**C.G. Johnson Engineering, Inc.** **Charles G. Johnson, P.E.**
*203 Willow Street*
*South Hamilton, MA 01982*
*Phone (978) 468-2957*
*Fax (978) 468-3862*

# *Transmittal*

**To:** Gregory P. Bernard, Wenham Health Agent
**From:** Charles G. Johnson, P.E. (Civil) CGJ
**Date:** March 18, 2015
**Re:** Proposed On-Site Wastewater Treatment & Dispersal System Plan

**Site:** Proposed "Maple Woods" at 62 Maple Street (Tax Map 23, Lot 16)

**Applicant:** Maple Woods Housing, LLC
c/o Andrew DeFranza
238 Elliott Street
P.O. Box 507
Beverly, MA 01915
Office: (978) 922-1305, extension 207

**Enclosures:**
1. Proposed On-Site Wastewater Treatment & Dispersal System Plan dated March 12, 2015 (3 sets)
2. Permit Site Development Plans (to accompany a Notice of Intent Application) revised February 18, 2015
3. $400 check #6978 dated February 11, 2015 for Disposal System Construction Permit
4. Application for Disposal System Construction Permit dated March 12, 2015
5. Soil Suitability Assessment for On-Site Sewage Disposal dated May 28, 2014, June 4, 2014 & July 23, 2014
6. MA DEP Renewal of Approval for General Use: Waterloo Biofilter dated November 1, 2012
7. MA DEP Standard Conditions for Secondary Treatment Units Certified for General Use date February 19, 2013

**Comments:** Please let me know if you have any questions during your review.

Our next meeting with the Wenham Zoning Board of Appeals is scheduled for Wednesday, April 15, 2015.

Thank you.

Cc: Andrew DeFranza, Maple Woods Housing, LLC
Theodore C. Regnante, Esq. & Paul J. Haverty, Esq., Regnante, Sterio & Osborne LLP
Charles E. Wear, III, P.E., and April Ferraro, P.E., Meridian Associates
John Harden, AIA, Siemasko & Verbridge
Daniel J. Mills, P.E., MDM Transportation Consultants, Inc.
Emilie Cademartori, Wenham Zoning Board of Appeals Coordinator (4 sets of items 1 & 3 to 7)
C.G. Johnson Engineering, Inc.

No. _____ THE COMMONWEALTH OF MASSACHUSETTS FEE _____

BOARD OF HEALTH

Town OF Wenham

# APPLICATION FOR DISPOSAL SYSTEM CONSTRUCTION PERMIT

Application for a Permit to Construct (X) Repair ( ) Upgrade ( ) Abandon ( ) - [X] Complete System ☐ Individual Components

| | |
|---|---|
| 62 Maple Street ("Maple Woods") | Maple Woods Housing, LLC (Applicant) |
| Map 23 (Location) | Owner's Name |
| Lot 16 (Map/Parcel #) | 238 Elliott Street, P.O. Box 507 |
| Lot # | Address |
| Installer's Name | Beverly, MA 01915 (978-922-1305) |
| Address | Telephone # |
| Telephone # | C.G. Johnson Engineering, Inc. |
| | Designer's Name |
| | 203 Willow Street, South Hamilton, |
| | (978-468-2957) Address MA 01982 |
| | Telephone # |

Type of Building: "Housing for the Elderly" Lot Size 3.48+/- ~~Square~~ Acres

Dwelling — No. of Bedrooms 60 One-bedroom Units Garbage Grinder ( )

Other — Type of Building _____ No. of persons _____ Showers ( ), Cafeteria ( )

Other fixtures _____

Design Flow (min. required) 6,600 gpd Calculated design flow 6,600 gpd Design flow provided 6,660 gpd

**Plan:** Date March 12, 2015 Number of sheets 6 Revision Date _____

Title Proposed On-Site Wastewater Treatment & Dispersal System

Description of Soil(s) Loamy Fine Sand & Loamy Medium Sand

~~Soil Evaluator Form No.~~ _____ ~~Name of Soil Evaluator~~ C. Johnson Date of Evaluation May 28, 2014, June 4, 2014, ~~July 23,~~ 2014

DESCRIPTION OF REPAIRS OR ALTERATIONS 20,000 gallon 2-compartment Septic Tank, 10,000 gallon Pump Chamber, 6,600 gpd Waterloo Biofilter Treatment Unit and 4-zone 25'x90' Pressure-Distribution Leach Fields.

**The undersigned agrees to install the above described Individual Sewage Disposal System in accordance with the provisions of TITLE 5 and further agrees not to place the system in operation until a Certificate of Compliance has been issued by the Board of Health.**

Signed _____ Date March 12, 2015

Andrew DeFranza

**Inspections** _____

**FORM 1 - APPLICATION FOR DSCP** **DEP APPROVED FORM 5/96**

---

No. _____ THE COMMONWEALTH OF MASSACHUSETTS FEE _____

_____ BOARD OF HEALTH

# CERTIFICATE OF COMPLIANCE

**Description of Work:** ☐ **Individual Component(s)** ☐ **Complete System**

The undersigned hereby certify that the Sewage Disposal System; Constructed ( ), Repaired ( ), Upgraded ( ), Abandoned ( )

by: _____

at _____

has been installed in accordance with the provisions of 310 CMR 15.00 (Title 5) and the approved design plans/as-built

# Soil Suitability Assessment for On-site Sewage Disposal

| | |
|---|---|
| Site: | 62 Maple Street, Wenham, Massachusetts |
| Applicant: | Maple Woods Housing, LLC |
| Soil Evaluator: | Charles G. Johnson, P.E., S.E. #1134 |
| Witness: | Gregory P. Bernard, Wenham Health Agent, S.E. #2860 |
| Testing Dates: | May 28, 2014, June 4, 2014 & July 23, 2014 |


***Charles G. Johnson, P.E.***
*Civil/Environmental Engineer*

***C.G. Johnson Engineering, Inc.***
*203 Willow Street* *Tel (978) 468-2957*
*South Hamilton, MA 01982* *Fax (978) 468-3862*


*On-Site Wastewater Treatment & Dispersal System Design*
*including Conventional & Innovative Technology*
*Consultation, Soil Testing, Design, Permitting, Inspection, As-Built Certification*

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*South Hamilton, MA 01982*
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*Fax (978) 468-3862*

*Charles G. Johnson, P.E.*

(1)

**FORM 11 –SOIL EVALUATOR FORM**


**No.** _____ **Date:** May 28, 2014

**Commonwealth of Massachusetts**
Wenham, **Massachusetts**

# *Soil Suitability Assessment for On-site Sewage Disposal*

**Performed by:** Charles G. Johnson, P.E. (Civil #34367, S.E. #1134) **Date:** May 28, 2014
**Witnessed by:** Gregory P. Bernard, Wenham Board of Health Agent (S.E. #2860)

| | |
|---|---|
| **Location Address** 62 Maple Street<br>**Lot #** Map 23, Lot 16<br>**New Construction** _X_ **Repair** __ | **Applicant's Name** Maple Woods Housing, LLC<br>c/o Andrew DeFranza<br>**Address** 238 Elliott Street, P.O. Box 507<br>Beverly, MA 01915<br>**Telephone #** (978) 922-1305, ext. 207 |

**Office Review**

**Published Soil Survey Available:** **No** ___ **Yes** X (Essex County, MA, Southern Part)
**Year Published:** 1984 **Publication Scale:** 1:15840 **Soil Map Unit:** HfB=Hinckley gravelly fine sandy loam
**Drainage Class:** _A_ **Soil Limitations:** Excessively drained and permeable

**Surficial Geologic Report Available:** **No** X **Yes** ___
**Year Published:** ____ **Publication Scale:** _____
**Geologic Material (Map Unit):** _____

**Landform:** Glacial Outwash Terrace

**Flood Insurance Rate Map:** Wenham FIRM (Effective Date: July 3, 2012)
**Above 500 year flood boundary:** **No** ___ **Yes** X
**Within 500 year flood boundary:** **No** X **Yes** ___
**Within 100 year flood boundary:** **No** X **Yes** ___

**Wetland Area:** Delineated by Hancock Associates & reviewed by Wenham Conservation Commission
**National Wetland Inventory Map (map unit):** _____
**Wetlands Conservancy Program Map (map unit):** _____

**Current Water Resource Conditions (USGS): Month:** Not Available
**Range: Above Normal** ___ **Normal** ___ **Below Normal** ___

**Other References Reviewed:** _____

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*Charles G. Johnson, P.E.*

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-1 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50$^0$
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 200+/- feet **Property Line:** 200+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-9" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 9"-22" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 22"-80" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 80"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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*Charles G. Johnson, P.E.*

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-2 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 160+/- feet **Property Line:** 200+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-9" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 9"-20" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 20"-66" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 66"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-3 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50$^0$
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 210+/- feet **Property Line:** 190+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-32" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 32"-84" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 84"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-4 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 180+/- feet **Property Line:** 180+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-9" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 9"-22" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 22"-48" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 48"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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*Charles G. Johnson, P.E.*

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-5 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 220+/- feet **Property Line:** 170+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-9" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 9"-22" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 22"-86" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 86"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-6 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 170+/- feet **Property Line:** 140+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-7" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 7"-18" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 18"-48" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 48"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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*Charles G. Johnson, P.E.*

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** DT-1 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50$^0$
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 190+/- feet **Property Line:** 200+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-5" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 5"-88" | $C_1$ | Loamy Medium Sand | 2.5Y5/4 | @52" 2.5Y6/2, 10YR5/8 | Friable, Blocky, 20% Gravel |
| 88"-115"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/3 | None | Friable, Blocky, 25% Gravel, some Cobbles |

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** None **Weeping from Pit Face:** Moist @ 88"
**Estimated Seasonal High Ground Water:** 52"

Note: This test was performed as requested by Meridian Associates (Civil/Site Engineering firm for this project) for the design of a proposed Stormwater Management System and was not witnessed by Gregory P. Bernard.

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*Charles G. Johnson, P.E.*

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** DT-2 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 120+/- feet **Property Line:** 100+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-5" | -- | Fill | --- | None | --- |
| 5"-66"+ | C | Loamy Medium Sand | 2.5Y5/4 | @30" 2.5Y6/2, 10YR5/8 | Friable, Blocky, 20% Gravel |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** 49" **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** 30"

Note: This test was performed as requested by Meridian Associates (Civil/Site Engineering firm for this project) for the design of a proposed Stormwater Management System and was not witnessed by Gregory P. Bernard.

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** DT-3 **Date:** May 28, 2014 **Time:** 8:00am start **Weather:** Overcast, rain, 50°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 110+/- feet **Property Line:** 70+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-4" | --- | Fill | --- | None | --- |
| 4"-60"+ | C | Loamy Medium Sand | 2.5Y5/4 | @13" 2.5Y6/2, 10YR5/8 | Friable, Blocky, 20% Gravel |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** 30" **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** 13"

Note: This test was performed as requested by Meridian Associates (Civil/Site Engineering firm for this project) for the design of a proposed Stormwater Management System and was not witnessed by Gregory P. Bernard.

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

# *Determination for Seasonal High Water Table*

**Method Used:**

___ **Depth observed standing in observation hole** _____ **inches**
___ **Depth weeping from side of observation hole** _____ **inches**
_X_ **Depth to soil mottles** T-1 through T-6 = None; DT-1 = 52"; DT-2 = 30"; DT-3 = 13"
___ **Ground water adjustment** _____ **feet**

**Index Well Number** _____ **Reading Date** _____ **Index well level** _____

**Adjustment factor** _____ **Adjusted ground water level** _____

**Depth of Naturally Occurring Pervious Material**

**Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?** Yes

**If not, what is the depth of naturally occurring pervious material?** _____

**Certification**

**I certify that on** April 1995 **(date) I have passed the soil evaluator examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.**

**Signature** _____ **Date** May 28, 2019
Charles G. Johnson, P.E.
(MA Civil #34367, S.E. #1134)

**C.G. Johnson Engineering, Inc.**
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*South Hamilton, MA 01982*
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**Charles G. Johnson, P.E.**

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**FORM 12 –PERCOLATION TEST**

**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

# Percolation Test*

**Date:** May 28, 2014 **Time:** Start at 8:00am

| **Observation Hole #** | P-1 at T-1 | P-2 at T-2 | P-5 at T-5 | P-6 at T-6 |
|---|---|---|---|---|
| **Depth of Perc** | 24" + 18" = 42" | 25" + 18" = 43" | 29" + 18" = 47" | 26" + 18" = 44" |
| **Start Pre-soak** | 9:54 | 9:56 | 12:41 | 12:39 |
| **End Pre-soak** | 10:09 (15 min.) | 10:11 (15 min.) | 12:56 (15 min.) | 12:54 (15 min.) |
| **Time at 12"** | 10:09 | 10:11 | 12:56 | 12:54 |
| **Time at 9"** | 10:12 | 10:16 | 12:59 | 12:58 |
| **Time at 6"** | 10:16 | 10:24 | 1:03 | 1:03 |
| **Time (12"-9")** | 3 minutes | 5 minutes | 3 minutes | 4 minutes |
| **Time (9"-6")** | 4 minutes | 8 minutes | 4 minutes | 5 minutes |
| **Rate (Minutes per inch)** | 1.3 min./inch | 2.7 min./inch | 1.3 min./inch | 1.7 min./inch |

*** Minimum of 1 percolation test must be performed in both the primary area AND reserve area [for New Construction].**

**Site Passed** X **Site Failed** _____

**Performed By:** Charles G. Johnson, P.E. (MA Civil #34367; S.E. #1134)

**Witnessed By:** Gregory P. Bernard, Wenham Board of Health Agent (S.E. #2860)

**Comments:** Successful first day of soil testing.

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*Charles G. Johnson, P.E.*

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-7 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 120+/- feet **Property Line:** 50+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-14" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 14"-24" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 24"-52" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 52"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-8 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 130+/- feet **Property Line:** 40+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-24" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 24"-51" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 51"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-9 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 210+/- feet **Property Line:** 130+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-28" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 28"-60" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | @48" 2.5Y6/2, 10YR5/8 | Friable, Blocky, 10% Gravel |
| 60"-80" | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | Yes | Friable, Blocky, 25% Gravel, some Cobbles |
| 80"-120"+ | $C_3$ | Sandy Loam | 2.5Y5/4 | Yes | Friable, Blocky, 25% Gravel, some Cobbles |

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** None **Weeping from Pit Face:** Moist @ 52"
**Estimated Seasonal High Ground Water:** 48"

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-10 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 220+/- feet **Property Line:** 90+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-24" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 24"-58" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 58"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-11 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 190+/- feet **Property Line:** 60+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-14" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 14"-26" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 26"-56" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 56"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-12 **Date:** June 4, 2014 **Time:** 8:00am start **Weather:** Overcast,humid, 52°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 170+/- feet **Property Line:** 70+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-24" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 24"-52" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 52"-120"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

# *Determination for Seasonal High Water Table*

**Method Used:**

___ **Depth observed standing in observation hole** _____ **inches**
___ **Depth weeping from side of observation hole** _____ **inches**
_X_ **Depth to soil mottles** T-7 & T-8 = None, T-9 = 48", T-10 through T-12 = None
___ **Ground water adjustment** _____ **feet**

**Index Well Number** _____ **Reading Date** _____ **Index well level** _____

**Adjustment factor** _____ **Adjusted ground water level** _____

**Depth of Naturally Occurring Pervious Material**

**Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?** Yes

**If not, what is the depth of naturally occurring pervious material?** _____

**Certification**

**I certify that on** April 1995 **(date) I have passed the soil evaluator examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.**

**Signature** Charles G. John **Date** June 4, 2014

Charles G. Johnson, P.E.
(MA Civil #34367, S.E. #1134)

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**Charles G. Johnson, P.E.**

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**FORM 12 –PERCOLATION TEST**

**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

# Percolation Test*

| **Date:** June 4, 2014 **Time:** Start at 8:00am | | | | |
|---|---|---|---|---|
| **Observation Hole #** | P-7 at T-7 | P-8 at T-8 | P-9 at T-9 | P-10 at T-10 |
| **Depth of Perc** | 31" + 18" = 49" | 28" + 18" = 46" | 32" + 18" = 50" | 38" + 18" = 56" |
| **Start Pre-soak** | 9:44 | 9:49 | 11:00 | 11:14 |
| **End Pre-soak** | 10:01 (15 min.) | 10:04 (15 min.) | 11:16 (16 min.) | 11:30 (16 min.) |
| **Time at 12"** | 10:01 | 10:04 | 11:16 | 11:30 |
| **Time at 9"** | 10:06 | 10:07 | 11:32 | 11:40 |
| **Time at 6"** | 10:11 | 10:10 | 11:52 | 11:51 |
| **Time (12"-9")** | 5 minutes | 3 minutes | 16 minutes | 10 minutes |
| **Time (9"-6")** | 5 minutes | 3 minutes | 20 minutes | 11 minutes |
| **Rate (Minutes per inch)** | 1.7 min./inch | 1.0 min./inch | 6.7 min./inch | 3.7 min./inch |

*** Minimum of 1 percolation test must be performed in both the primary area AND reserve area [for New Construction].**

**Site Passed** X **Site Failed** _____

**Performed By:** Charles G. Johnson, P.E. (MA Civil #34367; S.E. #1134)

**Witnessed By:** Gregory P. Bernard, Wenham Board of Health Agent (S.E. #2860)

**Comments:** Successful second day of soil testing.

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**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-13 **Date:** July 23, 2014 **Time:** 8:00am start **Weather:** Sunny, humid, 80°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 220+/- feet **Property Line:** 190+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-22" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| 22"-84" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 84"-192"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-14 **Date:** July 23, 2014 **Time:** 8:00am start **Weather:** Sunny, humid, 80°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 170+/- feet **Property Line:** 160+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-8" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 8"-22" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 22"-70" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 70"-180"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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*Charles G. Johnson, P.E.*

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-15 **Date:** July 23, 2014 **Time:** 8:00am start **Weather:** Sunny, humid, 80°
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 130+/- feet **Property Line:** 70+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-14" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 14"-28" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 28"-52" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 52"-144"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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*Charles G. Johnson, P.E.*

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

## *On-Site Review*

**Deep Hole Number:** T-16 **Date:** July 23, 2014 **Time:** 8:00am start **Weather:** Sunny, humid, 80$^0$
**Location (identify on Site Plan)**
**Land Use:** Undeveloped **Slope (%):** 2% **Surface Stones** None
**Vegetation:** Woods
**Landform:** Glacial Outwash Terrace
**Position on landscape (sketch on back)**
**Distances from:**
**Open Water Body:** --- feet **Drainage way:** --- feet
**Possible Wet Area:** 210+/- feet **Property Line:** 100+/- feet
**Drinking Water Well:** --- feet **Other:** _____

**DEEP OBSERVATION HOLE LOG***

| Depth from Surface (Inches) | Soil Horizon | Soil Texture (USDA) | Soil Color (Munsell) | Soil Mottling | Other (Structure, Stones, Boulders, Consistency, % Gravel) |
|---|---|---|---|---|---|
| 0"-12" | A | Fine Sandy Loam | 10YR3/3 | None | Very Friable, Granular/Crumb |
| 12"-29" | $B_w$ | Fine Sandy Loam | 10YR5/6 | None | Friable, Blocky |
| | | | | | |
| 29"-74" | $C_1$ | Loamy Fine Sand | 2.5Y5/4 | None | Friable, Blocky, 10% Gravel |
| 74"-144"+ | $C_2$ | Loamy Medium Sand | 2.5Y5/4 | None | Friable, Blocky, 25% Gravel, some Cobbles |

***MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

**Parent Material (geologic):** Glacial Outwash **Depth to Bedrock:** None
**Depth to Groundwater: Standing Water in the Hole:** --- **Weeping from Pit Face:** None
**Estimated Seasonal High Ground Water:** None

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**FORM 11 –SOIL EVALUATOR FORM**



**Location Address or Lot No.** 62 Maple Street (Map 23, Lot 16), Wenham, Massachusetts

# *Determination for Seasonal High Water Table*

**Method Used:**

___ **Depth observed standing in observation hole** _____ **inches**
___ **Depth weeping from side of observation hole** _____ **inches**
_X_ **Depth to soil mottles** T-13 through T-16 = None
___ **Ground water adjustment** _____ **feet**

**Index Well Number** _____ **Reading Date** _____ **Index well level** _____

**Adjustment factor** _____ **Adjusted ground water level** _____

**Depth of Naturally Occurring Pervious Material**

**Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?** Yes

**If not, what is the depth of naturally occurring pervious material?** _____

**Certification**

**I certify that on** April 1995 **(date) I have passed the soil evaluator examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.**

**Signature** _____ **Date** July 23 2014
Charles G. Johnson, P.E.
(MA Civil #34387, S.E. #1134)

C.G. Johnson Engineering, Inc.
203 Willow Street
South Hamilton, MA 01982
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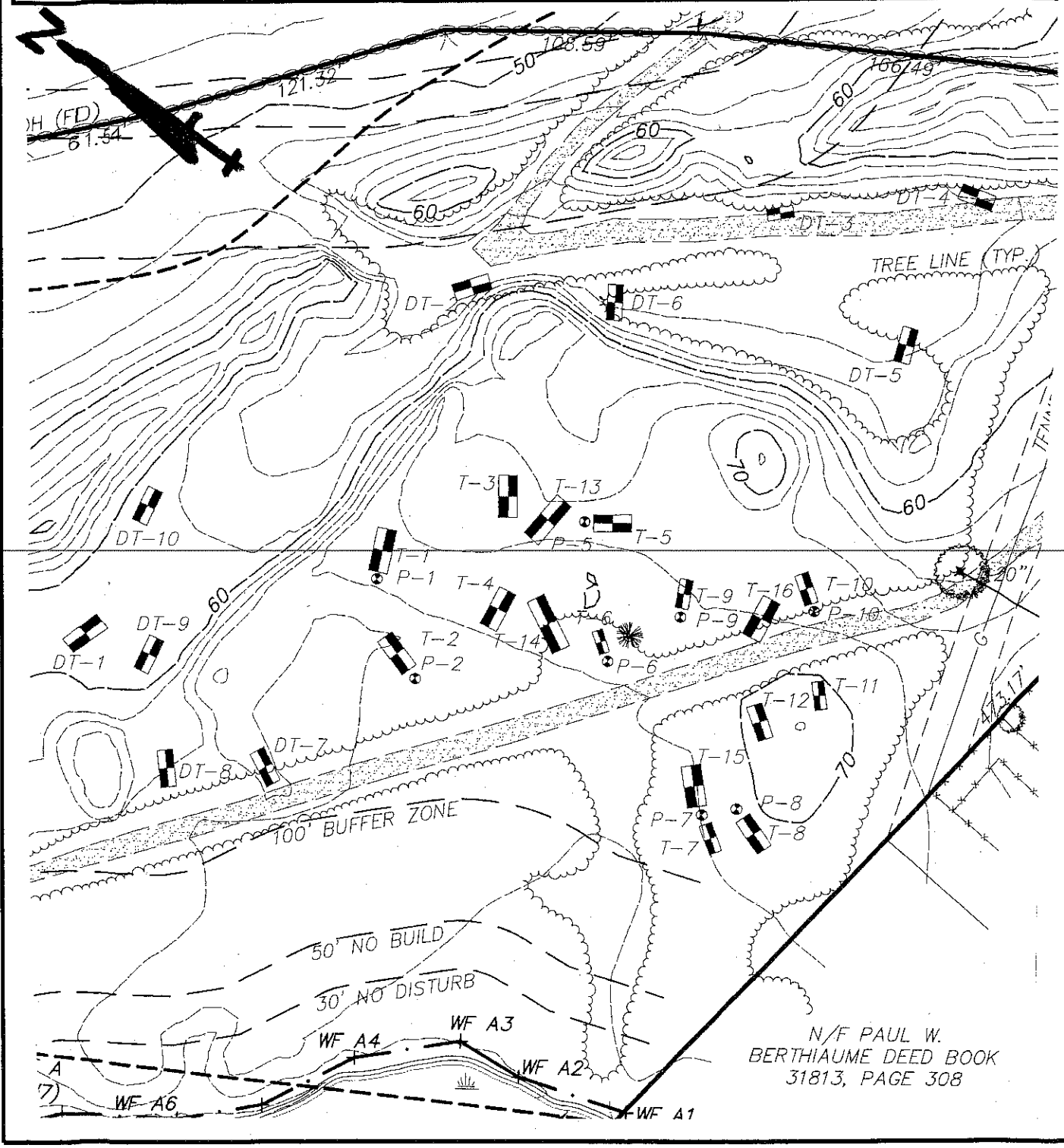
JOB Maple Woods Housing, LLC



SHEET NO. 1 OF 1
CALCULATED BY CGJ DATE July 23, 2014
CHECKED BY _____ DATE _____
SCALE Not to Scale

# Soil Testing Location Plan

Note: Deep Soil Observation Tests T-1 through T-16 and DT-1 through DT-3 and all Percolation Tests were staked by C.G. Johnson Engineering, Inc. and field-located by Meridian Associates



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500



**RENEWAL OF APPROVAL FOR GENERAL USE**
Pursuant to Title 5, 310 CMR 15.000

Name and Address of Applicant:

Waterloo Biofilter Systems, Inc.
143 Dennis Street, P.O. Box 400
Rockwood, ON N0B 2KO, Canada

Trade name of technology: Waterloo Biofilter (hereinafter the "System"). Schematic drawings of a typical System, a design and installation manual, Owner's Manual, O&M manual, and the technology inspection checklist are part of this Approval.

Transmittal Number: X252561
Date of Issuance: November 01, 2012

**Authority for Issuance**

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental Protection hereby issues this Renewal of approval for General Use to: Waterloo Biofilter Systems, Inc., 143 Dennis Street, Rockwood, Canada (hereinafter "the Company"), approving the System described herein for use in the Commonwealth of Massachusetts. Sale and use of the System are conditioned on compliance by the Company, the Designer, the Installer, the Service Contractor, and the System Owner with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Approval constitutes a violation of 310 CMR 15.000.

David Ferris, Director
Wastewater Management Program
Bureau of Resource Protection

November 01, 2012
Date

## Description of the Technology

The System is a Secondary Treatment Unit (STU). The System is an absorbent trickling filter in which dissolved organic matter and suspended solids are degraded by microbial action in an aerated environment. The System is installed following a septic tank with a screened pump vault or a separate pump tank. The media in the trickling filter is comprised of 2 to 3-inch open cell foam cubes, or course shredded foam in mesh bags, that allows for microbial growth on the interior surfaces as well as the exterior surface of the foam. The mesh bags or cubes are piled randomly into a suitable enclosure or self-contained baskets that are placed in a suitable enclosure. The sides and tops of the baskets or mesh bags are exposed to air circulation through an open meshwork. The baskets can be placed in a concrete tank for burial or in a plastic lined enclosure for above ground use. The cubes or mesh bags may be placed directly into suitable polyethylene or fiberglass containers for above ground or buried use. The wastewater is applied to the foam filter media by means of spray heads discharging the wastewater from a pump in a pump tank located downstream of a septic tank or in a screened pump vault located in the septic tank. Effluent from the System can be either a single pass or have effluent re-circulation, typically fifty percent or more, back to the septic tank or pump tank.

## Conditions of Approval

The term "System" refers to the STU in combination with the other components of an on-site treatment and disposal system that may be required to serve a facility in accordance with 310 CMR 15.000.

The term "Approval" refers to the technology-specific Special Conditions, the conditions applicable to all STU's with the General Conditions of 310 CMR 15.287, and any Attachments.

## Special Conditions

1. The System is Secondary Treatment Unit Approved for General Use. In addition to the Special Conditions contained in this Approval, the System shall comply with all the "Conditions for Secondary Treatment Units Approved for General Use", except where stated otherwise in these Special Conditions,

2. When utilizing a pump tank located downstream of a septic tank, the septic tank shall be designed in accordance with 310 CMR 15.223 and the discharge tee shall be equipped with an approved effluent tee filter.

3. When utilizing a screened pump vault located in the septic tank, the septic tank shall be a two-compartment tank. The compartments shall be interconnected by a minimum 12 square inch opening located a minimum 24 inches above the floor of the tank. Except for the design of the interconnection, two-compartment tanks shall meet the design requirements of Title 5 for multiple compartment tanks.

4. The pumping system to the biofilter chamber shall be equipped with a timed dosing control system with sensors and alarms to protect against high water in the septic tank or pump tank due to failure of the pump or pump controls. The pumping system shall have an emergency storage capacity above the working level equal to the daily design flow of the system. The volume below the working level of the pump(s) shall include an allowance for the volume of all drainage which may flow back to the chamber when pumping has ceased.

5. The System's biofilter chamber shall be provided with an air ventilation system.

6. Access shall be provided to all System tanks and to the septic tank in accordance with 310 CMR 15.228 (2). All access ports and manhole covers shall be readily removable impermeable covers of durable material installed and maintained at grade to allow for maintenance of the System. Manholes brought to final grade shall be secured to prevent unauthorized access.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
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KENNETH L. KIMMELL
Commissioner

# Standard Conditions for Secondary Treatment Units Certified for General Use

**Effective Date: February 19, 2013**

A Secondary Treatment Unit (STU) is an alternative technology designed to reduce the amount of organic material and solids in sanitary wastewater. An STU may be used as a component of an on-site sewage disposal system to enhance treatment prior to discharge to the soil absorption system (SAS). For residential systems with design flows less than 2,000 gpd, certain STU's may be used as a component of an on-site sewage disposal to reduce the effective leaching area required for the SAS where soil or site conditions may make conventional soil absorption systems more costly or less desirable to construct. For residential systems with design flows less than 2,000 gpd, an STU which allows for a reduced leach field may require less land area, potentially less fill, and less disturbance of the site.

The System consists of an STU preceding a soil absorption system and, when the leaching area is reduced or the design flow is 2,000 gpd or greater, the SAS must be pressure dosed. A conventional septic tank precedes the STU unless exempt by the Special Conditions for a specific Technology.

The use of an STU in accordance with this General Use Certification requires, among other things:

- A Disclosure Notice in the Deed to the property (310 CMR 15.287(10)) (A Deed Notice template is available from the Department);
- Certifications by the Designer and the Installer (310 CMR 15.021(3));
- A Massachusetts certified operator who has received training for the technology and is under contract for periodic inspection and maintenance (310 CMR 15.287(10));
- Periodic sampling, recordkeeping, and reporting, in accordance with this Approval;
- Notification within 24 hours by the System Owner to the local approving authority of any System failure;
- When pumping is required to discharge to the SAS, 24-hour emergency wastewater storage capacity above the elevation of the high level alarm;
- System Owner Acknowledgement of Responsibilities, in accordance with this Approval.

## Definitions and References

The term "System" refers to the approved technology in combination with the other components of an on-site treatment and disposal system that may be required to serve a facility in accordance with 310 CMR 15.000.

The term "Approval" or "Certification" refers to these Standard Conditions, the Special Conditions contained in the Technology Approval, the General Conditions of 310 CMR 15.287, and any Attachments.

The Conditions contained herein MUST be read in conjunction with any special conditions that are Technology-specific.

## I. Purpose

1. This Certification is for the installation of a System to serve a facility for which a site evaluation in compliance with 310 CMR 15.000 has been approved by the Approving Authority and the site meets the siting requirements for new construction.

2. The sale, design, installation, and use of the System shall be subject to these requirements for all systems that submit a complete Disposal System Construction Permit (DSCP) application after the effective date of these Standard Conditions. Existing Systems and Systems for which a complete DSCP application was submitted prior to the effective date of these requirements shall not be subject to the design and installation requirements, however, the System Owner, the Service Contractor, and the Company shall be subject to all other requirements contained herein.

3. This Certification shall not be used for the installation of a System to upgrade or replace an existing failed or nonconforming system, unless the facility meets the siting requirements for new construction, including a reserve area. All other proposed upgrades utilizing this System shall be in conformance with the Remedial Use Approval issued by the Department for this System.

4. With the other applicable permits or approvals that may be required by Title 5, the Certification for General Use authorizes the installation and use of the System in Massachusetts. All the provisions of Title 5, including the General Conditions for Alternative Systems (310 CMR 15.287), apply to the sale, design, installation, and use of the System, except those provisions that specifically have been varied by this Approval.

5. Provided that the local approving authority approves the System in conformance with the Department's General Use Certification for the System, Department review and approval of the site-specific System design and installation is not required unless the Department determines on a case-by-case basis, pursuant to its authority at 310 CMR 15.003(2)(e), that the proposed System requires Department review and approval.

## II. Design and Installation Requirements

1. Effluent $BOD_5$, TSS and pH - The effluent discharge concentrations from the Secondary Treatment Unit to the SAS shall not exceed secondary treatment standards of 30 mg/L $BOD_5$ and 30 mg/L TSS and the effluent pH range shall be 6.0 to 9.0.

2. Except where the Special Conditions for an approved Technology state otherwise, the Alternative System shall include a properly sized and constructed septic tank, designed in accordance with 310 CMR 15.223 – 15.229, connected to the building sewer and followed in series by the Technology and the SAS.

3. Except where the Special Conditions for an approved Technology state otherwise, the Alternative System shall be installed in a manner which does not intrude on, replace, or adversely affect the operation of any other component of the subsurface sewage disposal system.

4. Residential Systems less than 2000 gpd, Alternative Design Standard to 310 CMR 15.242(1)(a) Effluent Loading Rates – For residential Systems with design flows less than 2000 gpd, the required effective leaching area may be reduced up to 50 percent when using the loading rates for gravity systems of 310 CMR 15.242(1)(a), provided that:

   a) no variance is granted for a reduction in depth to groundwater;

   b) no variance is granted for a reduced depth of pervious material; and

   c) effluent pressure distribution is provided and designed in accordance with Department guidance. The Department's *Pressure Distribution Guidance* dated May 24, 2002 can be viewed on the internet under Title 5/Septic Systems Guidance at *http://mass.gov/dep/ water/laws/policies.htm#t5guid* .

   (Alternatively, the effluent loading rates provided in 310 CMR 15.242(1)(b) for pressure distribution may be utilized, but no reduction in the effective leaching area may be taken when using these loading rates, as stated in the regulation.)

   For residential design flows of 2000 gpd or greater and for all nonresidential systems, no reduction in the effective leaching area is allowed.

5. When the System is allowed a reduction in the required effective leaching in accordance with Paragraph I.4, the installation shall not disturb the site in any manner that would preclude the future installation of the conventional full-sized primary SAS without encroaching on the reserve area.

   The record drawings, approved by the local approving authority, must clearly indicate the area for a full-sized conventional primary SAS and the full-sized conventional reserve area are for the sole purpose of upgrading the on-site sewage disposal system in the future, if necessary, without any increase in flow.

6. The record drawings, approved by the local approving authority, must clearly indicate the area for a conventional reserve SAS is for the sole purpose of upgrading the on-site sewage disposal system in the future, if necessary, without any increase in flow.

Except for the installed SAS, the System Owner shall not construct any permanent buildings or structures or disturb the site in any manner that would encroach on the area approved for a full-sized conventional primary SAS or the area approved for a full-sized conventional reserve SAS.

7. In a nitrogen sensitive area (NSA), as defined in 310 CMR 15.215, Alternative Systems serving facilities with actual or design flows of 2,000 GPD or greater must include treatment with a Recirculating Sand Filter (RSF) or equivalent technology, as required by 310 CMR 15.202(1). Under this General Use Certification, Secondary Treatment Units are not approved as an RSF equivalent technology and shall not be installed in a NSA to serve facilities with actual or design flows of 2,000 GPD or greater. (The Technology may have a separate approval for nitrogen reduction, but must be installed under that approval.)

8. The System may only be installed in soils with a percolation rate of up to 60 minutes per inch (MPI).

9. Except for septic tank covers which are not required to be at grade, the frames and covers of all other access manholes and ports of the System components shall be watertight, made of durable material, and shall be installed and maintained at grade, to allow for necessary inspection, operation, sampling and maintenance access. Manholes brought to final grade shall be secured to prevent unauthorized access. No structures which could interfere with performance, access, inspection, pumping, or repair shall be located directly upon or above the access locations.

10. All System control units, valve boxes, distribution piping, conveyance lines and other System appurtenances shall be designed and installed to prevent freezing.

11. The System control panel including alarms and controls shall be mounted in a location always accessible to the operator (service contractor).

    When pumping is required to discharge to the SAS, the System shall be equipped with sensors and high-level alarms to protect against high water due to pump failure, pump control failure, loss of power, system freeze ups, or backups. Emergency storage shall be provided when pumping to discharge is employed, including pressure distribution, such as when the System is allowed a reduction in the required effective leaching area, in accordance with Paragraph I.4. Emergency storage capacity for wastewater above the high level alarm shall be provided equal to the daily design flow of the System and the storage capacity shall include an additional allowance for the volume of all drainage which may flow back into the System when pumping has ceased.

12. System unit malfunction and high water alarms shall be readily visible and audible for the facility occupants and the Service Contractor and shall be connected to circuits separate from the circuits serving the operating equipment and pumps.

13. The System shall not include any relief valve or outlet for the discharge of wastewater to prevent flooding of the system, back up or break out.

14. Any System structures with exterior piping connections located within 12 inches of or lower than the Estimated Seasonal High Groundwater elevation shall have the connections made watertight with neoprene seals or equivalent.

15. In compliance with 310 CMR 15.240(13), a minimum of one (1) inspection port shall be provided within the SAS consisting of a perforated four inch pipe placed vertically down to the elevation of the SAS interface with the underlying unsaturated pervious soils to enable monitoring for ponding. The pipe shall be capped with a screw type cap and accessible to within three inches of finish grade. (A locking cap at-grade is preferred for annual inspection.)

16. Upon submission of an application for a Disposal System Construction Permit (DSCP), the Designer shall provide to the local Approving Authority:
    a) proof that the Designer has satisfactorily completed any required training by the Company for the design and installation of the Technology;
    b) certification of the design by the Company for any residential system with a design of 2,000 gpd or more or for any proposed non-residential system or if required by the Special Conditions for an approved Technology;
    c) certification by the Designer that the design conforms to the Approval, any Company Design Guidance, and the 310 CMR 15.000; and
    d) a certification, signed by the Owner of record for the property to be served by the Technology, stating that the property Owner:
        i) has been provided a copy of the Approval, the Owner's Manual, and the Operation and Maintenance Manual and the Owner agrees to comply with all terms and conditions;
        ii) has been informed of all the Owner's estimated costs associated with the operation including, when applicable: power consumption, maintenance, sampling, recordkeeping, reporting, and equipment replacement;
        iii) understands the requirement for a service contract;
        iv) agrees to fulfill his responsibilities to provide a Deed Notice as required by 310 CMR 15.287(10) and the Approval;
        v) agrees to fulfill his responsibilities to provide written notification of the Approval to any new Owner, as required by 310 CMR 15.287(5);
        vi) if the design does not provide for the use of garbage grinders, the restriction is understood and accepted; and
        vii) whether or not covered by a warranty, the System Owner understands the requirement to repair, replace, modify or take any other action as required by the Department or the local Approving Authority, if the Department or the local Approving Authority determines the System to be failing to protect public health and safety and the environment, as defined in 310 CMR 15.303.

17. The System Owner and the Designer shall not submit to the local Approving Authority a DSCP application for the use of a Technology under this Certification if the Certification has been revised, reissued, suspended, or revoked by the Department

prior to the date of application. The Certification continues in effect until the Department revises, reissues, suspends, or revokes the Certification.

18. The System Owner shall not authorize or allow the installation of the System other than by a locally approved Installer and, if required by the Company, a person certified or trained by the Company to install the System.

19. Prior to the commencement of construction, the System Installer must certify in writing to the Designer, the local Approving Authority, and the System Owner that (s)he is a locally approved System Installer and, if required by the Company, is certified by or has received appropriate training by the Company.

20. The Installer shall maintain on-site, at all times during construction, a copy of the approved plans, the Owner's manual, the O&M manual, and a copy of the Approval.

21. Prior to the issuance of a Certificate of Compliance by the local Approving Authority, the System Installer and Designer must provide, in addition to the certifications required by Title 5, certifications in writing to the local Approving Authority that the System has been constructed in compliance with the terms of the Approval.

22. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sanitary sewer system.

    If it is feasible to connect a new or existing facility to the sewer, the Designer shall not propose an Alternative System to serve the facility and the facility Owner shall not install or use an Alternative System; and

    When a sanitary sewer connection becomes feasible after an Alternative System has been installed, the System Owner shall connect the facility served by the System to the sewer within 60 days of such feasibility and the System shall be abandoned in compliance with current Code requirements, unless a later time is allowed in writing by the Department or the local Approving Authority.

## III. Operation and Maintenance

1. To ensure proper operation and maintenance (O&M) of the System, the System Owner shall enter into an O&M Agreement with a qualified Service Contractor whose name appears on the Company's current list of Service Contractors and has been certified, at a minimum, at Grade Level II (two) by the Board of Registration of Operators of Wastewater Treatment Facilities, in accordance with Massachusetts regulations 257 CMR 2.00. Prior to commencement of construction of the System, the System Owner shall provide to the local Approving Authority a copy of a signed O&M Agreement.

2. From start up and thereafter, the System Owner and Service Contractor shall be responsible for the proper operation and maintenance of the System in accordance with this Certification, the Designer's O&M requirements, the Company's O&M requirements, and the requirements of the local Approving Authority. The System

Owner and Service Contractor shall be responsible for compliance with all monitoring and inspection requirements. All inspection, operation, maintenance, and monitoring requirements remain in effect until the conditions are modified, terminated, or superseded by a new Approval.

3. The System shall comply with the following monitoring requirements and effluent limits. The required O&M Agreement with the Service Contractor shall include the following monitoring schedule, at a minimum, subject to modifications that may be required by Paragraphs III.7.a) and 7.b):

| Parameter | Monitoring Frequency | Sample Type | Location | Effluent Limits |
|---|---|---|---|---|
| pH | See frequency specified below | grab | effluent of treatment unit | 6 to 9 |
| turbidity | See frequency specified below | measure | effluent of treatment unit | ≤ 40 NTU |
| settleable solids | See frequency specified below | measure | effluent of treatment unit | Measure and record ml/l only |
| color | See frequency specified below | visual observation | effluent of treatment unit | Record observation only |
| dissolved oxygen (D.O.) | See frequency specified below | measure | effluent of treatment unit | ≥ 2 mg/l |
| Depth of Ponding within SAS | See Paragraph III.10 | measure | Inspection port to bottom of SAS | See Paragraph III.10 |
| Thickness of floating grease/scum layer | Once every 3 years | measure | Septic tank or other process tank where solids are retained | Pump out, as necessary |
| Depth of Sludge and distance to effluent tee/filter/outlet | Once every 3 years | measure | Septic tank or other process tank where solids are retained | Pump out, as necessary |

4. An individual household shall be monitored at least once every 12 months (exclusive of alarm responses or other maintenance visits).

5. Facilities (residential and nonresidential) with a design flow of less than 2,000 gpd, other than an individual household, shall be monitored a minimum of twice/year with a minimum of 5 months since the last monitoring inspection (exclusive of alarm responses or other maintenance visits) and a maximum of 7 months between monitoring inspections.

6. Facilities (residential and nonresidential) with a design flow of 2,000 gpd or greater shall be monitored quarterly not less than 2 months since the last monitoring inspection (exclusive of alarm responses or other maintenance visits) and not more than 4 months between monitoring inspections.

7. Systems installed under this Approval shall be subject to the following Performance Requirements:

   a) Whenever field tests indicate a pH outside the specified range, an exceedance of the turbidity limit, or D.O. below the desired minimum, the Service Contractor shall make adjustments and/or repairs to the System, as deemed necessary during the inspection, and collect an effluent sample for laboratory analysis for $BOD_5$ and TSS;

   b) For an individual household, if laboratory analyses indicate an exceedance of 30 mg/L $BOD_5$ or 30 mg/L TSS, the Service Contractor shall conduct a follow-up inspection and field-testing within 180 days of the original inspection date. Should the follow-up field-test indicate a pH outside the specified range, an exceedance of the turbidity limit, or D.O. below the desired minimum, the Service Contractor shall make adjustments and/or repairs to the System, as deemed necessary during the inspection, and collect another effluent sample for laboratory analysis for $BOD_5$ and TSS; and

   c) Whenever two consecutive sampling rounds for any Secondary Treatment Unit include at least one exceedance of the limits for $BOD_5$ or TSS, the System Owner shall be responsible for submitting to the local Approving Authority, within 90 days of the second exceedance of the limits for $BOD_5$ or TSS, a written evaluation with recommendations for changes in the design, operation, and/or maintenance of the System. The written evaluation with recommendations shall be prepared by the Service Contractor or a Designer and the submission shall include all monitoring data, inspection reports, and laboratory analyses since the last annual report to the local Approving Authority.

   Recommendations shall be implemented, as approved by the local Approving Authority, in accordance with an approved schedule, provided that all corrective measures are implemented consistent with the limitations described in Paragraph IV.10.

8. Each time an Alternative System is visited by a Service Contractor the following shall be recorded, at a minimum:
   a) date, time, air temperature, and weather conditions;
   b) observations for objectionable odors;
   c) observations for signs of breakout of sanitary sewage in the vicinity of the Alternative System;
   d) depth of ponding within the SAS, if measured;
   e) identification of any apparent violations of the Approval;
   f) since the last inspection, whether the system had been pumped with date(s) and volume(s) pumped;
   g) sludge depth and scum layer thickness, if measured;
   h) when responding to alarm events, the cause of the alarm and any steps taken to address the alarm and to prevent or reduce the likelihood of future similar alarm events;
   i) field testing results when performed as part of the site visit;
   j) samples taken for laboratory analysis, if any
   k) any cleaning and lubrication performed;
   l) any adjustments of control settings, as recommended or deemed necessary;
   m) any testing of pumps, switches, alarms, as recommended or deemed necessary;
   n) identification of any equipment failure or components not functioning as designed;
   o) parts replacements and reason for replacement, whether routine or for repair; and
   p) further corrective actions recommended, if any.

9. Unless directed by the local Approving Authority to take other action, the System Owner shall immediately cease discharges or have wastewater hauled off-site, if at any time during the operation of the Alternative System the system is in failure as described in 310 CMR 15.303(1)(a)1 or 2, backing up into facilities or breaking out to the surface.

10. Measuring the depth of ponding within the SAS above the interface with the underlying unsaturated pervious soils shall be performed once per year by means of the inspection ports and any other available access to the distribution system for:
    a) Residential systems less than 2000 gpd where the effective leaching area installed is less than that required by Title 5 (310 CMR 15.223-228); and
    b) Any system where a septic tank meeting the requirements of Title 5 has not been installed. (Not providing a septic tank meeting the requirements of Title 5 must be allowed by the Special Conditions of the Technology approval.)

11. Whenever an SAS inspection port measurement indicates the ponding level within the SAS is above the invert of the distribution system, an additional measurement shall be made 30 days later. If the subsequent reading indicates the elevation of ponding

within the SAS is above the invert of the distribution system, the System Owner shall be responsible for submitting to the local Approving Authority, within 60 days of the follow up inspection, a written evaluation with recommendations for changes in the design, operation, and/or maintenance of the System. The written evaluation with recommendations shall be prepared by the Service Contractor or a Designer and the submission shall include all monitoring data, inspection reports, and any laboratory analyses for the previous year.

Recommendations shall be implemented, as approved by the local Approving Authority, in accordance with an approved schedule, provided that all corrective measures are implemented consistent with the limitations described in Paragraph IV.10.

## IV. Additional System Owner and Service Contractor Requirements

1. Prior to commencement of construction of the System and after recording and/or registering the Deed Notice required by 310 CMR 15.287(10), the System Owner shall provide to the local Approving Authority a copy of:
   a) a certified Registry copy of the Deed Notice bearing the book and page/or document number; and
   b) if the property is unregistered land, a copy of the System Owner's deed to the property as recorded at the Registry, bearing a marginal reference on the System Owner's deed to the property.

   The Notice to be recorded shall be in the form of the Notice provided by the Department.

2. Prior to signing any agreement to transfer any or all interest in the property served by the System, or any portion of the property, including any possessory interest, the System Owner shall provide written notice, as required by 310 CMR 15.287(5), of all conditions contained in the Approval to the transferee(s). Any and all instruments of transfer and any leases or rental agreements shall include as an exhibit attached thereto and made a part of thereof a copy of the Approval for the System. The System Owner shall send a copy of such written notification(s) to the local Approving Authority within 10 days of giving such notice to the transferee(s).

3. The System Owner shall not install, modify, upgrade, or replace the System except in accordance with a valid DSCP issued by the local Approving Authority which covers the proposed work.

4. The System Owner shall provide access to the site for the Service Contractor to perform inspections, maintenance, repairs, and responding to alarm events, as may be required by the Approval.

5. The System Owner and the Service Contractor shall maintain an O&M Agreement at all times. The duration of the O & M Agreement shall be at least one year and shall include the following provisions:

a) The name of a Service Contractor, who meets the qualifications specified in the Approval, shall be included;

b) The Service Contractor's responsibilities for inspection, operation, maintenance, monitoring, recordkeeping and reporting, as required by this Approval shall be included;

c) The Service Contractor shall be responsible for obtaining lab analyses and submitting the monitoring results to the System Owner and the local Approving Authority in accordance with the reporting requirements; and

d) In the case of a System which is determined to be failing to protect public health and safety and the environment, as defined in 310 CMR 15.303, an equipment failure, alarm event, components not functioning as designed, or violations of the Approval, procedures and responsibilities of the Service Contractor and System Owner shall be clearly defined, including corrective measures to be taken immediately.

The System Owner and the Service Contractor shall maintain on-site, at all times, a copy of the O&M Agreement, the approved design plans, the Owner's Manual, and the O&M Manual.

6. The Service Contractor shall submit to the System Owner the O&M report and inspection checklist within 60 days of any site visit.

7. The System Owner and the Service Contractor shall maintain copies of the Service Contractor's O&M reports, inspection checklists, and all reports and notifications to the local Approving Authority for a minimum of three years.

8. Upon determining that the System is in violation of the Approval or the System is failing to protect public health and safety and the environment, as defined in 310 CMR 15.303, the Service Contractor shall notify the System Owner immediately.

9. Upon determining that the System is failing to protect public health and safety and the environment, as defined in 310 CMR 15.303, the System Owner and the Service Contractor shall be responsible for the notification of the local Approving Authority within 24 hours of such determination.

10. In the case of a System that has been determined to be failing to protect public health and safety and the environment, an equipment failure, alarm event, components not functioning as designed, components not functioning in accordance with manufacturers' specifications, or violations of the Approval, the Service Contractor shall provide written notification within five days, describing corrective measures to the System Owner, the local board of health, and the Company and may only propose or take corrective measures provided that:

a) all emergency repairs, including pumping, shall be in accordance with the limitations and permitting requirements of 310 CMR 15.353;

b) the design of any repairs or upgrades are consistent with the System Approval;

c) the design of any repairs or upgrades requiring a DSCP shall be performed by a Designer who is a Massachusetts Registered Professional Engineer or a

Massachusetts Registered Sanitarian, provided that such Sanitarian shall not design a system with a discharge greater than 2,000 gallons per day.

d) the installation of any repairs or upgrades requiring a DSCP shall be done by an Installer with a currently valid Disposal System Installers Permit and, if training is required, the Installer shall be certified by the Company as qualified to install the System.

The System Owner shall also be responsible for ensuring written notification is provided within five days to the local board of health.

11. The System Owner and the Service Contractor shall provide written notification to the local Approving Authority within seven days of any cancellation, expiration or other change in the terms and/or conditions of a required O&M Agreement with a Service Contractor. The Service Contractor shall provide written notification to the Company within seven days of any cancellation, expiration or other change in the terms and/or conditions of a required O&M Agreement.

12. By March 1st of each year, the System Owner and the Service Contractor shall be responsible for submitting to the local Approving Authority all O&M reports and inspection checklists completed by the Service Contractor during the previous calendar year.

13. By March 1st of each year, the Service Contractor shall be responsible for submitting to the Company copies of all O&M reports including alarm event responses, violations of the Approval, inspection checklists completed by the Service Contractor, notifications of system failures, and reports of equipment replacements with reasons during the previous calendar year.

14. The Service Contractor shall notify the System Owner of these Conditions and any other changes to the terms and conditions of the Approval within 60 days of any changes.

15. Within one year of any changes to the terms and conditions of the Approval, the System Owner shall amend, as necessary, the O&M Agreement required by Paragraph IV.5 to reflect the changes to the terms and conditions of the Approval.

16. To determine whether cause exists for modifying, revoking, or suspending the Approval or to determine whether the conditions of the Approval have been met, the System Owner shall furnish the Department any information that the Department requests regarding the System, within 21 days of the date of receipt of that request.

17. The Approval shall be binding on the System Owner and on its agents, contractors, successors, and assigns, including but not limited to the Designer, Installer, and Service Contractor. Violation of the terms and conditions of the Approval by any of the foregoing persons or entities, respectively, shall constitute violation of the Approval by the System Owner unless the Department determines otherwise.

## V. Company Requirements

1. The Approval shall only apply to model units with the same model designations specified in the System Approval and meet the same specifications, operating requirements, and plans, as provided by the Company or its authorized agent at the time of the application. Any proposed modifications of the units, installation requirements, or operating requirements shall be subject to the review of the Department for inclusion under a modification of the Approval. The Designer shall be responsible for the selection of the appropriate model unit except the Company shall be responsible for verification of the appropriate model unit as part of any review of proposed installations that may be required by Paragraph V.3 of these Standard Conditions or the Special Conditions in a Technology approval.

2. Prior to submission of an application for a DSCP, the Company or its authorized agent shall provide to the Designer and the System Owner:
   a) All design and installation specifications and requirements;
   b) An operation and maintenance manual, including:
      i) an inspection checklist;
      ii) recommended inspection and maintenance schedule;
      iii) monitoring (i.e. water use);
      iv) alarm response procedures and troubleshooting procedures;
   c) An owner's manual, including alarm response procedures;
   d) Estimates of the Owner's costs associated with the operation including, when applicable: power consumption, maintenance, recordkeeping, reporting, and equipment replacement;
   e) A copy of the Company's warranty; and
   f) Lists of trained Designers and trained Service Contractors and, if training is required by the Company, trained Installers.

3. Prior to the submission of an application for a DSCP, for all nonresidential Systems and Systems with design flows of 2,000 gpd or greater, the Company shall submit to the Designer and the System Owner, a certification by the Company or its authorized agent that the design conforms to the Approval and all Company requirements and that the proposed use of the System is consistent with the Technology's capabilities. The authorized agent of the Company responsible for the design review shall have received technical training in the Company's products.

4. The Company must maintain programs of training and continuing education for Service Contractors. Training shall be made available at least annually. If the Company requires trained Designers or Installers, the Company or its authorized agent shall institute programs of training and continuing education that is separate from or combined with the training for Service Contractors. The Company or its authorized agent shall maintain, annually update, and make available by February 15$^{th}$ of each year, lists of trained Service Contractors and, if certification or training is provided by the Company, Designers and Installers. The Company or its authorized

agent shall certify that the Service Contractors and, if training is provided, Designers and Installers on the lists have taken the appropriate training and passed the Company's training qualifications. The Company or its authorized agent shall further certify that the Service Contractors on the list have submitted to the Company all the reports required by Paragraphs IV.10, 11, and 13.

5. The Company or its authorized agent shall not re-certify a Service Contractor if the Service Contractor has not complied with the reporting requirements for the previous year.

6. If training is required, the Company shall not sell the Technology to an Installer unless the Installer is trained to install the System by the Company. The Company shall require, by contract, that distributors and resellers of the Technology shall not sell the Technology to an Installer unless the Installer is trained to install the System by the Company.

7. As part of any training programs for Service Contractors, Installers, or Designers, the Company or its authorized agent shall provide each trainee with a copy of this Approval with the design, installation, O&M, and owner's manuals that were submitted as part of the Approval.

8. The Company shall provide, in printed or electronic format, the System design, installation, O&M, and Owner's manuals, and any updates associated with this System Approval, to the System Owners, Designers, Installers, Service Contractors, vendors, resellers, and distributors of the System. Prior to publication or distribution in Massachusetts, the Company shall submit to the Department for review a copy of any proposed changes to the manual(s) with reasons for each change, at least 30 days prior to issuance. The Company shall request Department approval for any substantive changes which may require a modification of the Approval.

9. Prior to its sale of any System that may be used in Massachusetts, the Company shall provide the purchaser with a copy of this Approval with the System design, installation, O&M, and Owner's manuals. In any contract for distribution or sale of the System, the Company shall require the distributor or seller to provide the purchaser of a System for use in Massachusetts with copies of these documents, prior to any sale of the System.

10. To determine whether cause exists for modifying, revoking, or suspending the Approval or to determine whether the conditions of the Approval have been met, the Company shall furnish the Department any information that the Department requests regarding the Technology within 21 days of the date of receipt of that request.

11. Within 60 days of issuance by the Department of these Conditions and any other revisions to the Approval, the Company shall provide written notification of changes to the Approval to all Service Contractors servicing existing installations of the System and all distributors and resellers of the System.

12. The Company shall provide written notification to the Department's Director of the Wastewater Management Program at least 30 days in advance of the proposed transfer of ownership of the technology for which this Certification is issued. Said notification shall include the name and address of the proposed owner containing a specific date of transfer of ownership, responsibility, coverage and liability between them. All provisions of this Approval applicable to the Company shall be applicable to successors and assigns of the Company, unless the Department determines otherwise.

13. The Company shall maintain copies of:
    a) the Approval;
    b) the installation manual specifically detailing procedures for installation of its System;
    c) an owner's manual, including alarm response procedures;
    d) an operation and maintenance manual, including:
        i) an inspection checklist;
        ii) recommended inspection and maintenance schedule;
        iii) monitoring requirements and recommendations (including water use and power consumption when required) and sampling procedures;
        iv) alarm response procedures and troubleshooting procedures.
    e) estimates of the operating costs provided to the Owner, including, when applicable: power consumption, maintenance, recordkeeping, reporting, and equipment replacement;
    f) a copy of the Company's warranty; and
    g) lists of trained Service Contractors and, if training or certification is required, Designers and Installers.

14. By April 15th of each year, the Company shall submit a report to the Department, signed by a corporate officer, general partner or Company owner that identifies the specific alternative technology approval for which the annual report is being filed and contains, for the previous calendar year, the following information with the date and address of each event:
    a) all known violations of the Approval, including Systems not operated by qualified Service Contractors;
    b) any System failures or malfunctions; and
    c) corrective actions taken, including but not limited to: design changes; installation changes; operation/maintenance changes; monitoring changes; and/or changes in roles and responsibilities for the manufacturer, vendors, designers, installers, operators, and owners.

    In the absence of any system failures, system malfunctions, or violations, the Company shall submit a letter certifying, to the best of their knowledge, all installed Systems are in compliance.

15. The Company shall maintain the following additional information for the Systems installed in Massachusetts and make it available to the Department within 30 days of a request by the Department:
    a) the address of each facility where the System was installed, the Owner's name and mailing address (if different), the type of use (e.g. residential, commercial, institutional, etc.), the design flow, the model installed;
    b) the installation date, start-up date, current operational status;
    c) the name of the Service Contractor, noting any cancellations or changes to any Service Contracts; and
    d) copies of all Service Contractor records submitted to the Company, including all O&M reports with alarm event responses, all monitoring results, inspection checklists completed by the Service Contractor, notifications of system failures, and reports of equipment replacements with reasons.

16. The Approval shall be binding on the Company and its officers, employees, agents, contractors, successors, and assigns, including but not limited to dealers, distributors, and resellers. Violation of the terms and conditions of the Approval by any of the foregoing persons or entities, respectively, shall constitute violation of the Approval by the Company unless the Department determines otherwise.

## VI. General Requirements

1. Any System for which a complete Disposal System Construction Permit ("DSCP") Application is submitted while the Approval is in effect, may be permitted, installed, and used in accordance with the Approval, unless and until:
    a) the Department issues modifications or amendments to the Approval which specifically affect the installation or use of a System installed under the Approval for the System; or
    b) the Department, the local approval authority, or a court requires the System to be modified or removed or requires discharges to the System to cease.

2. All notices and documents required to be submitted to the Department by the Approval shall be submitted to:

    Director
    Wastewater Management Program
    Department of Environmental Protection
    One Winter Street - 5th floor
    Boston, Massachusetts 02108

3. The Department may suspend, modify or revoke the Approval for cause, including, but not limited to, non-compliance with the terms of the Approval, for obtaining the Approval by misrepresentation or failure to disclose fully all relevant facts or any change in or discovery of conditions that would constitute grounds for discontinuance of the Approval, or as necessary for the protection of public health, safety, welfare or the environment, and as authorized by applicable law. The Department reserves its

rights to take any enforcement action authorized by law with respect to the Approval and/or the System against the Company, a System Owner, a Designer, an Installer, and/or Service Contractor.