox"/> 1. No <input type="checkbox"/> 2. Yes <input type="checkbox"/> 3. Maybe If Yes or Maybe, specify one below: <input type="checkbox"/> a. multi-compartment tank <input type="checkbox"/> b. _____ tanks in series <input type="checkbox"/> c. increase in tank capacity <input type="checkbox"/> d. Filter on Tank Outlet	
<b>SOIL DATA</b> PROFILE <b>2</b> CONDITION <b>C/AIII</b> at Observation Hole # <b>TB-8</b> Depth <b>20</b> " of Most Limiting Soil Factor <b>Bedrock</b>		<b>DISPOSAL FIELD SIZING</b> <input type="checkbox"/> 1. Medium---2.6 sq. ft. / gpd <input checked="" type="checkbox"/> 2. Medium---Large 3.3 sq. ft. / gpd <input type="checkbox"/> 3. Large---4.1 sq. ft. / gpd <input type="checkbox"/> 4. Extra Large---5.0 sq. ft. / gpd		<b>EFFLUENT/EJECTOR PUMP</b> <input type="checkbox"/> 1. Not Required <input type="checkbox"/> 2. May Be Required <input checked="" type="checkbox"/> 3. Required Specify only for engineered systems: DOSE: <b>100</b> gallons	
<b>DESIGN FLOW</b> <div style="text-align: center; font-size: 1.2em;"> <b>360</b> gallons per day         </div> BASED ON: <input checked="" type="checkbox"/> 1. Table 4A (dwelling unit(s)) <input type="checkbox"/> 2. Table 4C (other facilities) SHOW CALCULATIONS — for other facilities —					
<input type="checkbox"/> 3. Section 4G (meter readings) <b>ATTACH WATER METER DATA</b>					
<b>LATITUDE AND LONGITUDE at center of disposal area</b> Lat. <b>N43</b> d <b>46</b> m <b>40.77</b> s Lon. <b>W70</b> d <b>25</b> m <b>0.60</b> s if g.p.s. state margin of error: <b>20</b>					
<b>SITE EVALUATOR STATEMENT</b>					
I certify that on <b>11/5/2018</b> (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).					
 Site Evaluator Signature				<b>387</b> SE #	
<b>Stephen B. Marcotte</b> Site Evaluator Name Printed				<b>11/12/18</b> Date	
<b>(207) 939-2600</b> Telephone Number				<b>smarcotte@summitgeoeng.com</b> Email Address	
Designed with SeptiCAD v5 Note: Changes to or deviations from the design should be confirmed with the Site Evaluator.					

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION				Maine Department of Human Services Division of Health Engineering, Station 10 (207) 287-5672 Fax: (207) 287-3165																																																																																																																			
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<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">For Permitting Only Not for Construction</div>  <div style="margin-top: 10px;"><b>NOTES:</b> 1. Site plan based on draft digital plans provided by DM Roma Consulting Engineers.</div>		SITE PLAN      Scale 1" = <u>150</u> ft.		SITE LOCATION PLAN																																																																																																																			
		<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Proposed Road</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">SITE</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Swett Rd</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Gray Rd (Rt 202)</div> <div style="text-align: right;">N Fire Dept.</div>		<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Proposed Disposal Field</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">25 Eljen GSF Geotextile Sand Filter units</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">5 rows x 5 units long (19' x 20')</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Nearby Proposed Disposal Field</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">(min. 100 ft between fields)</div>																																																																																																																			
<b>SOIL PROFILE DESCRIPTION AND CLASSIFICATION</b> (Location of Observation Holes Shown Above)																																																																																																																							
<div>Observation Hole # <u>TB-8</u>      <input type="checkbox"/> Test Pit      <input checked="" type="checkbox"/> Boring</div> <div><u>1</u> "      Depth of organic horizon above mineral soil</div> <table border="1" style="width:100%; border-collapse: collapse;"><thead><tr><th>Texture</th><th>Consistency</th><th>Color</th><th>Mottling</th></tr></thead><tbody><tr><td>0</td><td></td><td>Dark Brown</td><td></td></tr><tr><td>6</td><td rowspan="3">Friable</td><td></td><td></td></tr><tr><td>12</td><td>Yellowish Brown</td><td></td></tr><tr><td>18</td><td></td><td>Few &amp; Faint</td></tr><tr><td colspan="4" style="text-align: center;">Bedrock at 20 inches</td></tr><tr><td>24</td><td></td><td></td><td></td></tr><tr><td>30</td><td></td><td></td><td></td></tr><tr><td>36</td><td></td><td></td><td></td></tr><tr><td>42</td><td></td><td></td><td></td></tr><tr><td>48</td><td></td><td></td><td></td></tr></tbody></table> <table border="1" style="width:100%; border-collapse: collapse;"><tr><td>Soil</td><td>Classification</td><td>Slope</td><td>Limiting Factor</td><td><input type="checkbox"/> Groundwater</td></tr><tr><td><u>2</u></td><td><u>C/III</u></td><td><u>3-5</u></td><td><u>20"</u></td><td><input type="checkbox"/> Restrictive Layer</td></tr><tr><td>Profile</td><td>Condition</td><td>Percent</td><td>Depth</td><td><input checked="" type="checkbox"/> Bedrock</td></tr></table>				Texture	Consistency	Color	Mottling	0		Dark Brown		6	Friable			12	Yellowish Brown		18		Few & Faint	Bedrock at 20 inches				24				30				36				42				48				Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater	<u>2</u>	<u>C/III</u>	<u>3-5</u>	<u>20"</u>	<input type="checkbox"/> Restrictive Layer	Profile	Condition	Percent	Depth	<input checked="" type="checkbox"/> Bedrock	<div>Observation Hole # _____      <input type="checkbox"/> Test Pit      <input type="checkbox"/> Boring</div> <div>_____ "      Depth of organic horizon above mineral soil</div> <table border="1" style="width:100%; border-collapse: collapse;"><thead><tr><th>Texture</th><th>Consistency</th><th>Color</th><th>Mottling</th></tr></thead><tbody><tr><td>0</td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td></tr><tr><td>12</td><td></td><td></td><td></td></tr><tr><td>18</td><td></td><td></td><td></td></tr><tr><td>24</td><td></td><td></td><td></td></tr><tr><td>30</td><td></td><td></td><td></td></tr><tr><td>36</td><td></td><td></td><td></td></tr><tr><td>42</td><td></td><td></td><td></td></tr><tr><td>48</td><td></td><td></td><td></td></tr></tbody></table> <table border="1" style="width:100%; border-collapse: collapse;"><tr><td>Soil</td><td>Classification</td><td>Slope</td><td>Limiting Factor</td><td><input type="checkbox"/> Groundwater</td></tr><tr><td> </td><td> </td><td> </td><td> </td><td><input type="checkbox"/> Restrictive Layer</td></tr><tr><td>Profile</td><td>Condition</td><td>Percent</td><td>Depth</td><td><input type="checkbox"/> Bedrock</td></tr></table>				Texture	Consistency	Color	Mottling	0				6				12				18				24				30				36				42				48				Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater					<input type="checkbox"/> Restrictive Layer	Profile	Condition	Percent	Depth	<input type="checkbox"/> Bedrock
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<b>PROPERTY LOCATION</b>		>> CAUTION: LPI APPROVAL REQUIRED <<	
City, Town, or Plantation	Windham	Town/City _____	Permit # _____
Street or Road	Gray Rd (Map 9 / Lot 27K)	Date Permit Issued ____/____/____	Double Fee Charged <input type="checkbox"/>
Subdivision, Lot #	Gray Road Retirement Community	<div style="border: 1px solid black; padding: 5px; display: inline-block;">For Permitting Only Not for Construction</div>	
<b>OWNER/APPLICANT INFORMATION</b>		Local Plumbing Inspector Signature _____	L.P.I. # _____
Name (last, first, MI)	WELD, LLC	<input checked="" type="checkbox"/> Owner <input type="checkbox"/> Town <input type="checkbox"/> State	
Mailing Address of Owner/Applicant	PO Box 1361 Windham, ME 04062	The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. This Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.	
Daytime Tel. #		Municipal Tax Map # _____ Lot # _____	
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Signature of Owner or Applicant _____ Date _____		Local Plumbing Inspector Signature _____ (1st) date approved _____ _____ (2nd) date approved _____	
<b>PERMIT INFORMATION</b>			
<b>TYPE OF APPLICATION</b> <input checked="" type="checkbox"/> 1. First Time System <input type="checkbox"/> 2. Replacement System Type replaced: _____ Year installed: _____ <input type="checkbox"/> 3. Expanded System <input type="checkbox"/> a. <25% Expansion <input type="checkbox"/> b. >= 25% Expansion <input type="checkbox"/> 4. Experimental System <input type="checkbox"/> 5. Seasonal Conversion	<b>THIS APPLICATION REQUIRES</b> <input checked="" type="checkbox"/> 1. No Rule Variance <input type="checkbox"/> 2. First Time System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 3. Replacement System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 4. Minimum Lot Size Variance <input type="checkbox"/> 5. Seasonal Conversion Permit	<b>DISPOSAL SYSTEM COMPONENTS</b> <input checked="" type="checkbox"/> 1. Complete Non-engineered System <input type="checkbox"/> 2. Primitive System (graywater & alt. toilet) <input type="checkbox"/> 3. Alternative Toilet, specify: _____ <input type="checkbox"/> 4. Non-engineered Treatment Tank (only) <input type="checkbox"/> 5. Holding Tank, _____ gallons <input type="checkbox"/> 6. Non-engineered Disposal Field (only) <input type="checkbox"/> 7. Separated Laundry System <input type="checkbox"/> 8. Complete Engineered System (2000 gpd or more) <input type="checkbox"/> 9. Engineered Treatment Tank (only) <input type="checkbox"/> 10. Engineered Disposal Field (only) <input checked="" type="checkbox"/> 11. Pre-treatment, specify: <b>Fuji Clean CE10</b> <input type="checkbox"/> 12. Miscellaneous Components	
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<b>DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)</b>			
<b>TREATMENT TANK</b> <input checked="" type="checkbox"/> 1. Concrete <input checked="" type="checkbox"/> a. Regular <input type="checkbox"/> b. Low Profile <input type="checkbox"/> 2. Plastic <input type="checkbox"/> 3. Other: _____ CAPACITY: <u>1,000</u> GAL	<b>DISPOSAL FIELD TYPE &amp; SIZE</b> <input checked="" type="checkbox"/> 1. Stone Bed <input type="checkbox"/> 2. Stone Trench <input type="checkbox"/> 3. Proprietary Device <input type="checkbox"/> a. cluster array <input type="checkbox"/> c. Linear <input type="checkbox"/> b. regular load <input type="checkbox"/> d. H-20 load <input type="checkbox"/> 4. Other: _____ SIZE: 1230 sf including sidewall area	<b>GARBAGE DISPOSAL UNIT</b> <input checked="" type="checkbox"/> 1. No <input type="checkbox"/> 2. Yes <input type="checkbox"/> 3. Maybe If Yes or Maybe, specify one below: <input type="checkbox"/> a. multi-compartment tank <input type="checkbox"/> b. _____ tanks in series <input type="checkbox"/> c. increase in tank capacity <input type="checkbox"/> d. Filter on Tank Outlet	<b>DESIGN FLOW</b> <div style="text-align: center; font-size: 1.2em;">720</div> gallons per day BASED ON: <input checked="" type="checkbox"/> 1. Table 4A (dwelling unit(s)) <input type="checkbox"/> 2. Table 4C (other facilities) <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">             Fuji Clean CE10 approved for 50% reduction in disposal field area - see attached 48% reduction proposed           </div> <input type="checkbox"/> 3. Section 4G (meter readings) ATTACH WATER METER DATA
<b>SOIL DATA</b> PROFILE <u>2</u> CONDITION <u>AIII</u> at Observation Hole # <u>TB-9</u> Depth <u>12 to 24</u> of Most Limiting Soil Factor <b>Bedrock</b>	<b>DISPOSAL FIELD SIZING</b> <input type="checkbox"/> 1. Medium---2.6 sq. ft. / gpd <input checked="" type="checkbox"/> 2. Medium---Large 3.3 sq. ft. / gpd <input type="checkbox"/> 3. Large---4.1 sq. ft. / gpd <input type="checkbox"/> 4. Extra Large---5.0 sq. ft. / gpd	<b>EFFLUENT/EJECTOR PUMP</b> <input type="checkbox"/> 1. Not Required <input checked="" type="checkbox"/> 2. May Be Required <input type="checkbox"/> 3. Required Specify only for engineered systems: DOSE: _____ gallons	<b>LATITUDE AND LONGITUDE</b> at center of disposal area Lat. <u>N43</u> d <u>46</u> m <u>43.99</u> s Lon. <u>W70</u> d <u>25</u> m <u>4.35</u> s if g.p.s. state margin of error: <u>20'</u>
<b>SITE EVALUATOR STATEMENT</b>			
I certify that on <u>11/5/2018</u> (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).			
<div style="text-align: center;">               Site Evaluator Signature           </div>		<div style="text-align: center;"> <u>387</u>              SE #           </div>	<div style="text-align: center;"> <u>11/12/18</u>              Date           </div>
<div style="text-align: center;"> <u>Stephen B. Marcotte</u>              Site Evaluator Name Printed           </div>		<div style="text-align: center;"> <u>(207) 939-2600</u>              Telephone Number           </div>	<div style="text-align: center;"> <u>smarcotte@summitgeoeng.com</u>              Email Address           </div>
Designed with SeptiCAD v5 Note: Changes to or deviations from the design should be confirmed with the Site Evaluator.			

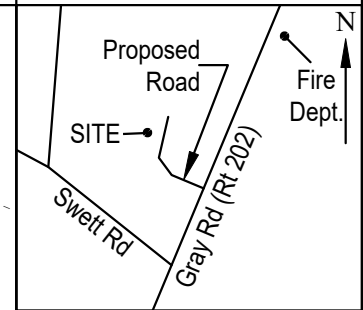


Maine Department of Human Services  
Division of Health Engineering, Station 10  
(207) 287-5672 Fax: (207) 287-3165

Owner or Applicant Name
-------------------------

WELD, LLC

### SITE LOCATION PLAN



1. Site plan based on draft digital plans provided by DM Roma Consulting Engineers.

(Location of Observation Holes Shown Above)

" Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
6				
12				
18				
24				
30				
36				
42				
48				
	Soil	Classification	Slope	Limiting Factor
	Profile	Condition	Percent	Depth
				<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Page 2 of 3  
HHE-200 Rev. 10/02





Paul R. LePage, Governor  
Tel. (207) 287-2070

Mary C. Mayhew, Commissioner

Department of Health and Human Services  
Maine Center for Disease Control and Prevention  
286 Water Street  
11 State House Station  
Augusta, Maine 04333-0011  
Tel. (207) 287-8016  
Fax (207) 287-9058; TTY (800) 606-0215  
Fax (207) 287-4172

October 12, 2016

Fuji Clean, LLC  
Attn.: Bennette D. Burkes, P.E.  
1518 Willow Lawn Drive, Suite 300  
Hnerico, VA 23230

Subject: Modified Approval for General Use, Fuji Clean System, CE and CEN Series

Dear Mr. Burkes:

The Division of Environmental and Community Health has reviewed your proposal for reductions in disposal field sizing and reduced separation form limiting factors for systems which incorporate the Fuji Clean System, CE and CEN Series (Fuji Clean) wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 50 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers;
5. Eljen GSF units may be used with Fuji Clean systems, but with no reduction in size; and
6. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system. Further, the Division strongly recommends that property owners enter into long term maintenance contracts with Fuji Clean, in accordance with Fuji Clean's company policies.

Should you have any questions, please feel free to contact me.

Sincerely,

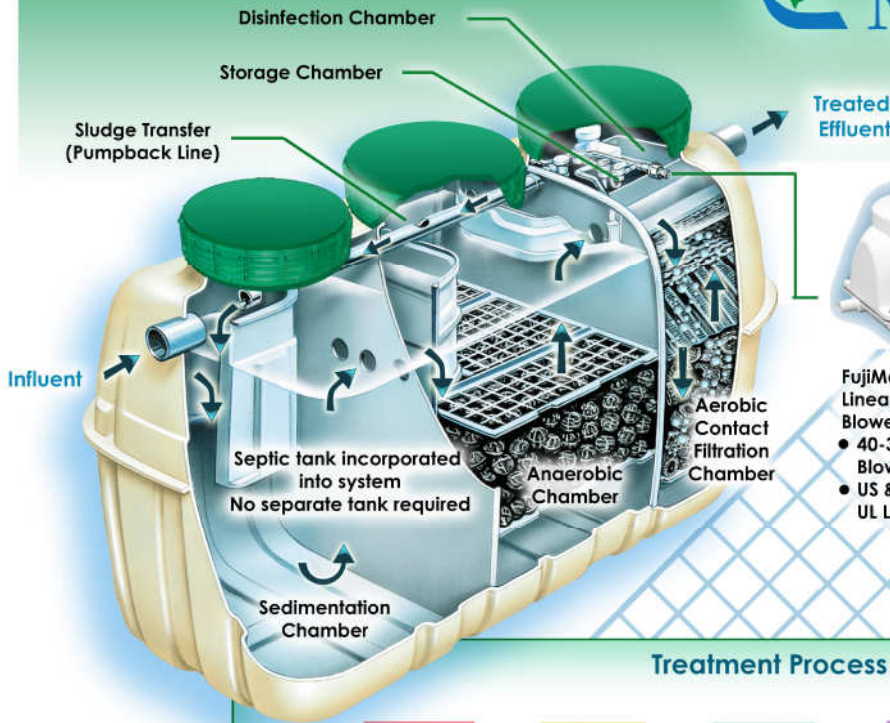
A handwritten signature in blue ink that reads "James A. Jacobsen". The signature is fluid and cursive, with a long horizontal stroke at the end.

James A. Jacobsen  
Project Manager, Webmaster  
Division of Environmental Health  
Drinking Water Program  
Engineering Review Team  
e-mail: james.jacobsen@maine.gov

/jaj

xc: File

# MODEL CE & CEN SERIES *Technical Specification Sheet*



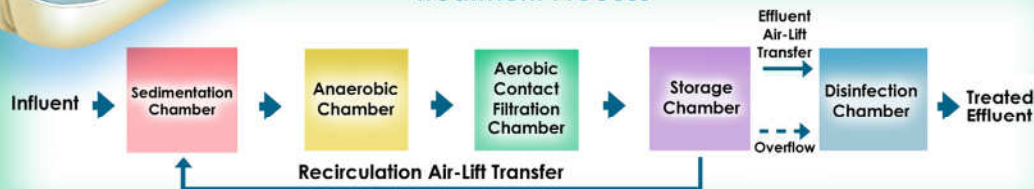
**FujiMac RII  
Linear Diaphragm  
Blower**

- 40-300L/min Blower Options
- US & CAN UL Listed

## Fuji Clean Advantages

- Over 2 million installed systems worldwide
- 1-tank system – no septic tank necessary
- No moving parts in tank
- Built-in equalization - levels variable inflow
- NSF 40 and 40/245 certified
- TN removal to 70+% with CEN models
- Phosphorous reduction technology
- Smallest footprint vs. competitors
- Lowest power use vs. competitors
- Lightweight tank - easy installation
- Quick and easy O&M - no mess
- Rapid startup and restart for seasonal homes

## Treatment Process



Design Specification Table	CE Series BOD, TSS, TN							CEN Series BOD, TSS, Enhanced TN			
MODEL:	CE5	CE7	CE10	CE14	CE21	CE30	CE6KG	CEN5	CEN7	CEN10	CEN21
Load Hydraulic (GPD)	360	540	720	1,000	1,900	2,700	6,000	360	540	720	1,900
EFFLUENT (assumes domestic strength influent):											
BOD – Effluent (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BOD (removal pounds/day)	.52	.73	1.04	1.46	2.08	3.12	6.93	.69	.97	1.38	2.9
TSS (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
TN (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BLOWER DETAIL:											
Blower Model	MAC80R	MAC80R	MAC100R	MAC100R	MAC150R	MAC200R	MAC200R (3)	MAC80R	MAC100R	MAC100R	MAC200R
Normal Pressure (kPa)	15	15	18	18	20	20	20	15	18	18	20
Airflow Volume (CFM; L/Min.)	2.8 CFM 80 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	5.3 CFM 150 L/MIN	7.0 CFM 200 L/MIN	21.0 CFM 600 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	7.0 CFM 200 L/MIN
Power Use (kWh/day)	1.1	1.1	1.6	1.6	2.4	3.4	10.2	1.1	1.6	1.6	3.4
Weight (lbs.)	11	11	11	11	13	13	13 x 3	11	11	11	13
Outlet Diameter (OD, inches)	0.70	0.70	0.70	0.70	1.0	1.0	1.0 x 3	.070	0.70	0.70	1.0
TANK DETAIL:											
Material	Fibre-Reinforced Plastic							Fibre-Reinforced Plastic			
Height (inches)	61.8	65.7	73.6	77.4	81.3	87.2	87.2	65.7	73.6	77.4	87.2
Length (inches)	85	95.7	98.8	118.9	152.8	183.7	434.7	95.7	98.8	118.9	183.7
Width (inches)	43.7	49.2	56.7	68.9	72.4	78.3	115.3	49.2	56.7	68.9	78.3
Weight (lbs.)	397	463	705	926	1,168	1,543	2,900	463	705	926	1,543
Inlet Invert (inches)	49	53	61	62	65	71	67	53	61	62	71
Outlet Invert (inches)	47	51	59	59.5	63	69	64	51	59	59.5	69
Access Ports		2@20"	2@20"	2@20"	2@20"	2@20"	4@24"x24"	2@20"	2@20"	2@20"	2@20"
Quantity & Diameter (inches)	3@20"	1@24"	1@24"	1@24"	1@24"	1@24"	3@24"x48"	1@24"	1@24"	1@24"	1@24"
Tank Volume Total (gallons)	545	749	1,069	1,498	2,252	3,199	7,267	749	1,069	1,498	3,199



SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION				Maine Department of Human Services Division of Health Engineering, 10 SHS (207) 287-5672 Fax: (207) 287-3165	
<b>PROPERTY LOCATION</b>			>> CAUTION: LPI APPROVAL REQUIRED <<		
City, Town, or Plantation	Windham		Town/City	_____	
Street or Road	Gray Rd (Map 9 / Lot 27K)		Date Permit Issued	____/____/____	
Subdivision, Lot #	Gray Road Retirement Community		For Permitting Only Not for Construction		Permit # _____
<b>OWNER/APPLICANT INFORMATION</b>			Local Plumbing Inspector Signature _____		
Name (last, first, MI) <input checked="" type="checkbox"/> Owner <input type="checkbox"/> Applicant <b>WELD, LLC</b>			<input type="checkbox"/> Double Fee Charged <input type="checkbox"/> L.P.I. # _____		
Mailing Address of Owner/Applicant PO Box 1361 Windham, ME 04062			The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. This Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.		
Daytime Tel. # _____			Municipal Tax Map # _____ Lot # _____		
<b>OWNER OR APPLICANT STATEMENT</b> I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a Permit.			<b>CAUTION: INSPECTION REQUIRED</b> I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.		
Signature of Owner or Applicant _____ Date _____			Local Plumbing Inspector Signature _____ (1st) date approved _____ _____ (2nd) date approved _____		
<b>PERMIT INFORMATION</b>					
<b>TYPE OF APPLICATION</b> <input checked="" type="checkbox"/> 1. First Time System <input type="checkbox"/> 2. Replacement System Type replaced: _____ Year installed: _____ <input type="checkbox"/> 3. Expanded System <input type="checkbox"/> a. <25% Expansion <input type="checkbox"/> b. >= 25% Expansion <input type="checkbox"/> 4. Experimental System <input type="checkbox"/> 5. Seasonal Conversion		<b>THIS APPLICATION REQUIRES</b> <input checked="" type="checkbox"/> 1. No Rule Variance <input type="checkbox"/> 2. First Time System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 3. Replacement System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector <input type="checkbox"/> 4. Minimum Lot Size Variance <input type="checkbox"/> 5. Seasonal Conversion Permit		<b>DISPOSAL SYSTEM COMPONENTS</b> <input checked="" type="checkbox"/> 1. Complete Non-engineered System <input type="checkbox"/> 2. Primitive System (graywater & alt. toilet) <input type="checkbox"/> 3. Alternative Toilet, specify: _____ <input type="checkbox"/> 4. Non-engineered Treatment Tank (only) <input type="checkbox"/> 5. Holding Tank, _____ gallons <input type="checkbox"/> 6. Non-engineered Disposal Field (only) <input type="checkbox"/> 7. Separated Laundry System <input type="checkbox"/> 8. Complete Engineered System (2000 gpd or more) <input type="checkbox"/> 9. Engineered Treatment Tank (only) <input type="checkbox"/> 10. Engineered Disposal Field (only) <input type="checkbox"/> 11. Pre-treatment, specify: _____ <input type="checkbox"/> 12. Miscellaneous Components	
<b>SIZE OF PROPERTY</b> ±11.4 <input type="checkbox"/> SQ. FT. <input checked="" type="checkbox"/> ACRES		<b>DISPOSAL SYSTEM TO SERVE</b> <input type="checkbox"/> 1. Single Family Dwelling Unit, No. of Bedrooms: _____ <input checked="" type="checkbox"/> 2. Multiple Family Dwelling, No. of Units: (4) 2-Bedroom <input type="checkbox"/> 3. Other: _____ (specify) Current Use <input type="checkbox"/> Seasonal <input type="checkbox"/> Year Round <input checked="" type="checkbox"/> Undeveloped		<b>TYPE OF WATER SUPPLY</b> <input type="checkbox"/> 1. Drilled Well <input type="checkbox"/> 2. Dug Well <input type="checkbox"/> 3. Private <input checked="" type="checkbox"/> 4. Public <input type="checkbox"/> 5. Other	
<b>SHORELAND ZONING</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
<b>DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)</b>					
<b>TREATMENT TANK</b> <input checked="" type="checkbox"/> 1. Concrete <input checked="" type="checkbox"/> a. Regular <input type="checkbox"/> b. Low Profile <input type="checkbox"/> 2. Plastic <input type="checkbox"/> 3. Other: _____ CAPACITY: 2,000 GAL		<b>DISPOSAL FIELD TYPE &amp; SIZE</b> <input type="checkbox"/> 1. Stone Bed <input type="checkbox"/> 2. Stone Trench <input checked="" type="checkbox"/> 3. Proprietary Device <input type="checkbox"/> a. cluster array <input type="checkbox"/> c. Linear <input checked="" type="checkbox"/> b. regular load <input type="checkbox"/> d. H-20 load <input type="checkbox"/> 4. Other: _____ SIZE: 2496 sf stone bed equivalent		<b>GARBAGE DISPOSAL UNIT</b> <input checked="" type="checkbox"/> 1. No <input type="checkbox"/> 2. Yes <input type="checkbox"/> 3. Maybe If Yes or Maybe, specify one below: <input type="checkbox"/> a. multi-compartment tank <input type="checkbox"/> b. _____ tanks in series <input type="checkbox"/> c. increase in tank capacity <input type="checkbox"/> d. Filter on Tank Outlet	
<b>SOIL DATA</b> PROFILE CONDITION 7 C at Observation Hole # TB-11 Depth 16" of Most Limiting Soil Factor Groundwater		<b>DISPOSAL FIELD SIZING</b> <input type="checkbox"/> 1. Medium---2.6 sq. ft. / gpd <input checked="" type="checkbox"/> 2. Medium---Large 3.3 sq. f.t / gpd <input type="checkbox"/> 3. Large---4.1 sq. ft. / gpd <input type="checkbox"/> 4. Extra Large---5.0 sq. ft. / gpd		<b>EFFLUENT/EJECTOR PUMP</b> <input type="checkbox"/> 1. Not Required <input type="checkbox"/> 2. May Be Required <input checked="" type="checkbox"/> 3. Required Specify only for engineered systems: DOSE: 208 gallons	
				<b>DESIGN FLOW</b> 720 gallons per day BASED ON: <input checked="" type="checkbox"/> 1. Table 4A (dwelling unit(s)) <input type="checkbox"/> 2. Table 4C (other facilities) SHOW CALCULATIONS — for other facilities —	
				<input type="checkbox"/> 3. Section 4G (meter readings) ATTACH WATER METER DATA	
				<b>LATITUDE AND LONGITUDE</b> at center of disposal area Lat. N43 d 46 m 45.36 s Lon. W70 d 25 m 4.11 s if g.p.s. state margin of error: 20'	
<b>SITE EVALUATOR STATEMENT</b>					
I certify that on 11/5/2018 (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).					
 Site Evaluator Signature		387 SE #		11/12/18 Date	
Stephen B. Marcotte Site Evaluator Name Printed		(207) 939-2600 Telephone Number		smarcotte@summitgeoeng.com Email Address	
Designed with SeptiCAD v5 Note: Changes to or deviations from the design should be confirmed with the Site Evaluator.					

Maine Department of Human Services  
Division of Health Engineering, Station 10  
(207) 287-5672 Fax: (207) 287-3165

Owner or Applicant Name
WELD, LLC

Scale: 1" = 20 ft

Serial Over-Flow  
Pipe Distribution  
See Figure 14 from  
Installation Manual

Shoulder of Gravelly Coarse Sand Fill

52 Eljen GSF Geotextile Sand Filter units  
4 rows x 13 units long (15' x 52')

D-Box (insulate)

Soil Underdrain  
Filter  
(Lined)

25'

A

B

Approx. Toe of 4:1 Fill Extension

Force Main (Protect from Frost)  
From 2,000 gallon septic tank and  
pump station with 208 gallon dose

N

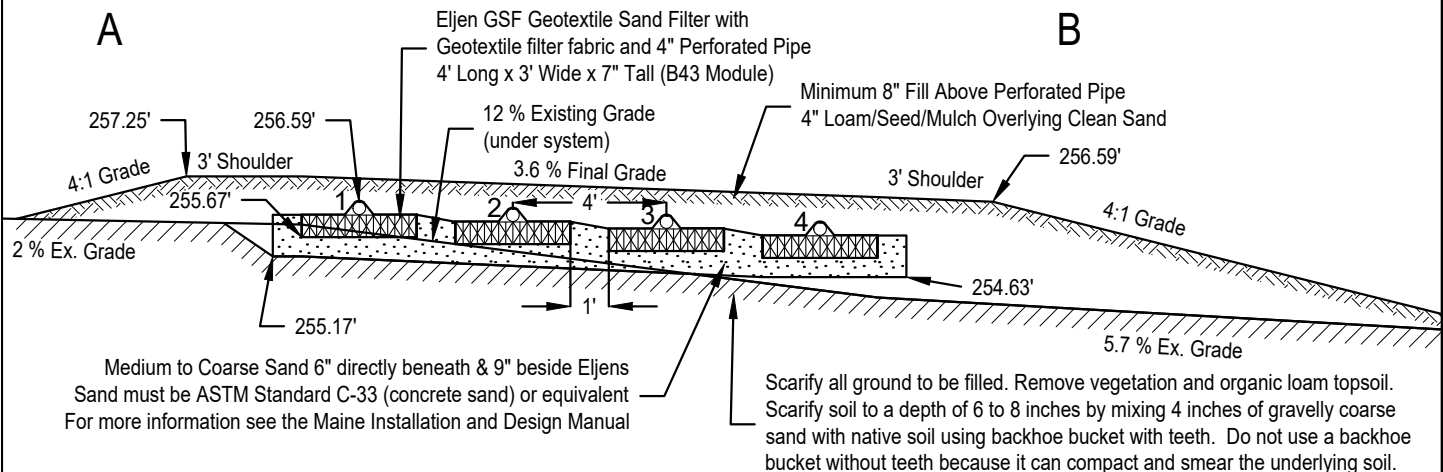
## ELEVATION REFERENCE POINT

Reference Elevation: \_\_\_\_\_

Scales:

Horizontal: 1" = 5

ROW #	1	2	3	4
TOP	256.59'	256.41'	256.23'	256.05'
BOTTOM	255.67'	255.49'	255.31'	255.13'
TOP OF ROW #1 INLET AT 256.5'				

Page 3 of 3  
HHE-200 Rev. 10/02

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Town, City, Plantation

Windham

Street, Road, Subdivision

Gray Rd (Map 9 / Lot 27K)

Owner or Applicant Name

WELD, LLC

For Permitting Only

Not for Construction

SITE PLAN

Scale 1" = 150 ft.

SITE LOCATION PLAN

Proposed Disposal Field

52 Eljen GSF Geotextile Sand Filter units

4 rows x 13 units long (15' x 52')

Serves Four 2-Bedroom Units

Nearby Proposed Disposal Field

(min. 100 ft between field)

Proposed ± 115' setback between

Wetland

Drilled Well

100' Well Setback

Gray Road

Swett Road

TB-11

Proposed

SITE

Road

Swett Rd

Gray Rd (Rt 202)

Fire Dept.

N

N

NOTES:

1. Site plan based on draft digital plans provided by DM Roma Consulting Engineers.

SOIL PROFILE DESCRIPTION AND CLASSIFICATION

(Location of Observation Holes Shown Above)

Observation Hole #

TB-11

☐ Test Pit

☒ Boring

1

"

Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
0		Dark Brown	
6	Friable	Light Yellowish Brown	
12			
18			
24	Firm	Olive/Gray	Common & Distinct
30			
36			
42			
48			

Soil

Classification

Slope

Limiting Factor

☒ Groundwater

7

C

12

16"

☐ Restrictive Layer

Profile

Condition

Percent

Depth

☐ Bedrock

Observation Hole #

☐ Test Pit

☐ Boring

"

Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
0			
6			
12			
18			
24			
30			
36			
42			
48			

Soil

Classification

Slope

Limiting Factor

☐ Groundwater

☐ Restrictive Layer

Profile

Condition

Percent

Depth

☐ Bedrock

Site Evaluator Signature

387

11/12/18

Page 2 of 3

SE #

Date

HHE-200 Rev. 10/02

## **Attachment 3**

### **Wetland Nitrate-Nitrogen Removal Calculations**



## WETLAND NITROGEN REMOVAL CALCULATIONS

**Date:** 11/16/2018

**Project:** Gray Road Retirement Community

**Project #:** 18323

**Summit Personnel:** Stephen B. Marcotte, C.G., L.S.E.

**Site Location:** Gray Road, Windham, Maine

**Assumptions:** Wetlands remove nitrogen through both plant uptake and microbial activity (denitrification). The capacity of planted and unplanted wetlands to remove nitrogen at concentration similar to those in treated septic system effluent show nitrogen removal rates in excess of 95% for planted wetlands and removal rates of 25% to 36% in unplanted (natural) wetlands. Assuming a 25% nitrate removal rate wetland area nitrate removal rate of 0.0825 grams per square.

The nitrate-nitrogen plumes from subsurface wastewater disposal fields C and D will flow to and through an on-site wetland area approximately 21,000 square feet in size. Approximately 16,000 square feet of wetland is located along the anticipated flow pathway through this wetland prior to crossing the property boundary. The flow pathway length is approximately 200 feet.

Disposal Field C has a design flow of 720 gallons per day, a Fuji Clean CE10 advanced treatment unit, and treated effluent discharged to the disposal field will have a concentration of 20 mg-N/L total nitrogen.

Disposal Field D has a design flow of 720 gallons per day, no advanced treatment, and treated effluent discharged to the disposal field will have a concentration of 40 mg-N/L nitrate-nitrogen.

The combined flow from both disposal fields is 1440 gallons per day and the weighted average concentration of nitrate-nitrogen is 30 mg-N/L.

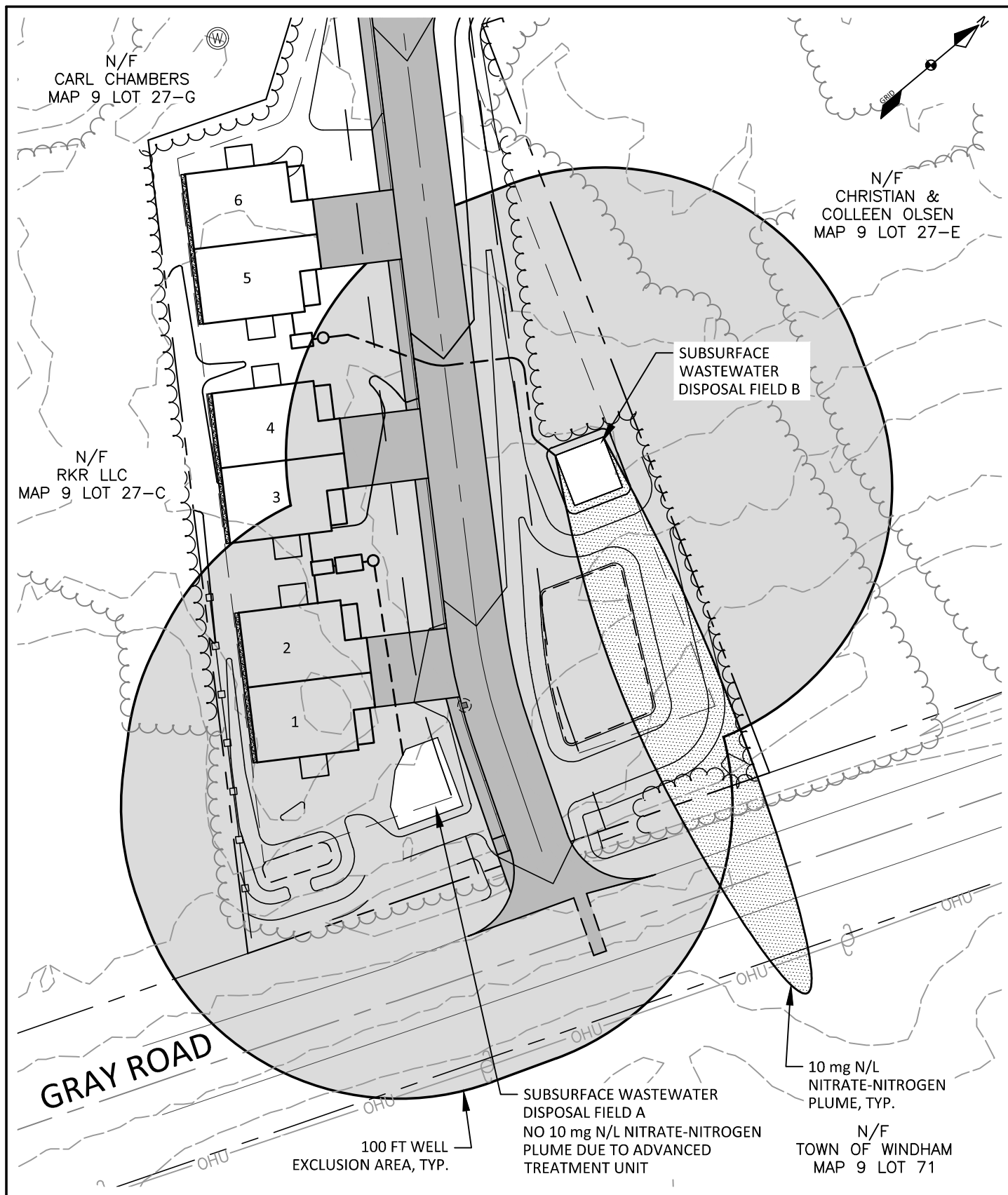
**Calculations:**

<b>Nitrogen Loading from Disposal Fields</b>	
1,440 gallons per day	5451.0 liters/day
30 mg-N/L	163529.7 mg-N/day
	163.5 grams-N/day
<b>Wetland Size &amp; Nitrogen Removal Rate</b>	
16,000 square feet	1469.2 sq. meters
0.0825 grams / sq. meters / day	
<b>Results</b>	
121.21 grams / day removed	
42.32 grams / day remaining	
<b>7.76 mg/L in groundwater after wetland treatment</b>	

**References:**

Lin, et. al. (2002), Effects of macrophytes and external carbon sources on nitrate removal from groundwater in constructed wetlands. Environmental Pollution, v. 119, pp. 413-420.





## PLAN OF WASTEWATER DISPOSAL SYSTEMS A & B

GRAY ROAD RETIREMENT COMMUNITY  
WINDHAM, MAINE

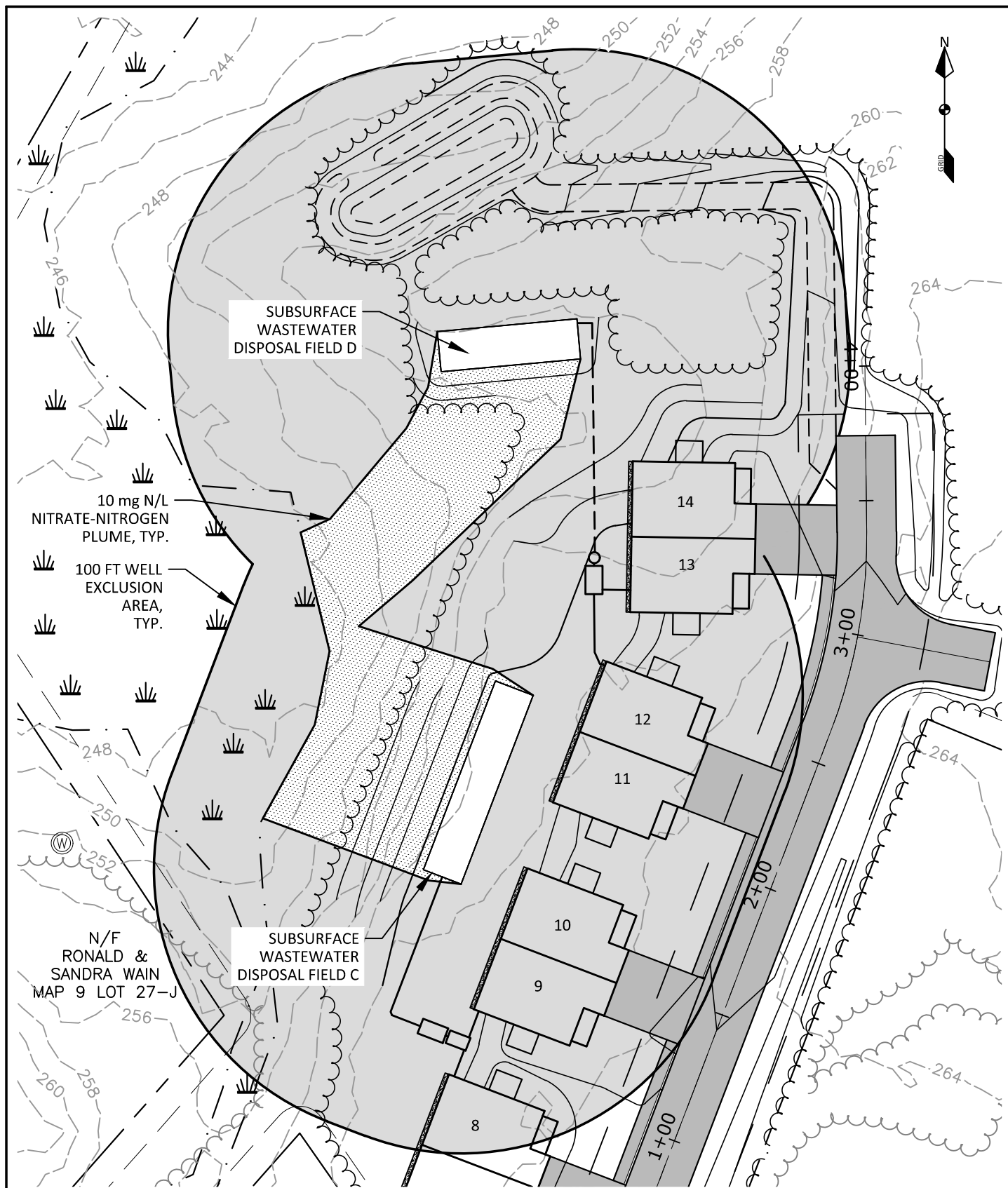
FOR RECORD OWNER:  
WELD, LLC  
PO BOX 1361  
WINDHAM, MAINE 04062

SCALE: 1"=50'  
DATE: 11-13-2018  
JOB NUMBER: 17070

**DM ROMA**

CONSULTING ENGINEERS

P.O. BOX 1116  
WINDHAM, ME 04062  
(207) 310 - 0506



## PLAN OF WASTEWATER DISPOSAL SYSTEMS C & D

GRAY ROAD RETIREMENT COMMUNITY  
WINDHAM, MAINE

FOR RECORD OWNER:  
WELD, LLC  
PO BOX 1361  
WINDHAM, MAINE 04062

SCALE: 1"=50'  
DATE: 11-13-2018  
JOB NUMBER: 17070

**DM ROMA**

CONSULTING ENGINEERS

P.O. BOX 1116  
WINDHAM, ME 04062  
(207) 310 - 0506



## STORMWATER MANAGEMENT REPORT

### GRAY ROAD RETIREMENT COMMUNITY WINDHAM, MAINE

#### A. Narrative

Weld, LLC is proposing to develop a 11.4-acre parcel off Gray Road (Rt. 202) in Windham. The project site is located on Lot 27K on the Town of Windham Assessors Map 9 and is located in the Farm Residential District and Retirement Community and Care Facility Overlay District.

This proposed retirement community development will consist of seven (7) residential duplex buildings, totaling twelve (14) residential units including the construction of approximately 800 linear feet of paved roadway, utilities and stormwater infrastructure. In general, the site drains either easterly to Gray Road or northwesterly to a drainage wetland draining northerly along the property boundary. Runoff along Gray Road drains across the street, eventually discharging to Black Brook. Runoff collected in the wetlands along the northwesterly property line are eventually tributary to the Pleasant River. Both waterbodies are ultimately tributary to the Presumpscot River.

#### B. Alterations to Land Cover

The 11.4-acre parcel consists of undeveloped woodland. The proposed development will generate approximately 43,494 square feet (0.99± acres) of new impervious area consisting of the seven (7) structures (duplexes ~ 17,442 square feet (0.40± acres)), and 26,052 square feet (0.60± acres) of new roadway and driveways. An additional 62,520 square feet (1.44± acres) of proposed lawn and landscaping will generate a total site developed area of approximately 106,014 square feet (2.43± acres).

Since the project site will not generate more than one (1) acre of new impervious surface or five (5) acres of new developed area, a Stormwater Permit will not be required from the Maine Department of Environmental Protection (MDEP). The site will be required to obtain an MDEP Stormwater Permit by Rule prior to construction since it will generate more than one (1) acre of land disturbance. The project will be reviewed by the Town of Windham as a Major Subdivision.

The site is generally moderate to steeply sloped (5%-33%), with a portion of the site in the vicinity of the proposed roadway intersection with Gray Road being relatively flat (2%-5%). The site drains in two predominant drainage patterns; with the northwesterly portion of the

site draining to the northwesterly property limits, and the southeasterly portion of the site draining to the southwest and into a drainage swale along Gray Road. The onsite soils are primarily Belgrade very fine sandy loam, Lamoine silt loam, Lyman-Turnbridge complex, Paxton fine sandy loam, and Woodbridge fine sandy loam as identified on the Medium Intensity Soil Maps for Cumberland County, Maine published by the Natural Resources Conservation Service. The soils within the proposed development are in the hydrologic soil group “B”, “C”. “C/D” and “D”.

The soils boundaries and hydrologic soils group (HSG) designations are indicated on the Watershed Maps and the Medium Intensity Soils Map has been included as Attachment 1 of this report.

#### C. Methodology and Modeling Assumptions

The proposed stormwater management system has been designed utilizing Best Management Practices to maintain existing drainage patterns while providing stormwater quality improvement measures. The goal of the storm drainage system design is to remove potential stormwater pollutants from runoff generated by the development while providing attenuation of the peak rates of runoff leaving the site. The method utilized to predict the surface water runoff rates in this analysis is a computer program entitled HydroCAD, which is based on the same methods that were originally developed by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, and utilized in the TR-20 modeling program. Peak rates of runoff are forecasted based upon land use, hydrologic soil conditions, vegetative cover, contributing watershed area, time of concentration, rainfall data, storage volumes of detention basins and the hydraulic capacity of structures. The computer model predicts the amount of runoff as a function of time, with the ability to include the attenuation effect due to dams, lakes, large wetlands, floodplains and constructed stormwater management basins. The input data for rainfalls with statistical recurrence frequencies of 2-, 10- and 25 years was obtained from Appendix H of the MDEP, Chapter 500 Stormwater Management, last revised in 2015. The National Weather Service developed four synthetic storm types to simulate rainfall patterns around the country. For analysis in Cumberland County, Maine, the type III rainfall pattern with a 24-hour duration is appropriate.

#### D. Basic Standards

The project is required by the Town and the MDEP to provide permanent and temporary Erosion Control Best Management Practices. These methods are incorporated into the project design and outlined in detail in the plan set.

#### E. General Standard

The Town of Windham requires the entire project to meet the General Standards outlined in the MDEP Chapter 500 to provide water quality treatment for no less than 95% of the new impervious surface and 80% of the total developed area associated with the project.

To provide the required stormwater treatment for the development, two (2) underdrained filter basins, one (1) bio-retention cell, and roofline dripedges along the residential buildings will be constructed as part of the site's stormwater infrastructure. As a result of the proposed stormwater infrastructure the project provides water quality treatment for over 96% of the equivalent new impervious and for over 83% of the new developed areas. Calculations can be found on the Watershed Maps and enclosed as Attachment 2 in this report.

#### F. Flooding Standard

The Town of Windham Land Use Ordinance requires the project to detain, retain or result in the infiltration of stormwater from the 24-hour storms of the 2-year, 10-year and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project. To maintain these rates, two (2) underdrained filter basins, and one (1) bio-retention cell have been proposed as part of the stormwater infrastructure.

The proposed project design has been modeled to evaluate and analyze the stormwater runoff characteristics of the site prior to construction of the project and upon completion of all proposed construction activities. Since the project site is not being completely utilized, the study was performed on the area of development. The first study point (SP-1) is located along the southeasterly portion of the site, to the north of the proposed roadway intersection with Gray Road. The second study point (SP-2) is along the westerly property limit which discharged and then conveyed overland in an existing natural drainage channel.

The following table summarizes the analysis prepared for this stormwater management report:

<b>Table 1 – Peak Rates of Stormwater Runoff</b>						
<b>Study Point</b>	<b>2-Year (cfs)</b>		<b>10-Year (cfs)</b>		<b>25-Year (cfs)</b>	
	Pre	Post	Pre	Post	Pre	Post
SP-1	0.55	0.55	1.28	1.23	1.98	1.82
SP-2	3.71	3.36	7.42	6.90	10.67	10.50

As illustrated by the table above, the proposed BMP's as incorporated in the project's storm water design, effectively maintains or reduces the peak flow at all study points, during all storms events.



The watershed maps showing pre-development and post-development drainage patterns are included in the plan set and the computations performed with the HydroCAD software program are included as Attachment 3 of this report.

G. Maintenance of common facilities or property

The applicant will be responsible for the maintenance of the stormwater facilities until a homeowners' association is created. Enclosed within this submission is an Inspection, Maintenance and Housekeeping Plan for the project.

Prepared by:

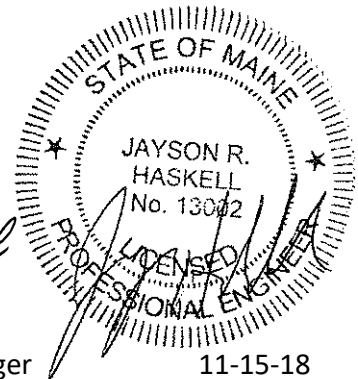
DM ROMA CONSULTING ENGINEERS



J.P. Connolly  
Senior Project Engineer



Jayson R. Haskell P.E.  
Southern Maine Regional Manager

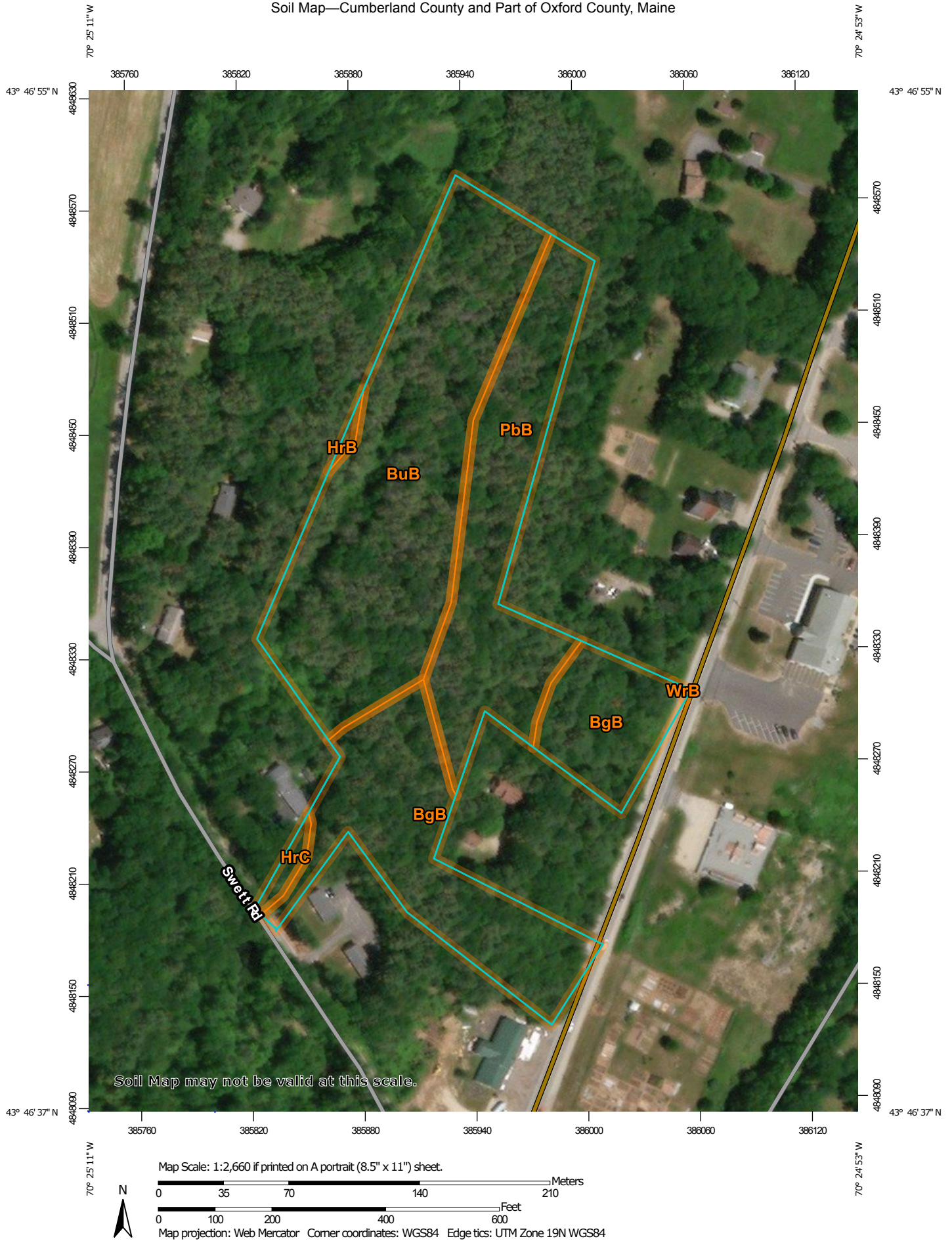


## **ATTACHMENT 1**

---

### **MEDIUM INTENSITY SOILS MAP**

# Soil Map—Cumberland County and Part of Oxford County, Maine




**Natural Resources  
Conservation Service**

Web Soil Survey  
National Cooperative Soil Survey


7/2/2018  
Page 1 of 3


## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine

Survey Area Data: Version 13, Sep 11, 2017

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

Date(s) aerial images were photographed: Apr 29, 2012—Jun 26, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BgB	Belgrade very fine sandy loam, 0 to 8 percent slopes	3.6	31.4%
BuB	Lamoine silt loam, 3 to 8 percent slopes	5.0	43.4%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	0.0	0.3%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	0.1	1.1%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	2.7	23.7%
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	0.0	0.1%
<b>Totals for Area of Interest</b>		<b>11.5</b>	<b>100.0%</b>

## **ATTACHMENT 2**

---

### **STORMWATER TREATMENT CALCULATIONS**



## Stormwater Treatment Table

Gray Road Retirement Community

	Total Watershed Area (SF)	New Driveway and Road Impervious Area (SF)	New Building Area (SF)	New Landscaped Area (SF)	Existing/Offsite Impervious Area (SF)**	Existing/Offsite Landscaped Area (SF)**	Existing Undeveloped Area (SF)	Treatment Provided	New Impervious Area Treated In Treatment Device (SF)	New Landscaped Area Treated In Treatment Device (SF)	Treatment Device
WS-11	32,325	13,090	8,566	10,670	0	0	0	Yes	21,656	10,670	FB1
WS-12	25,130	6,451	0	16,616	0	0	2,062	Yes	6,451	16,616	FB1
WS-13	9,560	259	0	5,974	0	0	136	Yes	259	5,974	BR1
<i>WS-13 (treated by drip edge) *</i>			3,192					Yes	3,192	0	DripEdge
WS-21	21,056	4,655	1,428	12,988	0	0	1,985	Yes	6,083	12,988	FB2
WS-1	15,362	1,289	0	1,861	3,571	3,306	5,335	No	0	0	None
WS-2	159,814	308	0	14,411	0	0	140,839	No	0	0	None
<i>WS-2 (treated by drip edge) *</i>			4,256					Yes	4,256	0	DripEdge
Total		<b>26,052</b>	<b>17,442</b>	<b>62,520</b>					<b>41,897</b>	<b>46,248</b>	

\*All new buildings shall install a rooftop drip edge along the rear of the structure to provide treatment for the rooftop impervious surface. The building's impervious area is included in the watershed and overall treatment calculations below, but not included in the BMP sizing calculations for each treatment device

\*\* The project is not taking credit for the Existing or Offsite impervious and landscaped areas, but are included in the BMP sizing calculations for each treatment device

New Impervious Area =

43,494 sf

Impervious Area Requiring Treatment (95%) =

41,320 sf

Impervious Area Treatment Provided =

41,897 sf

96% New Impervious Area Treated

New Developed Area =

106,014 sf

Developed Area Requiring Treatment (80%) =

84,811 sf

Developed Area Treatment Provided =

88,145 sf

83% New Developed Area Treated

## Filter Basin FB-1

Tributary Impervious Area=	28,107 sf	(WS-11 & WS-12 Impervious Area)
Tributary Landscaped Area=	27,286 sf	(WS-11 & WS-12 Landscaped Area)

### Water Quality Volume (WQV) Calculation

---

WQV (Required) = 1.0"xImpervious Area + 0.4"xLandscaped Area

**WQV (Required) = 3,252 cf**

### Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
253.75	2,103	0
257.25	5,037	11,846

Outlet Elevation =	256.40
Storage Volume Provided =	4,045 cf > Required

### Filter Bottom Calculation

---

Filter Area (Required) = 5%xlmpervious Area + 2%xLandscaped Area

**Filter Area Required = 1,951 sf**

**Filter Area Provided = 2,103 sf > Required**

## Filter Basin FB-2

Tributary Impervious Area=	6,083 sf	(WS-21 Impervious Area)
Tributary Landscaped Area=	12,988 sf	(WS-21 Landscaped Area)

### Water Quality Volume (WQV) Calculation

---

WQV (Required) = 1.0"xImpervious Area + 0.4"xLandscaped Area

**WQV (Required) = 940 cf**

### Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
250.5	702	0
253	2,008	3,305

Outlet Elevation =	252.00
Storage Volume Provided=	1,588 cf > Required

### Filter Bottom Calculation

---

Filter Area (Required) = 5%xlmpervious Area + 2%xLandscaped Area

**Filter Area Required = 564 sf**

**Filter Area Provided = 702 sf > Required**

## Bioretention Cell BR-1

Tributary Impervious Area=	259 sf	(WS-13 Impervious Area)
Tributary Landscaped Area=	5,974 sf	(WS-13 Landscaped Area)

### Water Quality Volume (WQV) Calculation

---

WQV (Required) =  $1.0'' \times \text{Impervious Area} + 0.4'' \times \text{Landscaped Area}$

**WQV (Required) = 221 cf**

### Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
256.9	205	0
257.4	309	128

Storage From Filter Media (1/3 Filter Volume)= 103 cf

Outlet Elevation = 257.40

Storage Volume Above Media= 128 cf

**Total Storage Volume Provided= 231 cf > Required**

### Filter Bottom Calculation

---

Filter Area (Required) =  $7\% \times \text{Impervious Area} + 3\% \times \text{Landscaped Area}$

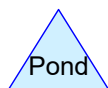
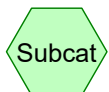
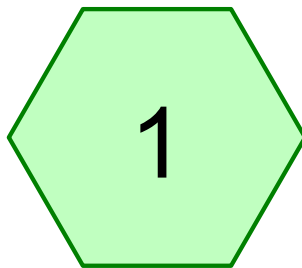
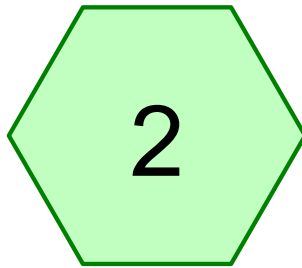
**Filter Area Required = 197 sf**

**Filter Area Provided = 205 sf > Required**

## **ATTACHMENT 3**

---

### **HYDROCAD OUTPUT**



**Routing Diagram for 17070 - PRE**

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**17070 - PRE***Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10*

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Page 2

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**Runoff Area=58,625 sf 4.86% Impervious Runoff Depth=0.68"  
Flow Length=345' Tc=29.5 min CN=61 Runoff=0.55 cfs 3,341 cf**Subcatchment2:**Runoff Area=204,250 sf 0.00% Impervious Runoff Depth=1.16"  
Flow Length=447' Tc=24.4 min CN=73 Runoff=3.71 cfs 19,734 cf**Total Runoff Area = 262,875 sf Runoff Volume = 23,075 cf Average Runoff Depth = 1.05"**  
**98.92% Pervious = 260,024 sf 1.08% Impervious = 2,851 sf**



**17070 - PRE**

Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

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Page 3

**Summary for Subcatchment 1:**

Runoff = 0.55 cfs @ 12.46 hrs, Volume= 3,341 cf, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

	Area (sf)	CN	Description
*	2,851	98	Gray Road - Ex. Paved roads, HSG B
*	912	96	Ex. driveway - Gravel surface, HSG B
	54,862	58	Woods/grass comb., Good, HSG B
	58,625	61	Weighted Average
	55,774	59	95.14% Pervious Area
	2,851	98	4.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0304	0.10		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.10"
4.0	195	0.0270	0.82		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
29.5	345	Total			

**Summary for Subcatchment 2:**

Runoff = 3.71 cfs @ 12.36 hrs, Volume= 19,734 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

	Area (sf)	CN	Description
	48,931	58	Woods/grass comb., Good, HSG B
	35,748	72	Woods/grass comb., Good, HSG C
	119,571	79	Woods/grass comb., Good, HSG D
	204,250	73	Weighted Average
	204,250	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	150	0.0427	0.11		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.10"
1.1	39	0.0153	0.62		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
0.7	85	0.1879	2.17		<b>Shallow Concentrated Flow, Seg C to D</b> Woodland Kv= 5.0 fps
0.3	173	0.0404	11.41	272.75	<b>Channel Flow, Seg D to E</b> Area= 23.9 sf Perim= 25.6' r= 0.93' n= 0.025 Earth, clean & winding
24.4	447	Total			

**17070 - PRE***Type III 24-hr 10-Year Rainfall=4.60", Ia/S=0.10*

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Page 4

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**Runoff Area=58,625 sf 4.86% Impervious Runoff Depth=1.52"  
Flow Length=345' Tc=29.5 min CN=61 Runoff=1.28 cfs 7,402 cf**Subcatchment2:**Runoff Area=204,250 sf 0.00% Impervious Runoff Depth=2.26"  
Flow Length=447' Tc=24.4 min CN=73 Runoff=7.42 cfs 38,414 cf**Total Runoff Area = 262,875 sf Runoff Volume = 45,815 cf Average Runoff Depth = 2.09"**  
**98.92% Pervious = 260,024 sf 1.08% Impervious = 2,851 sf**

**17070 - PRE***Type III 24-hr 25-Year Rainfall=5.80", Ia/S=0.10*

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Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**

Runoff Area=58,625 sf 4.86% Impervious Runoff Depth=2.31"

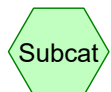
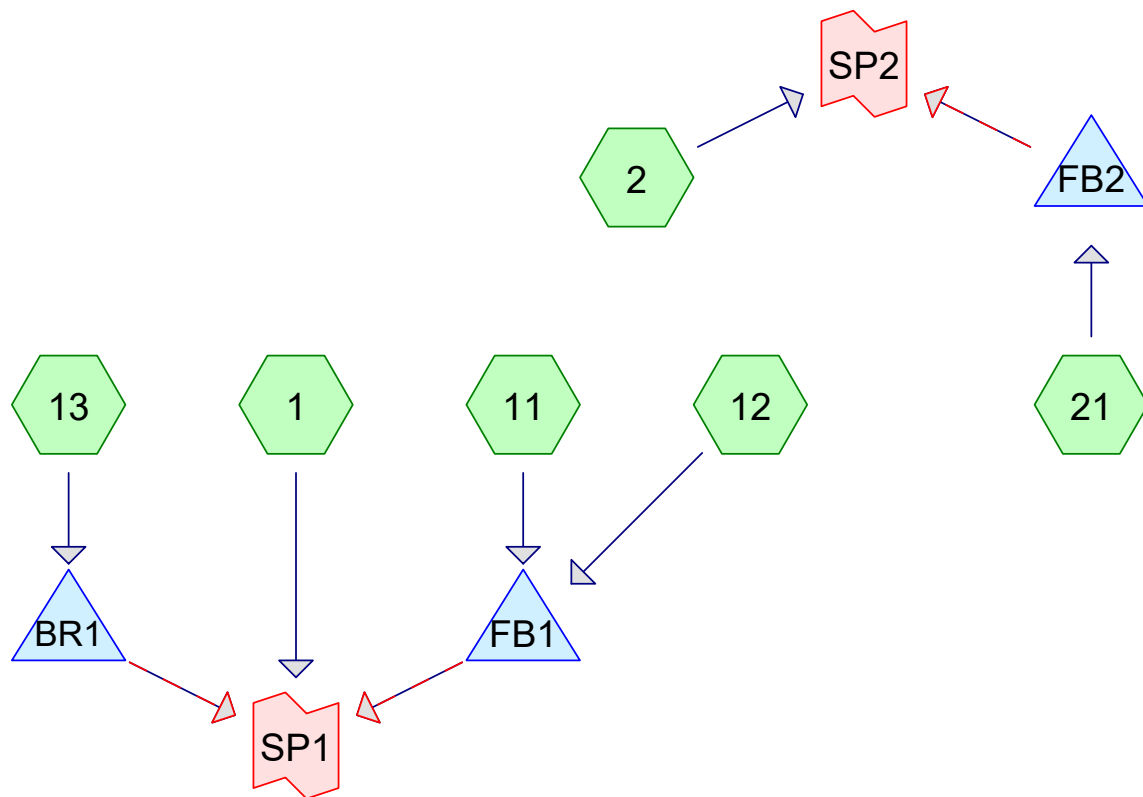
Flow Length=345' Tc=29.5 min CN=61 Runoff=1.98 cfs 11,261 cf

**Subcatchment2:**

Runoff Area=204,250 sf 0.00% Impervious Runoff Depth=3.23"

Flow Length=447' Tc=24.4 min CN=73 Runoff=10.67 cfs 54,978 cf

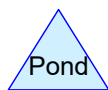
**Total Runoff Area = 262,875 sf Runoff Volume = 66,239 cf Average Runoff Depth = 3.02"**  
**98.92% Pervious = 260,024 sf 1.08% Impervious = 2,851 sf**



Subcat



Reach



Pond



Link

#### Routing Diagram for 17070 - POST

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**17070 - POST***Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10*

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Page 2

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**Runoff Area=15,362 sf 31.64% Impervious Runoff Depth=1.07"  
Flow Length=133' Slope=0.0356 '/' Tc=14.5 min CN=71 Runoff=0.31 cfs 1,369 cf**Subcatchment2:**Runoff Area=159,814 sf 2.86% Impervious Runoff Depth=1.30"  
Flow Length=447' Tc=24.4 min CN=76 Runoff=3.30 cfs 17,374 cf**Subcatchment11:**Runoff Area=32,325 sf 66.99% Impervious Runoff Depth=1.89"  
Flow Length=551' Tc=12.3 min CN=86 Runoff=1.25 cfs 5,091 cf**Subcatchment12:**Runoff Area=25,130 sf 25.67% Impervious Runoff Depth=1.07"  
Flow Length=473' Tc=7.1 min CN=71 Runoff=0.63 cfs 2,239 cf**Subcatchment13:**Runoff Area=9,560 sf 36.10% Impervious Runoff Depth=1.21"  
Flow Length=316' Tc=22.9 min CN=74 Runoff=0.19 cfs 961 cf**Subcatchment21:**Runoff Area=21,056 sf 28.89% Impervious Runoff Depth=1.63"  
Flow Length=384' Tc=12.2 min CN=82 Runoff=0.70 cfs 2,868 cf**Total Runoff Area = 263,247 sf Runoff Volume = 29,902 cf Average Runoff Depth = 1.36"**  
**82.12% Pervious = 216,182 sf 17.88% Impervious = 47,065 sf**

**17070 - POST**

Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

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Page 3

**Summary for Subcatchment 1:**

Runoff = 0.31 cfs @ 12.22 hrs, Volume= 1,369 cf, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

	Area (sf)	CN	Description
*	3,571	98	Gray Road - Ex. Paved roads, HSG B
	5,167	61	>75% Grass cover, Good, HSG B
	1,289	98	Paved roads w/curbs & sewers, HSG B
	896	55	Woods, Good, HSG B
	4,439	58	Meadow, non-grazed, HSG B
	15,362	71	Weighted Average
	10,502		68.36% Pervious Area
	4,860		31.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	133	0.0356	0.15		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.10"

**Summary for Subcatchment 2:**

Runoff = 3.30 cfs @ 12.35 hrs, Volume= 17,374 cf, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

	Area (sf)	CN	Description
	5,517	58	Woods/grass comb., Good, HSG B
	17,318	72	Woods/grass comb., Good, HSG C
	100,408	79	Woods/grass comb., Good, HSG D
	8,024	58	Meadow, non-grazed, HSG B
	9,573	78	Meadow, non-grazed, HSG D
	10,216	61	>75% Grass cover, Good, HSG B
	1,312	74	>75% Grass cover, Good, HSG C
	2,882	80	>75% Grass cover, Good, HSG D
*	4,256	98	Proposed Roofs w/ drip edge
*	308	98	Proposed misc. hardscape, Paved
	159,814	76	Weighted Average
	155,250		97.14% Pervious Area
	4,564		2.86% Impervious Area



**17070 - POST**

Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	150	0.0427	0.11		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.10"
1.1	39	0.0153	0.62		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
0.7	85	0.1879	2.17		<b>Shallow Concentrated Flow, Seg C to D</b> Woodland Kv= 5.0 fps
0.3	173	0.0404	11.41	272.75	<b>Channel Flow, Seg D to E</b> Area= 23.9 sf Perim= 25.6' r= 0.93' n= 0.025 Earth, clean & winding
24.4	447	Total			

**Summary for Subcatchment 11:**

Runoff = 1.25 cfs @ 12.19 hrs, Volume= 5,091 cf, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

Area (sf)	CN	Description
8,566	98	Roofs, HSG B
13,090	98	Proposed Roads, Driveways & misc. hardscape, Paved
10,567	61	>75% Grass cover, Good, HSG B
102	74	>75% Grass cover, Good, HSG C
32,325	86	Weighted Average
10,669		33.01% Pervious Area
21,656		66.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	57	0.0138	0.09		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.10"
0.2	15	0.0296	1.08		<b>Sheet Flow, Seg B to C</b> Smooth surfaces n= 0.011 P2= 3.10"
0.6	168	0.0109	4.72	29.09	<b>Trap/Vee/Rect Channel Flow, Seg C to D</b> Bot.W=0.08' D=0.50' Z= 48.0 & 1.0 ' Top.W=24.58' n= 0.013 Asphalt, smooth
0.7	281	0.0146	6.36	7.81	<b>Pipe Channel, Seg D to E</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	30	0.0070	4.40	5.40	<b>Pipe Channel, Seg E to F</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
12.3	551	Total			

**17070 - POST**

Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

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**Summary for Subcatchment 12:**

Runoff = 0.63 cfs @ 12.12 hrs, Volume= 2,239 cf, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

Area (sf)	CN	Description
6,451	98	Paved roads w/curbs & sewers, HSG B
2,062	55	Woods, Good, HSG B
14,559	61	>75% Grass cover, Good, HSG B
2,058	74	>75% Grass cover, Good, HSG C
25,130	71	Weighted Average
18,679		74.33% Pervious Area
6,451		25.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	52	0.0383	0.13		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.10"
0.5	421	0.0196	14.35	139.88	<b>Trap/Vee/Rect Channel Flow, Seg B to C</b> Bot.W=2.00' D=1.50' Z= 3.0 ' Top.W=11.00' n= 0.013 Asphalt, smooth
7.1	473	Total			

**Summary for Subcatchment 13:**

Runoff = 0.19 cfs @ 12.33 hrs, Volume= 961 cf, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

Area (sf)	CN	Description
5,973	61	>75% Grass cover, Good, HSG B
259	98	Paved roads w/curbs & sewers, HSG B
3,192	98	Roofs, HSG B
136	58	Woods/grass comb., Good, HSG B
9,560	74	Weighted Average
6,109		63.90% Pervious Area
3,451		36.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	150	0.0150	0.11		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.10"
0.4	166	0.0285	7.14	35.72	<b>Trap/Vee/Rect Channel Flow, Seg B to C</b> Bot.W=2.00' D=1.00' Z= 3.0 ' Top.W=8.00' n= 0.025 Earth, clean & winding
22.9	316	Total			

**17070 - POST**

Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

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**Summary for Subcatchment 21:**

Runoff = 0.70 cfs @ 12.19 hrs, Volume= 2,868 cf, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-Year Rainfall=3.10", Ia/S=0.10

Area (sf)	CN	Description
1,428	98	Roofs, HSG B
* 3,593	98	Proposed Sub. Road, paved roads w/curbs
* 1,062	98	Proposed driveways & misc. hardscape, paved
630	61	>75% Grass cover, Good, HSG B
6,586	74	>75% Grass cover, Good, HSG C
5,772	80	>75% Grass cover, Good, HSG D
1,985	72	Woods/grass comb., Good, HSG C
21,056	82	Weighted Average
14,973		71.11% Pervious Area
6,083		28.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	60	0.0144	0.09		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.10"
0.4	24	0.0166	0.94		<b>Sheet Flow, Seg B to C</b> Smooth surfaces n= 0.011 P2= 3.10"
0.3	49	0.0188	2.78		<b>Shallow Concentrated Flow, Seg C to D</b> Paved Kv= 20.3 fps
0.1	21	0.1454	6.14		<b>Shallow Concentrated Flow, Seg D to E</b> Unpaved Kv= 16.1 fps
0.4	230	0.0429	9.20	89.67	<b>Trap/Vee/Rect Channel Flow, Seg E to F</b> Bot.W=2.00' D=1.50' Z= 3.0 ' Top.W=11.00' n= 0.030 Earth, grassed & winding
12.2	384	Total			

**17070 - POST***Type III 24-hr 10-Year Rainfall=4.60", Ia/S=0.10*

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Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**Runoff Area=15,362 sf 31.64% Impervious Runoff Depth=2.12"  
Flow Length=133' Slope=0.0356 '/' Tc=14.5 min CN=71 Runoff=0.64 cfs 2,718 cf**Subcatchment2:**Runoff Area=159,814 sf 2.86% Impervious Runoff Depth=2.47"  
Flow Length=447' Tc=24.4 min CN=76 Runoff=6.37 cfs 32,846 cf**Subcatchment11:**Runoff Area=32,325 sf 66.99% Impervious Runoff Depth=3.25"  
Flow Length=551' Tc=12.3 min CN=86 Runoff=2.12 cfs 8,745 cf**Subcatchment12:**Runoff Area=25,130 sf 25.67% Impervious Runoff Depth=2.12"  
Flow Length=473' Tc=7.1 min CN=71 Runoff=1.27 cfs 4,446 cf**Subcatchment13:**Runoff Area=9,560 sf 36.10% Impervious Runoff Depth=2.33"  
Flow Length=316' Tc=22.9 min CN=74 Runoff=0.37 cfs 1,853 cf**Subcatchment21:**Runoff Area=21,056 sf 28.89% Impervious Runoff Depth=2.92"  
Flow Length=384' Tc=12.2 min CN=82 Runoff=1.25 cfs 5,120 cf**Total Runoff Area = 263,247 sf Runoff Volume = 55,727 cf Average Runoff Depth = 2.54"**  
**82.12% Pervious = 216,182 sf 17.88% Impervious = 47,065 sf**

**17070 - POST***Type III 24-hr 25-Year Rainfall=5.80", Ia/S=0.10*

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Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment1:**Runoff Area=15,362 sf 31.64% Impervious Runoff Depth=3.07"  
Flow Length=133' Slope=0.0356 '/' Tc=14.5 min CN=71 Runoff=0.93 cfs 3,927 cf**Subcatchment2:**Runoff Area=159,814 sf 2.86% Impervious Runoff Depth=3.48"  
Flow Length=447' Tc=24.4 min CN=76 Runoff=9.00 cfs 46,349 cf**Subcatchment11:**Runoff Area=32,325 sf 66.99% Impervious Runoff Depth=4.37"  
Flow Length=551' Tc=12.3 min CN=86 Runoff=2.83 cfs 11,783 cf**Subcatchment12:**Runoff Area=25,130 sf 25.67% Impervious Runoff Depth=3.07"  
Flow Length=473' Tc=7.1 min CN=71 Runoff=1.85 cfs 6,424 cf**Subcatchment13:**Runoff Area=9,560 sf 36.10% Impervious Runoff Depth=3.31"  
Flow Length=316' Tc=22.9 min CN=74 Runoff=0.53 cfs 2,639 cf**Subcatchment21:**Runoff Area=21,056 sf 28.89% Impervious Runoff Depth=4.01"  
Flow Length=384' Tc=12.2 min CN=82 Runoff=1.71 cfs 7,028 cf**Total Runoff Area = 263,247 sf Runoff Volume = 78,150 cf Average Runoff Depth = 3.56"**  
**82.12% Pervious = 216,182 sf 17.88% Impervious = 47,065 sf**

## **ATTACHMENT 4**

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### **INSPECTION, MAINTENANCE & HOUSEKEEPING PLAN**



## INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN

### GRAY ROAD RETIREMENT COMMUNITY WINDHAM, MAINE

#### **Responsible Party**

Owner: Weld, LLC  
P.O. Box 1361  
Windham, Maine 04062

The owner/applicant is responsible for the maintenance of all stormwater management structures and related site components and the keeping of a maintenance log book with service records until such time that a homeowner's association is created. Records of all inspections and maintenance work performed must be kept on file with the owner and retained for a minimum of five years. The maintenance log will be made available to the upon request. At a minimum, the maintenance of stormwater management systems will be performed on the prescribed schedule.

The procedures outlined in this plan are provided as a general overview of the anticipated practices to be utilized on this site. In some instances, additional measures may be required due to unexpected conditions. *The Maine Erosion and Sedimentation Control BMP and Stormwater Management for Maine: Best Management Practices* Manuals published by the Maine Department of Environmental Protection (MDEP) should be referenced for additional information.

#### **During Construction**

- 1. Inspection and Corrective Action:** It is the contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. Inspection shall occur on all disturbed and impervious areas, erosion control measures, material storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as 24 hours before and after a storm event and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections.
- 2. Maintenance:** Erosion controls shall be maintained in effective operating condition until areas are permanently stabilized. If best management practices (BMPs) need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. If BMPs need to be maintained or modified, additional

BMPs are necessary, or other corrective action is needed, implementation must be completed within seven calendar days and prior to any rainfall event.

3. **Documentation:** A report summarizing the inspections and any corrective action taken must be maintained on site. The log must include the name(s) and qualifications of the person making the inspections; the date(s) of the inspections; and the major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicle access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to Town staff, and a copy must be provided upon request. The owner shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

### **Housekeeping**

1. **Spill prevention:** Controls must be used to prevent pollutants from construction and waste materials on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.
2. **Groundwater protection:** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.
3. **Fugitive sediment and dust:** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads



once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

4. **Debris and other materials:** Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.
5. **Excavation de-watering:** Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.
6. **Authorized Non-stormwater discharges:** Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:
  - (a) Discharges from firefighting activity;
  - (b) Fire hydrant flushings;
  - (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);
  - (d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);
  - (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;
  - (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;
  - (g) Uncontaminated air conditioning or compressor condensate;
  - (h) Uncontaminated groundwater or spring water;
  - (i) Foundation or footer drain-water where flows are not contaminated;
  - (j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));
  - (k) Potable water sources including waterline flushings; and
  - (l) Landscape irrigation.
7. **Unauthorized non-stormwater discharges:** Approval from the Town does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Section 6 above. Specifically, the Town's approval does not authorize discharges of the following:

- (a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;
- (b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;
- (c) Soaps, solvents, or detergents used in vehicle and equipment washing; and
- (d) Toxic or hazardous substances from a spill or other release.

### **Post construction**

- 1. Inspection and Corrective Action:** All measures must be maintained by the owner in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions of the permit, shall conduct the inspections. The following areas, facilities, and measures must be inspected, and identified deficiencies must be corrected. Areas, facilities, and measures other than those listed below may also require inspection on a specific site.

**A. Vegetated Areas:** Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

**B. Ditches, Swales, and Open Channels:** Inspect ditches, swales, and other open channels in the spring, late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, control vegetative growth that could obstruct flow, and repair any erosion of the ditch lining. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side slopes.

**C. Culverts:** Inspect culverts in the spring, late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the culvert's inlet and outlet.

**D. Catch Basins:** Inspect and, if required, clean out catch basins at least once a year, preferably in early spring. Clean out must include the removal and legal disposal of any accumulated sediments and debris at the bottom of the basin, at any inlet grates, at any inflow channels to the basin, and at any pipes between basins. If the basin

outlet is designed to trap floatable materials, then remove the floating debris and any floating oils (using oil-absorptive pads).

- E. Underdrained Filter Basins and Bio-Retention Cell:** Basins and Bio-Retention Cell should be inspected semi-annually and following major storm events for the first year and every six months thereafter. The basins and bio-retention cell should drain within 48 hours following a one-inch storm and if a larger storm fills the system to overflow, it shall drain within 36 to 60 hours. If ponding exceeds 48 hours, the top of the filter bed must be rototilled to reestablish the soil's filtration capacity. If water ponds on the surface of the bed for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up in the forebay, basins and bio-retention cell; and remove as needed. Mowing of the basins and bio-retention cell can only occur semi-annually to a height of no less than 6 inches utilizing a hand-held string trimmer or push-mower. Any bare areas or erosion rills shall be repaired with new filter media or sandy loam then seeded and mulched. The basins and bio-retention cell should also be inspected annually for destabilization of side slopes, embankment settling and other signs of structural failure.
- F. Roofline Dripedge:** The dripedges should be inspected semi-annually and following major storm events for the first year and every six months thereafter. The reservoir crushed stone should drain within 48 hours following a one-inch storm and if a larger storm fills the system to overflow, it shall drain within 36 to 60 hours. If ponding exceeds 48 hours, the stone reservoir course shall be removed and the filter bed be rototilled to reestablish the soil's filtration capacity. If water ponds in the reservoir course for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up at surface and remove as needed. The dripedges are part of the stormwater management plan and cannot be paved over or altered in anyway.
- G. Regular Maintenance:** Clear accumulations of winter sand along roadway once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along pavement shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.
- H. Documentation:** Keep a log (report) summarizing inspections, maintenance, and any corrective actions taken. The log must include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed after removal. The log must be made accessible to Town staff upon request. The permittee shall retain a copy of the log for a period of at least five years from the completion of permanent stabilization. Attached is a sample log.

# MAINTENANCE LOG

## GRAY ROAD RETIREMENT COMMUNITY WINDHAM, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town upon request. Inspections are to be performed by a qualified third party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Vegetated Areas	Inspect slopes and embankments early in Spring.			
Ditches, swales, and other open channels	Inspect after major rainfall event producing 1" of rain in two hours.			
	Inspect for erosion or slumping & repair			
	Mowed at least annually.			
Culverts	Inspect semiannually and after major rainfall.			
	Repair erosion at inlet or outlet of pipe.			
	Repair displaced riprap.			
	Clean accumulated sediment in culverts when >20% full.			
Catch Basins	Inspect to ensure that structure is properly draining.			
	Remove accumulated sediment semiannually.			
	Inspect grates/inlets and remove debris as needed.			

**MAINTENANCE LOG**

**GRAY ROAD RETIREMENT COMMUNITY**

**WINDHAM, MAINE**

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Underdrained Filter Basin, Bio-Retention Cell And Roofline Dripedges	Check after each rainfall event to ensure that pond drains within 24-48 hours.			
	Replace top several inches of filter if pond does not drain within 72 hours.			
	Mow grass no more than twice a year to no less than 6 inches in height.			
	Inspect semi-annually for erosion or sediment accumulation and repair as necessary.			
Regular Maintenance	Clear accumulation of winter sand in paved areas annually.			