

STORMWATER REPORT
Proposed Site Redevelopment
Windsor Place
24 School Street
Wayland, MA 01778

Prepared for: ***Windsor Place LLC***
73 Pelham Island Road
Wayland, MA 01778

Prepared by: ***MetroWest Engineering, Inc.***
75 Franklin Street
Framingham, MA 01702
(508) 626-0063

September, 2017

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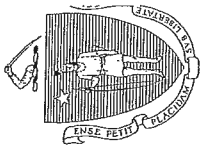
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CHAPTER 1: HYDROLOGIC ANALYSIS

CHAPTER 2: TITLE V SOIL TESTING RESULTS



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

DEP has provided this form for use by on-site professionals and local Boards of Health. Other forms may be used, but the information must be substantially the same as provided here. Before using this form, check with your local Board of Health to determine the form they use.

A. Facility Information FB 623

1. Facility Information

Owner Name Linda C. Knowles & Gary W. Ridge (Prepared for: Chadwich Homes)

Street Address 24 School Street Map/Lot Map 52, Lot 189

City/Town Wayland State MA Zip Code 01778

B. Site Information

1. (Check one) New Construction ☒ Upgrade ☐ Repair ☐

2. Published Soil Survey available? Yes ☒ No ☐ If yes: Online Year Published _____ Publication Scale _____ Soil Map Unit _____

Soil Name 415B-Narragansett Silt Loam
253C-Hinckley Loamy Sand

Soil limitations

3. Surficial Geological Report available? Yes ☐ No ☒ If yes: Year Published _____ Publication Scale _____ Map Unit _____

Geologic Material

Landform

4. Flood Rate Insurance Map:

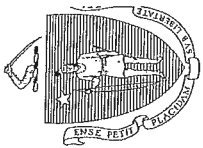
Above the 500 year flood boundary? Yes ☒ No ☐ Within the 100 year flood boundary? Yes ☐ No ☒

Within the 500 year flood boundary? Yes ☐ No ☒ Within a Velocity Zone? Yes ☐ No ☒

5. Wetland Area: National Wetland Inventory Map

Map Unit N/A Name _____

Wetlands Conservancy Program Map N/A _____



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) July 31, 2014 Map Unit July 31, 2014 Name July 31, 2014 Range: Above Normal ☐ Normal ☒ Below Normal ☐

7. Other references reviewed: _____

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: DTH-1 July 31, 2014 a.m. Sunny
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 165.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home

(e.g. woodland, agricultural field, vacant lot, etc.)

Few 1 to 2
Surface Stones Slope (%)

Grass
Vegetation

Ground Moraine
Landform

See Plans

Position on landscape (attach sheet)

3. Distances from: Open Water Body >100 feet

Drainage Way >50 feet

Possible Wet Area >100 feet

Property Line 30 feet

Drinking Water Well

Other Town water

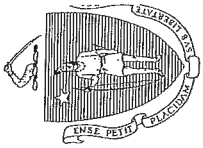
4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☒ No ☐

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 70" N/A
inches elevation



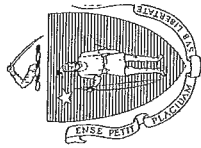
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-1

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
0-10	Ap	10yr3/3								
10-24	Bw	10yr5/6								
24-62	C1	2.5y5/3								
62-126	C2	2.5y5/4	@70"	7.5yr5/8	5%					C2 horizon is tight

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-1

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|----------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>70"</u> inches | B. _____ inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- a. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 24" to 62" inches Lower boundary: 62" to 126" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/8/17 June, 2005

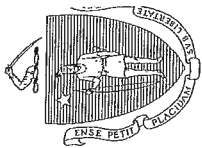
*Date of Soil Evaluator Exam

Bill Murphy

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

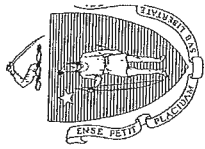
Deep Observation Hole Number: DTH-2 Date July 31, 2014 Time a.m. Weather Sunny

1. Location

Ground Elevation at Surface of Hole 165.9'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few Surface Stones 1 to 2 Slope (%)
- Grass Vegetation Ground Moraine Landform See Plans Position on landscape (attach sheet)
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet
4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐
5. Groundwater Observed: Yes ☒ No ☐
- If Yes: Depth Weeping from Pit 106" Depth Standing Water in Hole None
- Estimated Depth to High Groundwater: 80" 159.23' elevation
Inches



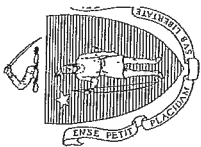
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-2

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
0-22	Ap	10yr3/3								
22-42	Bw	10yr5/6								
42-96	C1	2.5y5/3	@80"	7.5yr5/8						
96-118	C2	2.5y4/4								

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH.2

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|-----------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth weeping from side of observation hole | A. <u>106"</u> inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>80"</u> inches | B. _____ inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- b. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 42" to 96" inches Lower boundary: 96" to 118" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/8/17

June, 2005

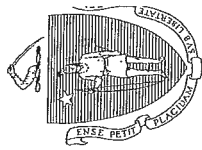
*Date of Soil Evaluator Exam

Bill Murphy

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-3 Date: July 31, 2014 Time: a.m. Weather: Sunny

1. Location

Ground Elevation at Surface of Hole 161.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few Surface Stones 1 to 2 Slope (%)
(e.g. woodland, agricultural field, vacant lot, etc.)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

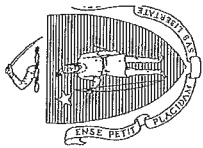
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☒ No ☐

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 82" 154.87'
Inches elevation



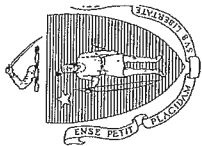
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-3

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10yr3/3				Fine Sandy Loam					
10-22	Bw	10yr5/6				Fine Sandy Loam					
22-84	C1	2.5y5/3	@82"	7.5yr5/8		Sandy Loam					
84-110	C2	2.5y6/3				Silt Loam					C2 horizon is damp

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-3

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|----------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>82"</u> inches | B. _____ inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- c. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 22" to 84" inches Lower boundary: 84" to 110" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

June, 2005

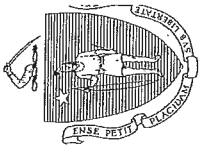
*Date of Soil Evaluator Exam

Bill Murphy

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

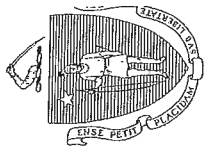
Deep Observation Hole Number: DTH-4 Date: July 31, 2014 Time: a.m. Weather: Sunny

1. Location

Ground Elevation at Surface of Hole 164.1'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few Surface Stones 1 to 2 Slope (%)
- Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet
4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
- If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐
5. Groundwater Observed: Yes ☐ No ☒
- If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None
- Estimated Depth to High Groundwater: No mottling to 116" associated w/GW N.A. elevation
Inches



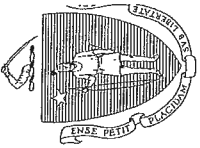
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-4

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
0-20	Fill									
20-28	Ap	10yr3/3			Fine Sandy Loam					
28-40	Bw	10yr5/6			Fine Sandy Loam					
40-86	C1	2.5y5/4			Sandy Loam					
86-116	C2	2.5y4/4			Sandy Loam					

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-4

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|----------------------------------------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>116"</u> No mottling to 116" associated w/GW | |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- d. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 40" to 86" inches Lower boundary: 86" to 116" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/8/17
June, 2005

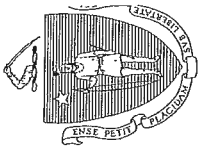
*Date of Soil Evaluator Exam

Bill Murphy

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-5 Date July 31, 2014 Time a.m. Weather Sunny

1. Location

Ground Elevation at Surface of Hole 162.6'

Location (Identify on Plan) See Sketch

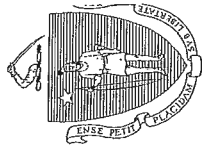
2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few Surface Stones 1 to 2 Slope (%)
- Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
- If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit 112" Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 72" N.A.
Inches elevation



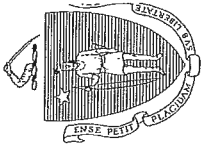
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-5

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-16	Ap	10yr3/3				Fine Sandy Loam					
16-34	Bw	10yr5/6				Fine Sandy Loam					
34-84	C1	2.5y5/4	@72"	7.5yr5/8		Sandy Loam					
84-118	C2	2.5y4/3				Sandy Loam					
86-116	C2	2.5y4/4				Sandy Loam					

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-5

1. Method used: ☐ Depth observed standing water in observation hole A. _____ inches B. _____ inches
☒ Depth weeping from side of observation hole A. 112" inches B. _____ inches
☒ Depth to soil redoximorphic features (mottles) A. 72" inches B. _____ inches
☐ Groundwater adjustment (USGS methodology) A. _____ inches B. _____ inches
2. Index Well Number _____ Reading Date _____ Index Well Level _____
Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- e. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 34" to 84" inches Lower boundary: 84" to 118" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/2/17
June, 2005

*Date of Soil Evaluator Exam

Bill Murphy

Name of Board of Health Witness

Wayland Board of Health

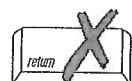
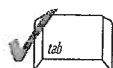
Board of Health



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)

Owner Name

24 School Street

Street Address or Lot #

Wayland

MA

01778

City/Town

State

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	07/31/14 Date	a.m. Time	07/31/14 Date	a.m. Time
Observation Hole #	P.T.-1		P.T.-2	
Depth of Perc	60"		68"	
Start Pre-Soak	10:34		10:37	
End Pre-Soak	10:34		10:37	
Time at 12"	10:49		10:52	
Time at 9"	11:02		11:30	
Time at 6"	11:24		12:05	
Time (9"-6")	22 minutes		35 minutes	
Rate (Min./Inch)	8 m.p.i.		13 m.p.i.	
	Test Passed: <input checked="" type="checkbox"/>		Test Passed: <input checked="" type="checkbox"/>	
	Test Failed: <input type="checkbox"/>		Test Failed: <input type="checkbox"/>	

Brian T. Nelson - Soil Evaluator

Test Performed By:

Bill Murphy - Wayland Board of Health

Witnessed By:

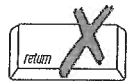
Comments:



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)

Owner Name

24 School Street

Street Address or Lot #

Wayland

MA

01778

City/Town

State

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	07/31/14 Date	a.m. Time	07/31/14 Date	a.m. Time
Observation Hole #	P.T.-3		P.T.-4	
Depth of Perc	50"		55"	
Start Pre-Soak	10:39		11:45	
End Pre-Soak	10:39		11:45	
Time at 12"	10:54		12:00	
Time at 9"	11:12		12:49	
Time at 6"	11:40			
Time (9"-6")	28 minutes			
Rate (Min./Inch)	10 m.p.i.			
Test Passed:	<input checked="" type="checkbox"/>		Test Passed:	<input type="checkbox"/>
Test Failed:	<input type="checkbox"/>		Test Failed:	<input type="checkbox"/>

Brian T. Nelson - Soil Evaluator

Test Performed By:

Bill Murphy - Wayland Board of Health

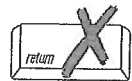
Witnessed By:

Comments:



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

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



Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)

Owner Name

24 School Street

Street Address or Lot #

Wayland

City/Town

MA

State

01778

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	<u>07/31/14</u> Date	<u>p.m.</u> Time	<u></u> Date	<u></u> Time
Observation Hole #	<u>P.T.-5</u>			
Depth of Perc	<u>60"</u>			
Start Pre-Soak	<u>12:04</u>			
End Pre-Soak	<u>12:04</u>			
Time at 12"	<u>12:19</u>			
Time at 9"				
Time at 6"				
Time (9"-6")				
Rate (Min./Inch)				

Test Passed:



Test Failed:



Test Passed:



Test Failed:



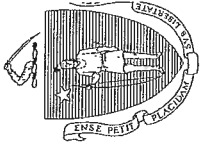
Brian T. Nelson - Soil Evaluator

Test Performed By:

Bill Murphy - Wayland Board of Health

Witnessed By:

Comments:



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

DEP has provided this form for use by on-site professionals and local Boards of Health. Other forms may be used, but the information must be substantially the same as provided here. Before using this form, check with your local Board of Health to determine the form they use.

A. Facility Information FB 623

1. Facility Information

Owner Name Linda C. Knowles & Gary W. Ridge (Prepared for: Chadwich Homes)

Street Address 24 School Street Map/Lot Map 52, Lot 189

City/Town Wayland State MA Zip Code 01778

B. Site Information

1. (Check one) New Construction ☒ Upgrade ☐ Repair ☐

2. Published Soil Survey available? Yes ☒ No ☐ If yes: Online Year Published Publication Scale Soil Map Unit

415B-Narragansett Silt Loam
253C-Hinckley Loamy Sand

Soil Name

Soil limitations

3. Surficial Geological Report available? Yes ☐ No ☒ If yes: Year Published Publication Scale Map Unit

Geologic Material

Landform

4. Flood Rate Insurance Map:

Above the 500 year flood boundary? Yes ☒ No ☐ Within the 100 year flood boundary? Yes ☐ No ☒

Within the 500 year flood boundary? Yes ☐ No ☒ Within a Velocity Zone? Yes ☐ No ☒

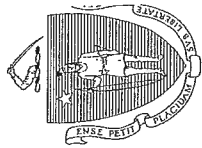
5. Wetland Area: National Wetland Inventory Map

N/A
Map Unit

Name

Wetlands Conservancy Program Map

N/A



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) August 21, 2014 Map Unit August 21, 2014 Name August 21, 2014 Range: Above Normal ☐ Normal ☒ Below Normal ☐
Month/Year

7. Other references reviewed: _____

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: DTH-6 August 21, 2014 a.m. Sunny

1. Location

Ground Elevation at Surface of Hole 167.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

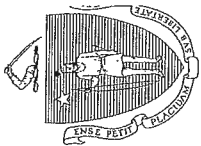
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 70" 161.87'
Inches elevation



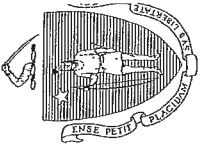
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-6

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-14	Apl	10yr3/3				Fine Sandy Loam				
14-26	Bw	10yr5/6				Fine Sandy Loam				
26-64	C1	10yr5/6				Sandy Loam				
64-122	C2	2.5y5/3	@70"	7.5yr5/8	5%	Sandy Loam				C1 & C2 are

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-6

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|----------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. 70" inches | B. _____ inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- a. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 26" to 64" inches Lower boundary: 64" to 122" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

June, 2005

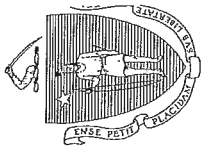
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-7 July 31, 2014 a.m. Sunny

1. Location

Ground Elevation at Surface of Hole 166.8'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

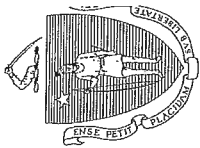
3. Distances from: Open Water Body >100 >50 Possible Wet Area >100
feet feet feet
Property Line 30 Drinking Water Well Other Town water
feet feet feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: No mottling to 76" associated w/GW N.A.
Inches elevation



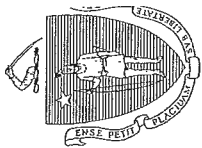
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-7

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14	Apl	10yr3/3				Fine Sandy Loam					
14-32	Bw	10yr5/6				Fine Sandy Loam					
32-58	C1	2.5y5/3				Sandy Loam					
58-114	C2	2.5y5/4				Sandy Loam					Lenses of silt loam from 76' down

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-7

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|--------------------------------------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>76"</u> No mottling to 76" associate w/ GW | |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- b. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 32" to 58" Lower boundary: 58" to 114"

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

June, 2005

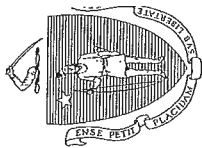
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-8 Date: July 31, 2014 Time: a.m. Weather: Sunny

1. Location

Ground Elevation at Surface of Hole 168.2'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

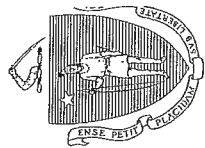
3. Distances from: Open Water Body >100 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 80" 161.53'
Inches elevation



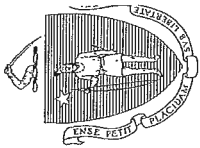
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-8

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-26	Fill										
26-40	Bw	10yr5/6				Fine Sandy Loam					
40-78	C1	2.5y5/4				Sandy Loam					
78-108	C2	2.5y5/3	@80"	7.35yr5/8	10%	Loamy Sand					
108-126	C3	2.5y6/3				Silt Loam					
											C3 horizon is damp

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-8

1. Method used: ☐ Depth observed standing water in observation hole A. inches B. inches
☐ Depth weeping from side of observation hole A. inches B. inches
☒ Depth to soil redoximorphic features (mottles) A. 80" inches B. inches
☐ Groundwater adjustment (USGS methodology) A. inches B. inches
2. Index Well Number Reading Date Index Well Level
Adjustment Factor Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- c. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 40" to 78" inches Lower boundary: 108" to 126" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/8/17
June, 2005

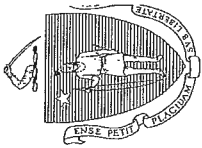
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-9 Date July 31, 2014 Time a.m. Weather Sunny

1. Location

Ground Elevation at Surface of Hole 163.8'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

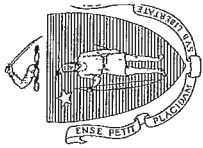
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit 88" Depth Standing Water in Hole 108"

Estimated Depth to High Groundwater: 62" 158.63'
Inches elevation



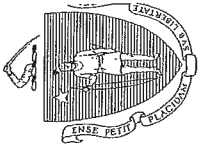
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-9

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-16	Apl	10yr3/3				Fine Sandy Loam					
16-30	Bw	10yr5/6				Fine Sandy Loam					
30-46	Bc	10yr5/4				Sandy Loam					
46-98	C1	2.5y5/3	@62"			Sandy Loam					Soil damp @ 70" C1 has high sand content
98-118	C2	2.5y4/4				Sandy Loam					

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-9

1. Method used:
- | | | |
|---------------------------------------------------------------------------------------|--------------------------|--------------------|
| <input checked="" type="checkbox"/> Depth observed standing water in observation hole | A. <u>108"</u>
inches | B. _____
inches |
| <input checked="" type="checkbox"/> Depth weeping from side of observation hole | A. <u>88"</u>
inches | B. _____
inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>62"</u>
inches | B. _____
inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____
inches | B. _____
inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- d. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 46" to 98" inches Lower boundary: 98" to 118" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

6/2/17

Date

June, 2005

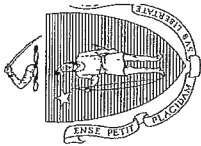
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-10

July 31, 2014 a.m. Sunny
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 160.75'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

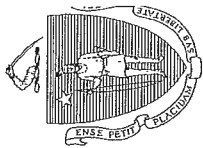
3. Distances from: Open Water Body >100 >50 >100
feet feet feet
Property Line 30 Drinking Water Well Other Town water
feet feet feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit 98" Depth Standing Water in Hole 110"

Estimated Depth to High Groundwater: 68" 155.08'
Inches elevation



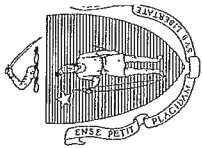
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-10

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-15	Apl	10yr3/3				Fine Sandy Loam					
15-30	Bw	10yr5/6				Fine Sandy Loam					
30-66	C1	2.5y5/3				Sandy Loam					
66-112	C2	2.5y5/4	@68"	7.5yr5/8	10%	Silt Loam					

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation - DTH-10

1. Method used:
- | | | |
|---------------------------------------------------------------------------------------|--------------------------|--------------------|
| <input checked="" type="checkbox"/> Depth observed standing water in observation hole | A. <u>100"</u>
inches | B. _____
inches |
| <input checked="" type="checkbox"/> Depth weeping from side of observation hole | A. <u>98"</u>
inches | B. _____
inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>68"</u>
inches | B. _____
inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____
inches | B. _____
inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- e. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 30" to 66" inches Lower boundary: 66" to 112" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

6/21/17
June, 2005

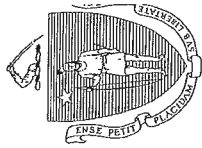
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



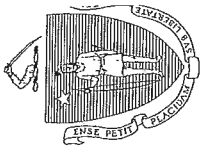
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-11

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent	Gravel	Cobbles & Stones			
0-18	Fill									
18-30	Ap	10yr3/3								
30-36	Bw	10yr5/6								
36-58	C1	2.5y5/3	@60"	7.5yr5/8	5%					
58-128	C2	2.5y6/3								

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-11 Date July 31, 2014 Time a.m. Weather Sunny

1. Location

Ground Elevation at Surface of Hole 164.1'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

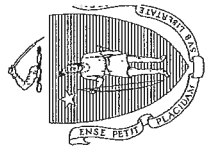
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole 125"

Estimated Depth to High Groundwater: 60" 161.0'
Inches elevation



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-11

1. Method used:
- | | | |
|---------------------------------------------------------------------------------------|----------------------------|----------------------------|
| <input checked="" type="checkbox"/> Depth observed standing water in observation hole | A. <u>125"</u>
inches | B. <u> </u>
inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. <u> </u>
inches | B. <u> </u>
inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. <u>60"</u>
inches | B. <u> </u>
inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. <u> </u>
inches | B. <u> </u>
inches |
2. Index Well Number Reading Date Index Well Level
- Adjustment Factor Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- f. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: 36" to 58" inches Lower boundary: 58" to 128" inches

F. Certification

I certify that 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 of Soil Evaluator

Brian T. Nelson

Typed or Printed Name of Soil Evaluator

Date

June, 2005

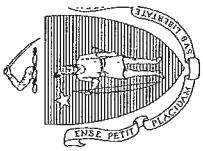
*Date of Soil Evaluator Exam

Julia Junghanns

Name of Board of Health Witness

Wayland Board of Health

Board of Health



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-12 Date July 31, 2014 Time a.m. Weather Sunny

1. Location

Ground Elevation at Surface of Hole 168.2'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home Few 1 to 2
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Ground Moraine See Plans
Vegetation Landform Position on landscape (attach sheet)

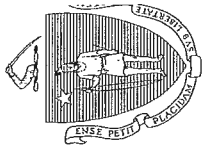
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet
Property Line 30 feet Drinking Water Well Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒
If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 64" 161.0'
inches elevation



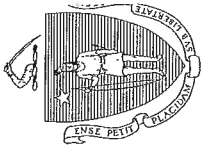
Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-12

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Gravel	Cobbles & Stones			
0-54	Fill									
54-82	C1	2.5y4/4	@64"	7.5yr5/8	Sandy Loam					
82-114	C2	2.5y5/4			Sandy Loam					C2 horizon has lenses of silt loam

Additional Notes No refusal



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-12

1. Method used:
- | | | |
|------------------------------------------------------------------------------------|----------------------|-----------------|
| <input type="checkbox"/> Depth observed standing water in observation hole | A. _____ inches | B. _____ inches |
| <input type="checkbox"/> Depth weeping from side of observation hole | A. _____ inches | B. _____ inches |
| <input checked="" type="checkbox"/> Depth to soil redoximorphic features (mottles) | A. 64" inches | B. _____ inches |
| <input type="checkbox"/> Groundwater adjustment (USGS methodology) | A. _____ inches | B. _____ inches |
2. Index Well Number _____ Reading Date _____ Index Well Level _____
- Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- g. 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 ☒ No ☐
- b. If yes, at what depth was it observed? Upper boundary: **54" to 82"** inches Lower boundary: **82" to 114"** inches

F. Certification

I certify that 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 of Soil Evaluator _____ Date _____
Brian T. Nelson **June, 2005**
Typed or Printed Name of Soil Evaluator _____
*Date of Soil Evaluator Exam _____

Julia Junghanns _____
Name of Board of Health Witness
Wayland Board of Health _____
Board of Health



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)

Owner Name

24 School Street

Street Address or Lot #

Wayland

City/Town

MA

State

01778

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	<u>08/21/14</u> Date	<u>p.m.</u> Time	<u>08/21/14</u> Date	<u>p.m.</u> Time
Observation Hole #	<u>P.T.-5</u>		<u>P.T.-6</u>	
Depth of Perc	<u>54"</u>		<u>60"</u>	
Start Pre-Soak	<u>12:50</u>		<u>12:52</u>	
End Pre-Soak	<u>12:50</u>		<u>12:52</u>	
Time at 12"	<u>1:05</u>		<u>1:07</u>	
Time at 9"	<u>1:22</u>		<u>1:13</u>	
Time at 6"	<u>1:52</u>		<u>1:22</u>	
Time (9"-6")	<u>30 minutes</u>		<u>9 minutes</u>	
Rate (Min./Inch)	<u>10 m.p.i.</u>		<u>3 m.p.i.</u>	
	Test Passed: <input checked="" type="checkbox"/>		Test Passed: <input checked="" type="checkbox"/>	
	Test Failed: <input type="checkbox"/>		Test Failed: <input type="checkbox"/>	

Brian T. Nelson - Soil Evaluator

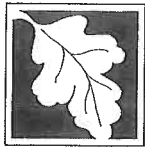
Test Performed By:

Julia Junghanns - Wayland Board of Health

Witnessed By:

Comments:

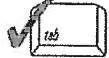
CHAPTER 3: CHECKLIST FOR STORMWATER REPORT



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

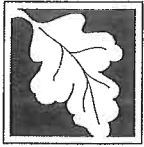
In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

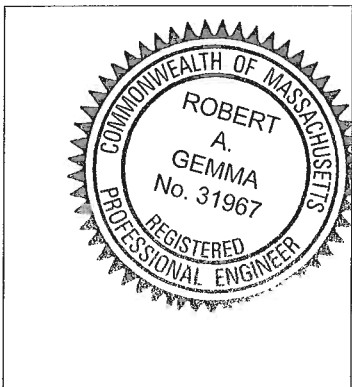
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

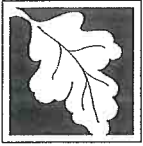


Signature and Date

Checklist

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

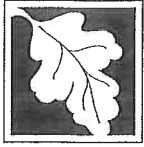
Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

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

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



Checklist for Stormwater Report

Checklist (continued)

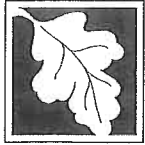
Standard 3: Recharge (continued)

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

Standard 4: Water Quality

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

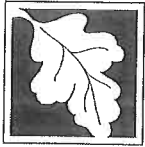
- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☒ The applicant proposes to use proprietary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

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

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

Standard 6: Critical Areas

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



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

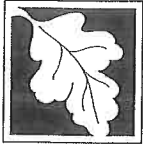
Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

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

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

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 9: Operation and Maintenance Plan

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

Standard 10: Prohibition of Illicit Discharges

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

CHAPTER 4: LID MEASURES

Chapter 4:

The proposed redevelopment project will be utilizing various low impact development (LID) approaches to minimize environmental impacts and these LID measures include stormwater management aspects of the project. Stormwater from the project will be managed by two primary techniques:

1. Stormwater will be managed by the extensive use of a subsurface infiltration system.
2. Porous pavement and porous paver patios will be used where possible on site.

LID measures:

Design of the project has utilized Low Impact Development (LID) techniques to the maximum extent practicable. The following LID approaches have been employed in the design of this project:

Subsurface Infiltration System

A subsurface infiltration system is designed to store and recharge runoff from the majority of the proposed impervious surfaces for the project. The infiltration system has been designed to handle runoff from storms up through and including the 25-year storm with no overflow. Runoff rates and volumes leaving the project site will be significantly reduced for all storm events.

Porous Pavement and Porous Paver Patios

Porous Pavement will be used in two locations for driveways for building A. Proposed patios at the rear of each of the individual units will be constructed of porous pavers.

<p>CHAPTER 5: STORMWATER MANAGEMENT STANDARDS 1 & 2</p>

Chapter 5:

Standard 1: No New Untreated Discharges

- No New Untreated Discharges will occur in the post-development condition.
- All discharges off site will be treated using both structural and non-structural Best Management Practices (Stormceptor® Units, deep sump catch basins, etc.) to remove TSS and other pollutants.
- Runoff from proposed impervious areas will be collected and recharged using a subsurface infiltration system, thereby decreasing discharge to resource areas from pre-development conditions.
- Supporting calculations specified in Volume 3 are attached with the Hydrologic Analysis, Chapter 1.

Standard 2: Peak Rate Attenuation

- The Hydrologic Analysis provided in Chapter 1 demonstrates that no off-site flooding will be increased in the post-development state during the 100-year 24-hour storm.
- The Hydrologic Analysis provided in Chapter 1, Tables One through Eight, demonstrate that the peak runoff rates will be reduced in the post development state during the 100-year 24-hour storm event. The table shown below shows that peak runoff rates in the post-development condition will be significantly reduced in comparison to the pre-development condition for runoff leaving the project site for all storm events.

Table One: Comparison of Pre and Post-Development Peak Runoff Rates for Total Site

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
Existing	0.65 CFS	1.50 CFS	2.04 CFS	3.19 CFS
Proposed	0.31 CFS	0.76 CFS	1.05 CFS	1.69 CFS
Difference	-0.34 CFS	-0.74 CFS	-0.99 CFS	-1.50 CFS
Difference	-52.3%	-49.3%	-48.5%	-47.0%

<p>CHAPTER 6: STORMWATER MANAGEMENT</p> <p>STANDARD 3</p>

Chapter 6:

Standard 3: Recharge

- **Soil Data is provided in Chapter 2 of Stormwater Report, Chapter 1, and on the Existing Conditions Plan**
- **The required recharge volume calculations:**

The required Recharge Volume is based on loamy sand with a NRCS Hydrologic Group rating of A and a Target Depth Factor (F) of 0.60-inch. Below is the calculation for the required recharge volume for the entire site:

Required Recharge Volume

$Rv = (F) \times (\text{Impervious Area})$

$Rv = (0.60 \text{ inch} / 12) \times (19,507 \text{ square feet})$

Rv = 975 cubic feet.

- The sizing of the infiltration BMP's is based on a "Static Method."
- Runoff from the proposed parking and a portion of roof surfaces on the site are being discharged into the infiltration BMP.
- The recharge BMP's have been sized to infiltrate the required Recharge Volume:

Proposed Infiltration System 1

Basic geometry:	35.5 feet wide by 44 feet long
System type:	Shea Leaching Galleys; 360 gallons each
	Use 70 Galleys; 4-feet long by 4.5-feet wide by 4-feet high
Infiltration rate:	1.02 inches per hour over 1,562 square foot bed
Exfiltration Capacity:	0.038 c.f.s.

Recharge Volumes from Hydrologic Analysis, Chapter 1.

Subsurface Infiltration System 1

2-Year Recharge Volume = 1,880 cubic feet

10-Year Recharge Volume = 3,398 cubic feet

25-Year Recharge Volume = 4,320 cubic feet

100-Year Recharge Volume = 5,756 cubic feet

Chapter 6: (continued)

- A more detailed analysis of the storage and infiltration capacities for the infiltration system can be found in the Hydrologic Analysis, Chapter 1.
- Below are the calculations showing that the Infiltration BMP's will drain in 72 hours:

Infiltration Basin (Based on Rv)

$$\text{Time}_{\text{drawdown}} = \frac{(Rv)}{(K) \times (\text{Bottom Area})}$$

$$\text{Time}_{\text{drawdown}} = \frac{(975 \text{ cubic feet})}{(1.02 \text{ inches/hour})(1 \text{ foot/ } 12 \text{ inches}) \times (1,562 \text{ square feet})}$$

$$\text{Time}_{\text{drawdown}} = \mathbf{7.4 \text{ hours} < 72 \text{ hours}}$$

Infiltration Basin (Based on System full))

$$\text{Time}_{\text{drawdown}} = \frac{(Rv)}{(K) \times (\text{Bottom Area})}$$

$$\text{Time}_{\text{drawdown}} = \frac{(3,828 \text{ cubic feet})}{(1.02 \text{ inches/hour})(1 \text{ foot/ } 12 \text{ inches}) \times (1,562 \text{ square feet})}$$

$$\text{Time}_{\text{drawdown}} = \mathbf{23.8 \text{ hours} < 72 \text{ hours}}$$

- The bottom of the infiltration system has a separation to the seasonal high water table of 2-feet or greater; therefore no mounding analysis is needed.

<p>CHAPTER 7: LONG-TERM POLLUTION PREVENTION PLAN STORMWATER MANAGEMENT STANDARDS 4-6</p>

Chapter 7:

Long Term Pollution Prevention Plan:

- The Stormwater Pollution Prevention Plan from Chapter 8 and the Operation and Maintenance Plan from Chapter 11 address all necessary aspects of the Long Term Pollution Prevention Plan

Standard 4: Water Quality

- Approximately 95% TSS Removal will be achieved prior to discharging to an infiltration BMP.
- Stormwater Runoff to be treated for Water Quality is based on 0.5-inches of runoff.
 - Requirement for Entire Site
Amount of Runoff to be treated = (0.5 inch) x (impervious area)
= (0.5 inch)/(1/12) x (19,507 square feet)
= **813 cubic feet**
- Below is a sample TSS Removal calculation for a single sub basin on the post-development site:

TSS Treatment Basins 1 and 2

Driveway and parking lot sweeping - **5% (BMP1)**

Deep sump catch basins - **25% (BMP2)**

Stormceptor – **93% (BMP3)**

Infiltration Basin – **80% (BMP4)**

Parking Lot Sweeping:

Average Annual Load (1.00) * BMP1 Removal Rate (0.05) = **0.05**
(0.95 of the TSS load remains)

Deep Sump Catch Basin:

TSS load remaining (0.95) * BMP2 Removal Rate (0.25) = **0.24**
(0.71 of the TSS load remains)

Stormceptor 450:

TSS load remaining (0.71) * BMP3 Removal Rate (0.93) = **0.66**
(0.05 of the TSS load remains)

Subsurface Infiltration System:

TSS load remaining (0.05) * BMP4 Removal Rate (0.80) = **0.04**
(0.01 of the TSS load remains)

Final TSS Removal Rate: $1.00 - 0.01 = 0.99$ (**99% TSS Removal**)

Chapter 7: (continued)

- TSS Removal data for sub basins 1 and 2 are attached hereafter. A weighted post-development TSS Removal was determined to be **99.0%**.

Standard 5: Land Use with Higher Potential Pollutant Loads

- The project does not include land uses with Higher Potential Pollutant Loads.

Standard 6: Critical Areas

- The project does not affect a critical area as defined by the MADEP Stormwater Handbook.

Windsor Place, 24 School Street, Wayland			4-Sep-17	
Stormwater Management Calculations, TSS Removal				
<u>Treatment Basin 1</u>	Basin Area (acres)	0.153		
<u>BMP List</u>	Removal Rate (%)	TSS Removed (%)	TSS Remaining (%)	
Street Sweeping	5	5.0	95.0	
Deep Sump Catch Basins	25	23.8	71.3	
StormCeptor 450*	93	66.3	5.0	
Infiltration System	80	4.0	1.0	
		TSS Removal	99.0	
<u>Treatment Basin 2</u>	Basin Area (acres)	0.163		
<u>BMP List</u>	Removal Rate (%)	TSS Removed (%)	TSS Remaining (%)	
Street Sweeping	5	5.0	95.0	
Deep Sump Catch Basins	25	23.8	71.3	
StormCeptor 450*	93	66.3	5.0	
Infiltration System	80	4.0	1.0	
		TSS Removal	99.0	
(*) - TSS Removal Rates based on 90% of TSS removal shown on Imbrium Systems Sizing Calculations				
Weighted Average TSS Removal Calculation				
<u>Location</u>	<u>Area</u>	<u>TSS Removal</u>	<u>Product</u>	
Treatment Basin 1	0.153	99.0	15.15	
Treatment Basin 2	0.163	99.0	16.14	
	0.316	Sum	31.28	
Weighted Average for TSS Removal (%)			99.0	



Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	9/4/2017
Project Name	TSS Basin 1
Project Number	N/A
Location	24 School Street, Wayland MA

Designer Information

Company	MetroWest Engineering Inc.
Contact	N/A

Notes

N/A

Drainage Area

Total Area (ac)	0.153
Imperviousness (%)	73

The Stormceptor System model STC 450i achieves the water quality objective removing 93% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	BOSTON WSFO AP
State	MA
ID	770
Years of Records	1948 to 2005
Latitude	42°21'38"N
Longitude	71°0'38"W

Water Quality Objective

TSS Removal (%)	80
-----------------	----

Upstream Storage

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

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	93
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99



Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)								
Particle Size	Distribution	Specific Gravity	Settling Velocity		Particle Size	Distribution	Specific Gravity	Settling Velocity
µm	%		ft/s		µm	%		ft/s
20	20	1.3	0.0013					
60	20	1.8	0.0051					
150	20	2.2	0.0354					
400	20	2.65	0.2123					
2000	20	2.65	0.9417					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763
www.rinkerstormceptor.com



Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	9/4/2017
Project Name	TSS Basin 2
Project Number	N/A
Location	24 School Street, Wayland MA

Designer Information

Company	MetroWest Engineering Inc.
Contact	N/A

Notes

N/A

Drainage Area

Total Area (ac)	0.163
Imperviousness (%)	74

The Stormceptor System model STC 450i achieves the water quality objective removing 93% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	BOSTON WSFO AP
State	MA
ID	770
Years of Records	1948 to 2005
Latitude	42°21'38"N
Longitude	71°0'38"W

Water Quality Objective

TSS Removal (%)	80
-----------------	----

Upstream Storage

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

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	93
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	97
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99



Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)							
Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s	Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
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Stormceptor Design Notes

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- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

**CHAPTER 8: CONSTRUCTION PERIOD POLLUTION
PREVENTION AND EROSION AND
SEDIMENTATION CONTROL PLAN (SWPPP)**

STORM WATER POLLUTION PREVENTION PLAN

for

**Proposed Site ReDevelopment
24 School Street
Wayland, MA 01778**

**Prepared for: Windsor Place, LLC
73 Pelham Island Road
Wayland, MA 01778**

**Prepared by: MetroWest Engineering, Inc.
75 Franklin Street
Framingham, MA 01702
(508) 626-0063**

September, 2017

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A. Project Name and Location

Name: Proposed Site Redevelopment
Street: 24 School Street, Wayland Massachusetts
Landmark: Locus has frontage along School Street and East Plain Street
Latitude: 42° - 19' - 22" N
Longitude: 71° - 21' - 22" W

B. Project Owner and Operator

Windsor Place, LLC
73 Pelham Island Road
Wayland, MA 01778

C. Project Engineer

MetroWest Engineering, Inc.
75 Franklin Street
Framingham, MA 01702
(508)-626-0063
Attn: Robert A. Gemma

D. Environmental Consultant

MetroWest Engineering, Inc.
75 Franklin Street
Framingham, MA 01702
(508)-626-0063
Attn: Robert A. Gemma

E. General Contractor

F. CERTIFICATION OF STORMWATER POLLUTION PREVENTION PLAN**Project: Proposed Site Redevelopment, 24 School Street, Wayland MA**

This certification must be completed by an authorized signatory of each operator (generally the owner and the General Contractor) before the effective date of the Plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____

Name: _____

Title: _____

Company: Windsor Place, LLC

Address: 73 Pelham Island Road, Wayland MA 01778

Telephone: Office: (508) 358-6298

Date: _____

G. CONTRACTOR/SUB-CONTRACTOR CERTIFICATION**Project: Proposed Site Redevelopment, 24 School Street, Wayland MA**

This Certification is to be completed by the General Contractor and each Sub-Contractor involved in any on-site activities related to the construction.

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the stormwater discharges associated with industrial activity from the construction site identified as part of this certification.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Date: _____

H. SUB-CONTRACTOR NAMES AND ADDRESSES

The following list includes all subcontractors working on the project site at any time. The general contractor and all subcontractors must sign the certification included in Section G., page 3.

Subcontractor: _____

Subcontractor: _____

Subcontractor: _____

Subcontractor: _____

Subcontractor: _____

I. Project Description

The subject property is located on the westerly side of School Street and northerly side of East Plain Street in Wayland, Massachusetts. The site contains approximately 0.87-acres of land that is presently improved with a single-family house, detached garage, barn and supporting utilities. The majority of the site is covered by impervious and lawn areas. Existing topography decreases in approximately 10-feet from northeast to southwest

The project involves the demolition of the existing house, barn and garage followed by the construction of two new townhouse buildings, paved driveway and parking areas, new subsurface sewage disposal system and stormwater management system. Proposed impervious coverage on the property will be approximately 19,507 square feet, an increase of 10,598 from the existing impervious coverage of 8,908 square feet.

Complete sets of site development plans are included as an attachment to this SWPPP.

J. Total Site Area and Disturbed Area

Total site area is 0.87-acres.

Existing impervious area is approximately 0.20-acres

Proposed impervious area is approximately 0.45 acres

Total developed area is approximately 0.80 acres

K. Surrounding Developments

The project is surrounded by single family residential developments to the north and west. Retail and commercial sites are located to the south and east across School Street and Commonwealth Road (Route 30.)

L. Soil Description

According to the NRCS Soil Survey, soils on and around the site belong to either the Hinckley loamy sand (253C) or the Narragansett Silt Loam (415B) soil series and are further classified within hydrologic soil group A and B respectively. Soil testing was performed at the site on July 31, 2014 and August 22, 2014. Twelve test holes, D.T.H.-1 through D.T.H.-12 were excavated and logged at the site. D.T.H. 1 through 3 and 6 through 10 were excavated in the northerly part of the property. C-horizons for these test pits were primarily sandy loam soils ranging in depth from approximately three to ten feet. Redoximorphic features were observed at depths ranging from six to eight-feet and no refusal was encountered. D.T.H.-4, D.T.H. 5 and D.T.H.-11 were excavated in the southerly portion of the site, south of the existing house. These test pits contained C-horizons of sandy loam soils ranging in depth between three and eleven feet. Redoximorphic features were observed at depths of approximately six to seven feet below existing grade and no refusal was encountered.

M. Runoff Coefficient

Existing soils have varying permeability rates therefore runoff will be generated from major storm events. The pre-development runoff coefficient for the site is 0.45 and the post-development runoff coefficient will be 0.61.

N. Site Map and Plans

Complete project site plans are attached to this SWPPP.

O. Receiving Water

No direct discharge will occur into any nearby body of water.

P. Extent of Wetland Resource Areas

Wetland Resource areas are located off the property to the west. All improvements will take place outside the 30-foot No-Alteration zone. Approximately 15,366 square feet of alteration will occur within the 100-foot Wetland Buffer Zone.

Q. Sequence of Major Activities

1. The project is scheduled to begin in April 2018.
2. Construction of the new buildings will begin in June 2018.
3. The site grading will be completed in November 2018.
4. All construction will be complete by April 2019.

R. Construction Sequence**1. Erosion Control**

An erosion control barrier consisting of either filter mitt mulch tubes or haybales and silt fence will be placed at the limit of work around the majority of the parcel as needed and in any sensitive areas.

2. Site Access

Site access, for construction equipment, will be made from an access point located off School Street. An erosion control barrier to the work area shall be removed at the start of each workday and replaced at the end of each workday. The erosion control barriers will be in place during periods of inclement weather when so directed by the Environmental Consultant. The barriers will remain in place during all non-work periods until the site has been deemed to be stable by the Environmental Consultant.

3. Construction Staging

A construction staging area will be established on the site in the southwesterly portion of the property. All construction materials, supplies, trailers and offices, portable toilets, and

equipment shall be stored within the limits of the staging area. Construction fence and filter mitt erosion control measures shall demarcate the limits of the staging area.

4. **Site Work**

Site work, including excavation for the buildings, parking lots, excavation for drainage system, grading as well as other utilities may commence only when the site is stable from erosion and all required control measures are in place and functional. Site work during wet periods should be avoided if possible and limited to only those areas that will not have adverse impacts on wetland resource areas or abutting properties.

S. Pollution Prevention Measures

1. Before, during and after construction, functional erosion and sedimentation controls shall be implemented to prevent the silting of abutting, down-gradient properties and roads. Siltation controls shall be properly maintained and are not to be removed until so approved by the Environmental Engineer. Other controls shall be added as warranted during construction to protect the environmentally sensitive areas. Sufficient extra materials (e.g. siltation fencing and other control materials) shall be stored on site for emergencies.
2. Casting of excavated materials shall be stored away from any sensitive land areas.
3. Any stockpiling of loose materials shall be properly stabilized to prevent erosion and siltation. Preventive controls such as hay bales or jute covering shall be implemented to prevent such an occurrence.
4. There shall be no flooding, ponding, or flood related damage caused by the project or surface run-off emanating from the project on lands of an abutter, nearby or down-gradient properties.
5. All surface discharge shall meet the water quality standards for the Mass. Division of Water Pollution Control for Class "B" Water.
6. Proper landscaping of embankments and run-off areas (that is, the use of grass, vegetation, shrubbery, and crushed stone) shall be implemented before the project is completed.
7. Finish grades shall be no steeper than a slope of 2 horizontal to 1 vertical.
8. There shall be no contaminant migration caused by the project to nearby and down-gradient properties, nearby aquifers, wetlands and nearby wells.
9. The use of salt and sand on paved surfaces shall be kept to an absolute minimum during the winter months.
10. The applicant shall make sufficient provisions to control any unexpected drainage and erosion conditions that may rise during construction that may create damage on abutting properties and

wetland areas. Said control measures are to be implemented at once and the Environmental Engineer shall be notified in writing.

11. During construction flood prevention, erosion, and sedimentation controls shall be in place before the natural ground cover is disturbed. Said controls shall be in place prior to other construction work and shall be monitored and approved by the Environmental Engineer before other work is commenced. They shall be properly maintained and are not to be removed until so approved by the Environmental Engineer.
12. The applicant shall designate a person or persons to inspect and supervise the drainage and erosion controls for the project and the Environmental Engineer shall be notified as to the means to contact said individual or individuals on a 24-hour basis on all working and non-working days of the project. Said means of contact shall include the telephone number of said designated person or persons.
13. There shall be periodic inspection of the fabric fencing and other controls by the applicant's designee to assure their continued effectiveness.
14. The Zoning Board and Town of Wayland Conservation Commission conditions of approval shall be included as part of the contracts and subcontracts and shall be posted in the supervisory office on-site.
15. Any changes in the construction plans must be submitted in writing in advance for approval by the Engineer.
16. Upon completion of this project, the project engineer shall certify that the work completed conforms to the plans as submitted. Certification must include registered engineers stamp. In addition, an as-built plan shall be submitted to the Zoning Board, Conservation Commission and Department of Public Works for approval prior to the issuance of a Certificate of Compliance.
17. Upon completion of the project, the permanent functional erosion, sedimentation, and flood control measures that are installed according to the presented plans and specifications submitted and revised shall be maintained in perpetuity.
18. Upon completion of the project, the contractor shall clean all deep sump catch basins, the Stormceptor treatment tanks, to remove all silt and sediment.

T. Other Control Measures

Off-site Vehicle Tracking. A stabilized construction entrance will be provided to help reduce vehicle tracking of sediments. The paved streets adjacent to the site shall be swept or scraped weekly, or as needed, to remove any excess mud, dirt, or rock tracked from the construction area. A source of fresh water for washing sediment from trucks, especially during periods of wet weather, may be provided in order to minimize the amount of street sweeping and scraping required. Any wash water resulting from this operation will be directed into a sediment trap.

Waste Materials. All trash and construction debris from the site will be hauled to an approved landfill. No construction waste material will be buried on the site. All personnel will receive instructions regarding the correct procedure for waste disposal. Notices describing these practices will be posted in the construction office. The site superintendent will be responsible for seeing that these procedures are followed. Employee waste and other loose materials will be collected so as to prevent the release of floatables during runoff events.

Hazardous Waste. No hazardous waste is expected to be generated or encountered in this project. In the event that hazardous waste is encountered, all hazardous waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. The site superintendent will be responsible for seeing that these practices are followed.

Sanitary Waste. Portable sanitary units will be provided for use by all workers throughout the life of the project. A licensed sanitary waste management contractor will regularly collect all sanitary waste from the portable units.

U. Maintenance

To maintain the erosion and sediment controls, the following procedures will be performed:

- ◆ **Sediment Capture Devices:** Sediment will be removed from the upstream or upslope side of the filter fabric fences, straw bale barriers, siltation ponds, diversion trenches, or other devices, when the depth of accumulated sediment reaches about one-third the height of the structure or device.
- ◆ **Storm Sewer Inlets:** Any sediment in the storm sewer inlets will be removed and disposed of properly.
- ◆ **Temporary Controls:** All temporary controls will be maintained until final site stabilization and landscaping is complete, and the Environmental Engineer approves removal.

Sediment that is removed from structural barriers; either will be hauled off the site and disposed of properly or will be used as backfill. Sediment temporarily stockpiled on site will be placed in such areas and in such manner as to minimize erosion of sediments back into the local drainage system. Berms, filter fabric fencing, straw bale barriers, and polyethylene or polypropylene covers are measures that may be utilized in minimizing erosion of stockpiled sediment.

V. Inspection Procedures

Inspections will be conducted by the responsible person(s) at least once every 7 calendar days and within 24 hrs after each storm event producing 0.5 inch of rainfall or greater. Areas that have been reseeded will be inspected regularly after seed germination to ensure complete coverage of exposed areas.

The contractor will designate a qualified person or persons to perform the following inspections:

- ◆ **Stabilization Measures:** Disturbed areas and other areas used for storage of materials that are exposed to precipitation will be inspected for evidence of, or the potential for, pollutants entering the drainage system. After a portion of the site is finally stabilized, inspections will be conducted at least once every month throughout the life of the project. Form 1 shows the inspection form to be used for stabilization measures.
- ◆ **Structural Controls:** Filter fabric fences, straw bale barriers, and all other erosion and sediment control measures identified in the plan will be inspected regularly for proper positioning, anchoring, and effectiveness in trapping sediments. Sediment will be removed from the upstream or upslope side of the filter fabric. Form 2 shows the inspection form to be used for structural controls.
- ◆ **Discharge Points:** Discharge points or locations will be inspected to determine whether erosion control measures are effective in preventing significant amounts of pollutants from entering receiving waters.
- ◆ **Construction Entrances:** Locations where vehicles enter or exit the site will be inspected for evidence of off-site sediment tracking.

Form 1 - **INSPECTION REPORT FORM FOR STABILIZATION MEASURES**

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____ inches

Area	Date last disturbed	Date of next Disturbance	Stabilized?	Stabilized With	Condition

Stabilization Required:

To be performed by: _____ On or Before: _____

Form 2 - INSPECTION FORM FOR STRUCTURAL CONTROLS

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____ inches

Location of Control	In place?	Condition	Sediment Depth	Washed out or overtopped?

Maintenance Required:

To be performed by: _____ On or Before: _____

W. Revisions to the SWPPP

Based on the results of the inspection, the site description and control measures of this pollution prevention plan will be revised as appropriate, but in no case later than 7 calendar days following the inspection. Form 3 shows the form to be used to record necessary changes to the SWPPP.

X. Inspection Report Summary

A report summarizing the scope of each inspection, name(s) and qualifications of personnel making the inspection, date(s) of the inspection, major observations relating to the implementation of the SWPPP, and actions taken to revise the plan will be completed and retained as part of the SWPPP for at least 3 years from the date that the site is finally stabilized. Form 4 shows the form to be used for certification of the inspection report. The report will be signed by one of the following persons:

Owner of the property.

A duly authorized representative of the property owner.

Y. Non-Storm-Water Discharges

It is expected that the following non-storm-water discharges will occur at the site during the construction period:

- ◆ **Dewatering discharges:** Water pumped from the construction area during dewatering operations (this may or may not be storm water).
- ◆ **Pressure test water:** Water used to pressure-test the potable water system.
- ◆ **Disinfectant water:** Water used to disinfect the potable water system.

Dewatering discharges will be done in such a manner as to avoid erosion problems and will pass through a portable sediment tank or temporary siltation pond. No direct discharge to surface waters or wetlands will be permitted.

Form 3 - **REPORT FORM FOR CHANGES IN POLLUTION PREVENTION PLAN**

INSPECTOR: _____ DATE: _____

SUMMARY OF REQUIRED CHANGES:

REASON(S) FOR CHANGES:

INSPECTOR'S SIGNATURE: _____ DATE: _____

Form 4 - INSPECTION CERTIFICATION FORM

Project: Windsor Place, 24 School Street, Wayland MA

This certification must be completed after each inspection to signify that the inspection has been properly completed and the site has been found to be in compliance with the Storm Water Pollution Prevention Plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Date: _____

Z. Significant-Materials Inventory

Significant materials expected to be found at the construction site include:

- Lime (trucked onto the site for soil stabilization purposes)
- Concrete mix (trucked onto the site for construction)
- Steel reinforcing bars and related materials
- Lumber
- Diesel and Gasoline fuel and lubricating oils
- Pre-cast concrete structures
- Ductile iron pipe
- Steel pipe
- Paints
- Fertilizers
- Plastic and p.v.c. pipe
- Earth materials, stone and aggregate
- Asphalt
- Cements and adhesives
- Waterproofing tar
- Block, brick and masonry materials
- Fiberglass and foam insulation
- Propane fuel for space heaters
- Acetylene fuel for welding

This list of significant materials may be reduced or expanded once a contractor has been chosen and the materials to be used have been specified. If fewer or additional materials are required, the SWPPP will be amended to reflect these changes.

AA. Spill Prevention and Response Procedures

Spill prevention and response include good housekeeping as well as specific practices for certain products and established procedures for responding to spills.

Good Housekeeping

The following good housekeeping practices will be followed onsite during the construction project.

- **Minimize materials:** An effort will be made to store only enough material required to do the job.
- **Storage:** All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers in a covered area. If storage in a covered area is not possible, the materials will be covered with polyethylene or polypropylene sheeting to protect them from the elements.

- **Labeling:** Products will be kept in their original containers with the original manufacturer's label affixed to each container.
- **Mixing:** Substances will not be mixed with one another unless this is recommended by the manufacturer.
- **Disposal:** Whenever possible, all of a product will be used prior to disposal of the container. Manufacturer's recommendations for proper use and disposal will be followed.
- **Inspections:** The site superintendent will inspect the site daily to ensure proper use and disposal of materials onsite.
- **Spoil materials:** Any excavated earth that will not be used for fill material and all demolished pavement will be hauled off site immediately and will be disposed of properly.

Product-Specific Practices

- **Petroleum Products.** All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. If petroleum products will be present at the site, they will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.
- **Concrete Trucks.** Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water at the site.
- **Paints.** All containers will be tightly sealed and stored when not required for use. Excess paint will not be poured into the storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.
- **Fertilizers.** Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. The fertilizer will be stored in a covered area, and any partially used bags will be transferred to a sealable plastic bin to avoid spills.

Spill Control and Response Practices

A spill prevention and response team will be designated by the owner or the site superintendent. In addition, the following practices will be followed for spill cleanup:

- **Information:** Manufacturers' recommended methods for spill cleanup will be clearly posted, and site personnel will be made aware of the procedures and location of the information and cleanup supplies.
- **Equipment:** Materials and equipment necessary for spill cleanup will be present on the site at all times. Equipment and materials will include but not be limited to brooms, shovels, rags,

gloves, goggles, absorbent materials (sand, sawdust, etc.) and plastic or metal trash containers specifically designed for this purpose. The materials and equipment necessary for spill cleanup will be dependent upon the nature and quantity of the material stored on site.

- **Response:** All spills will be cleaned up immediately upon discovery.
- **Safety:** The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances.
- **Reporting:** Spills of toxic or hazardous material (if present on site) will be reported to the appropriate state or local government agency, regardless of the spill size.
- **Record Keeping:** The spill prevention plan will be modified to include measures to prevent this type of spill from recurring as well as improved methods for cleaning up any future spills. A description of each spill, what caused it, and the cleanup measures used will be kept with the plan.

BB. Plan Location and Public Access

The SWPPP is not submitted to the EPA for review unless requested. The SWPPP must be available at the construction site from the date of project initiation to the date of final stabilization. The SWPPP and all reports required by the permit must be retained for at least 3 years from the date on which the site is finally stabilized.

Despite the fact that the SWPPP and associated reports are not necessarily required to be submitted with the Notice of Intent, these documents are considered to be reports according to section 308(b) of the Clean Water Act and therefore are available to the public. The permittee, however, may claim certain parts of the SWPPP as confidential according to regulations in 40 CFR part 2. These regulations state that records that contain trade secrets may be claimed as confidential.

The SWPPP shall also be at the offices of the Environmental Consultant, MetroWest Engineering, Inc (75 Franklin Street, Framingham, MA 01702).

APPENDIX A: PERMIT REQUIREMENTS

APPENDIX B: EPA NOTICES

Notice of Intent (NOI)

Notice of Termination (NOT)

APPENDIX C: EMERGENCY & INSPECTION INFORMATION
Emergency Contact Sheet

Form 1. Emergency Contact Numbers

Town of Wayland Fire Department

Emergency

911

.....
Business

(508) 358-4747

Town of Wayland Police Department

Emergency

911

.....
Business

(508) 358-4721

Massachusetts Department of Environmental Protection

Northeast Regional Office

(978) 694-3200

Town of Wayland Conservation Commission

(508) 358-3669

Town of Wayland Board of Health

(508) 839-3617

National Response Center

1-800-424-8802

US EPA

1-888-372-7341

Windsor Place, LC

1-508-358-6298

CHAPTER 9: STORMWATER MANAGEMENT
STANDARD 7

Chapter 9:

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

- The project will result in an increase of impervious area and, therefore, is considered a mixture of redevelopment and new development.
- The project will fully comply with Stormwater Management Policy.

CHAPTER 10: STORMWATER MANAGEMENT
STANDARD 8

Chapter 10:

Standard 8: Construction Period Pollution and Erosion and Sedimentation Control

- The Stormwater Pollution Prevention Plan is included in Chapter 8 of this Stormwater Report.
- The project is covered by a NPDES general construction permit as the project will result in over an acre of disturbance.

CHAPTER 11: OPERATION AND MAINTENANCE PLAN
STORMWATER MANAGEMENT STANDARD 9

Stormwater Operation and Maintenance Plan:
Proposed Site Redevelopment
24 School Street, Wayland MA 01778

Prepared for: *Windsor Place, LLC*
 73 Pelham Island Road
 Wayland, MA 01778

Prepared by: *MetroWest Engineering, Inc.*
 75 Franklin Street
 Framingham, MA 01702
 (508) 626-0063

September, 2017

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Form 2: Inspection Forms for Drain Catch Basins	Page 7
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Appendix A	Stormceptor Owner's Manual

Stormwater Operation and Maintenance Plan
Windsor Place, 24 School Street Wayland
Prepared By: MetroWest Engineering Inc.
Prepared For: Windsor Place, LLC

General

The property is located on the westerly side of School Street and northerly side of East Plain Street in the Town of Wayland, Massachusetts. The subject parcel (Assessors Map 52, Lot 189) has an area of 37,865 square feet (0.87 acres) and is presently improved with a two-story house, detached garage, barn, paved driveway, subsurface sewage disposal system and supporting utilities. The site presently contains approximately 8,908 square feet of impervious area. Existing topography slopes gradually downhill in westerly and southerly directions from the high point located at the northeast corner of the property. The property abuts developed single family residential housing to the north and west with commercial properties on the east side of School Street and southerly side of Commonwealth Road (Route 30.)

The site redevelopment program includes demolition and removal of the existing house, barn, garage, driveway and subsurface sewage disposal system. Demolition will be followed by the construction of two, six-unit townhouse buildings, paved parking areas, a new subsurface sewage disposal system and stormwater management system.

Resource Areas

A Bordering Vegetated Wetland and unnamed Intermittent Stream are located on the land of the westerly abutter. The Intermittent Stream is located approximately 40-feet west of the property and the Bordering Vegetated Wetland is located approximately 30-feet west of the westerly boundary line. The 30-foot No-Alteration Zone crosses approximately 12-feet on to the property at the northwest corner and occupies approximately 391 square feet of land on the property. The 100-foot Wetland Buffer Zone extends approximately 83-feet on to the subject property covering approximately 15,366 square feet of land on the site.

Drainage Approach

The site is currently improved with a single-family house, accessory buildings and paved parking areas and does not have a stormwater management system.

A stormwater management system is designed for the site that will reduce runoff rates and volumes from the project site in the post-development condition. Furthermore, all storm water runoff from paved parking areas will be treated in deep sump drain catch basins and Stormceptor™ manhole units prior to discharge into a subsurface infiltration system.

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Maintenance Requirements

The project's stormwater collection and treatment system is designed to collect and treat stormwater so that all discharges from the system are in compliance with all local, state and federal environmental regulations. Periodic routine inspection and maintenance of the system is critical if the system is to continue to meet required performance standards.

Responsible Party

The property owner **shall** be responsible for all maintenance and repair activities throughout the site relating to the grounds, pavement surface, stormwater collection system and subsurface infiltration systems. Contact information for the owner/responsible party is listed below:

Owner/Responsible Party

Windsor Place LLC
73 Pelham Island Road
Wayland, MA 01778

Contact: Chris D'Antonio
Email: Chris@chadwickproperties.com

If ownership of the subject property changes, the new owner shall become the responsible party. This Operation and Maintenance Plan shall run with the land.

The owner/responsible party shall be responsible for the implementation of this Operation and Maintenance Plan and the proper training of employees to ensure compliance with all daily and long term aspects of the plan.

Required Maintenance

Grounds

All slopes shall be inspected and any exposed areas or other locations susceptible to erosion shall be stabilized with mulch, sod, seed, stone or other suitable measures. All litter and trash shall be picked up and removed from all paved, landscaped and wooded areas on a regular basis. All grass clippings, leaves, brush and other natural materials will be transported to an approved composting facility. No clippings or leaves will be deposited in wooded areas or on abutting Properties.

Fertilizers and pesticides shall be applied in accordance with manufacturer's instructions and all applicable local and state regulations. They shall be applied sparingly by trained personnel.

BMPI - Parking and Driveway Areas

The driveway and parking areas shall be vacuum-swept at least four times per year to remove sediments. One cleaning shall be performed during the mid-winter period of late January to

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

early February, and another cleaning shall be performed in the spring during April or May. All sediment removed shall be disposed of in accordance with DEP policy and requirements for the disposal of road sediments.

During winter months the use of de-icing compounds shall be kept to a minimum. Untreated sand shall be used to the minimum extent necessary to provide for tire traction. During extreme events sand treated with a non-sodium de-icer may be used.

Extra care shall be taken during the treatment of porous paver patios during winter months. Sand shall be applied sparingly and voids between the pavers shall be manually cleaned or vacuumed four times per year to prevent clogging of joints and voids.

BMP 2 – Deep Sump Catch Basins

All catch basins shall include a deep sump and an MDC type oil/water separation hood. Catch basin sumps shall be cleaned and inspected twice per year, once in the spring and again in the fall. Catch basins may be cleaned with either clamshell bucket or by vacuum truck. Pipe inlets, outlets and MDC hoods shall be inspected at the time of the sump cleaning and shall be immediately repaired as necessary. All sediment removed shall be disposed of in accordance with DEP policy and requirements for the disposal of road sediments.

BMP 3 – Stormceptor Model 450i Treatment Systems

The Stormceptor Model 450i systems shall be cleaned a minimum of once per year. Additionally, the depth of sediment in the sumps of the units shall be measured quarterly. Additional cleaning shall commence when the depth of sediment in the sump reaches 8-inches or when oil is observed in the sump of the unit. A vacuum truck shall remove sediment and oil from the sump and dispose of the sediment in accordance with the current standards and requirements of the MADEP. Refer to the attached maintenance procedures provided by Rinker Industries.

BMP 4 – Subsurface Infiltration System

The subsurface infiltration system shall be inspected twice per year to evaluate sediment accumulation and once per year during a storm event. Routine inspection for sediment accumulation shall consist of the inspection of each chamber where an inlet is located. An inspection port cover is located at each point. Any sediment that has entered into the system at the inlet locations shall be removed and disposed of in accordance with MADEP policy.

The system shall also be observed at least once per year during a major storm event. A major storm event shall be defined for this Operation and Maintenance Plan as one in which the 24-hour rainfall volume exceeds one-inch. The inspection shall include removal of an inspection port cover to measure the water depth inside the system. The inspection should take place after at least one-inch of rainfall has fallen and prior to the end of storm. Following the inspection, the precipitation volume, based upon the nearest reporting weather station, should be recorded in the inspection log book.

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Snow Removal

There shall be no storage or stockpiling of snow within any wetland resource areas on or abutting the project site. Parking lot de-icing materials shall be stored inside the building or a location that is protected from precipitation and wind. De-icing material shall consist of sand mixed with a non-sodium based de-icing agent. Snow shall be removed from all drain inlets immediately after a snow event to prevent the accumulation of ice in parking lot areas.

Storage and Use of Chemicals

Chemical storage on the site shall be limited and all chemicals stored on site shall be done in accordance with the manufacturer's recommendations and all applicable local and state regulations.

Hazardous Waste

All hazardous waste materials shall be stored and disposed of in accordance with all applicable local and state regulations. In the event of an accident or spill involving and/or other hazardous materials the facilities manager shall contact a hazardous waste removal contractor and immediately notify local and state regulatory agencies.

There shall be no illicit discharges into the stormwater management system.

Waste Storage and Handling

All waste material shall be stored in a covered metal dumpster provided by a solid waste management company licensed in the Town of Wayland and the Commonwealth of Massachusetts. The dumpster shall be emptied on a regular basis or when full. Loose trash around the site and near the dumpster shall be picked up on a weekly basis.

Recommended Personnel

A commercial contractor should be engaged to perform the periodic cleaning and inspections required for the drainage and infiltration systems. A landscape contractor may perform gutter cleaning.

A professional engineer with expertise in drainage systems, hydrology or similar sciences should perform an annual inspection of the infiltration system and should evaluate the infiltration system during a major storm event.

Record Keeping

A logbook or other record should be maintained for all inspection, cleaning and maintenance activities. The logs or records should be provided to the drainage professional engaged to perform the annual inspection of the drainage and infiltration system. An annual report should be prepared by the drainage professional to summarize inspection and maintenance activities,

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

review the performance of the infiltration system, and provide recommendations for repair or remedial measures required to maintain the performance of the system. The annual report should be submitted to the property owner and operator and kept on site.

Emergency Contacts

In the event of a major drainage system failure, a release of dangerous materials or other unforeseen accident, the following organizations may be contacted:

Town of Wayland Board of Health
(508) 358-3617

Town of Wayland Conservation Commission
(508) 358-3669

Town of Wayland Building Department
(508) 358-3600

Massachusetts Department of Environmental Protection
(978) 694-3200

MetroWest Engineering, Inc. (Design Engineer)
(508) 626-0063

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 1 - INSPECTION REPORT FORM FOR STABILIZATION MEASURES

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____ inches

Area	Date last disturbed	Date of next Disturbance	Stabilized?	Stabilized With	Condition

Comments and Stabilization Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 2 - INSPECTION FORM FOR DRAIN CATCH BASIN D.D.C.B.-2
Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 2 - INSPECTION FORM FOR DRAIN CATCH BASIN D.D.C.B.-3
Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 3 - INSPECTION FORM FOR TRENCH DRAIN 1
Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 4 - INSPECTION FORM FOR STORMCEPTOR INLINE UNIT
StormCeptor STC-450 (D.M.H. 3) Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 4 - INSPECTION FORM FOR STORMCEPTOR INLINE UNIT
StormCeptor STC-450 (D.M.H 4) Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

Stormwater Operation and Maintenance Plan
Site Redevelopment 24 School Street, Wayland MA

Form 5 - INSPECTION FORM FOR SUBSURFACE INFILTRATION SYSTEM 1

Ongoing Maintenance

INSPECTOR: _____

DATE: _____

Days since last rainfall: _____

Amount of Last Rainfall: _____ inches

Rim Location	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

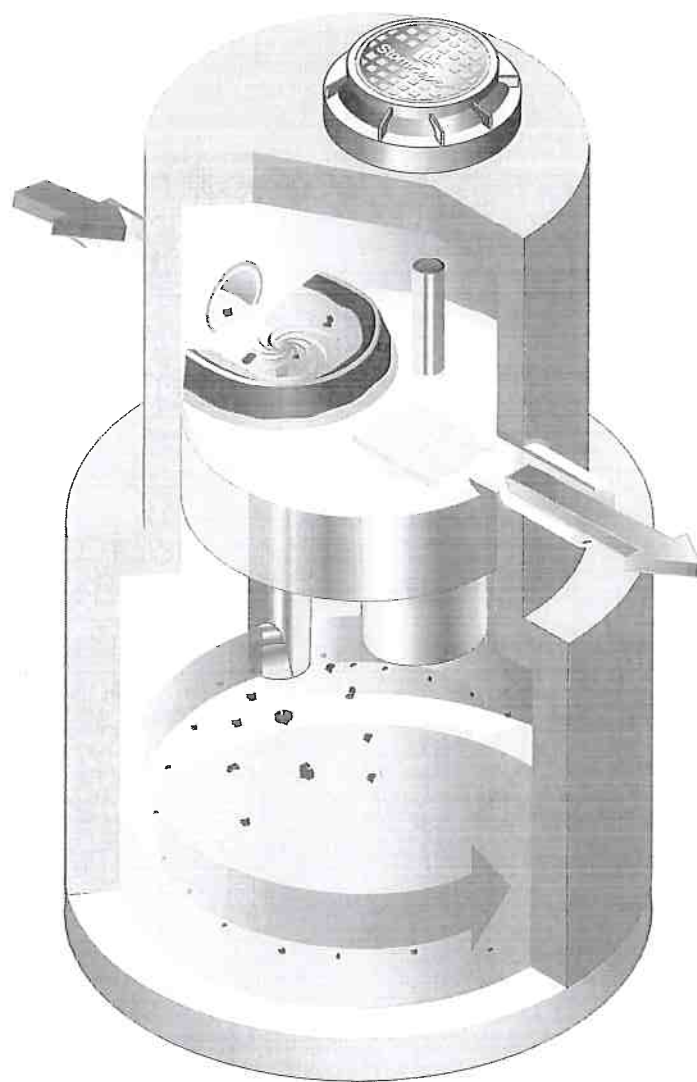
Comments and Maintenance Required:

To be performed by: _____ On or Before: _____

APPENDIX A: STORMCEPTOR OWNER'S MANUAL

Stormceptor®

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,175,277
Canadian Patent No. 2,180,305
Canadian Patent No. 2,180,338
Canadian Patent No. 2,206,338
Canadian Patent No. 2,327,768
U.S. Patent No. 5,753,115
U.S. Patent No. 5,849,181
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693,164
Australia Patent No. 707,133
Australia Patent No. 729,096
Australia Patent No. 779,401
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Indonesia Patent No. 0007058
Japan Patent No. 3581233
Japan Patent No. 9-11476
Korean Patent No. 0519212
Malaysia Patent No. 118987
New Zealand Patent No. 314,646
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Other Patents Pending

Table of Contents

1 – Stormceptor Overview

2 – Stormceptor Operation & Components

3 – Stormceptor Identification

4 – Stormceptor Inspection & Maintenance

 Recommended Stormceptor Inspection Procedure

 Recommended Stormceptor Maintenance Procedure

5 – Contact Information (Stormceptor Licensees)

Congratulations!

Your selection of a Stormceptor® means that you have chosen the most recognized and efficient stormwater oil/sediment separator available for protecting the environment. Stormceptor is a pollution control device often referred to as a “Hydrodynamic Separator (HDS)” or an “Oil Grit Separator (OGS)”, engineered to remove and retain pollutants from stormwater runoff to protect our lakes, rivers and streams from the harmful effects of non-point source pollution.

1 – Stormceptor Overview

Stormceptor is a patented stormwater quality structure most often utilized as a treatment component of the underground storm drain network for stormwater pollution prevention. Stormceptor is designed to remove sediment, total suspended solids (TSS), other pollutants attached to sediment, hydrocarbons and free oil from stormwater runoff. Collectively the Stormceptor provides spill protection and prevents non-point source pollution from entering downstream waterways.

Key benefits of Stormceptor include:

- Removes sediment, suspended solids, debris, nutrients, heavy metals, and hydrocarbons (oil and grease) from runoff and snowmelt.
- Will not scour or re-suspend trapped pollutants.
- Provides sediment and oil storage.
- Provides spill control for accidents, commercial and industrial developments.
- Easy to inspect and maintain (vacuum truck).
- “STORMCEPTOR” is *clearly* marked on the access cover (excluding inlet designs).
- Relatively small footprint.
- 3rd Party tested and independently verified.
- Dedicated team of experts available to provide support.

Model Types:

- STC (Standard)
- STF (Fiberglass)
- EOS (Extended Oil Storage)
- OSR (Oil and Sand Removal)
- MAX (Custom designed unit, specific to site)

Configuration Types:

- Inlet unit (accommodates inlet flow entry, and multi-pipe entry)
- In-Line (accommodates multi-pipe entry)
- Submerged Unit (accommodates the site's tailwater conditions)
- Series Unit (combines treatment in two systems)

Please Maintain Your Stormceptor

To ensure long-term environmental protection through continued performance as originally designed for your site, **Stormceptor must be maintained**, as any stormwater treatment practice does. The need for maintenance is determined through inspection of the Stormceptor. Procedures for inspection are provided within this document. Maintenance of the Stormceptor is performed from the surface via vacuum truck.

If you require information about Stormceptor, or assistance in finding resources to facilitate inspections or maintenance of your Stormceptor please call your local Stormceptor Licensee or Imbrium® Systems.

2 – Stormceptor Operation & Components

Stormceptor is a flexibly designed underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention using patented flow separation technology.

Stormceptor creates a non-turbulent treatment environment below the insert platform within the system. The insert diverts water into the lower chamber, allowing free oils and debris to rise, and sediment to settle under relatively low velocity conditions. These pollutants are trapped and stored below the insert and protected from large runoff events for later removal during the maintenance procedure.

With thousands of units operating worldwide, Stormceptor delivers reliable protection every day, in every storm. The patented Stormceptor design prohibits the scour and release of captured pollutants, ensuring superior water quality treatment and protection during even the most extreme storm events. Stormceptor's proven performance is backed by the longest record of lab and field verification in the industry.

Stormceptor Schematic and Component Functions

Below are schematics of two common Stormceptor configurations with key components identified and their functions briefly described.

Figure 1.

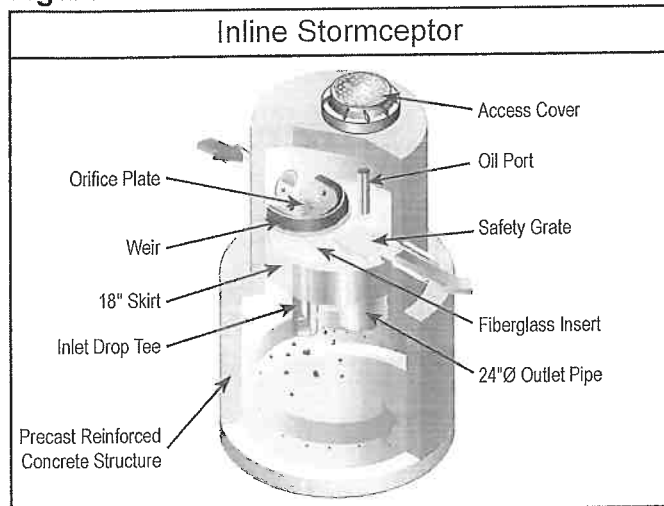
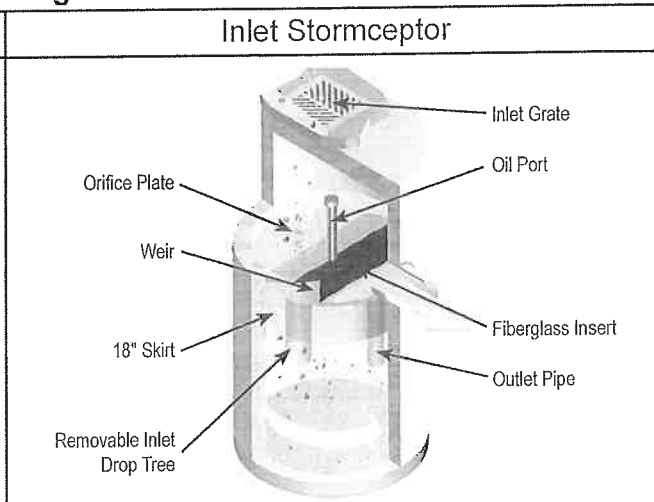


Figure 2.



- **Manhole access cover** – provides access to the subsurface components
- **Precast reinforced concrete structure** – provides the vessel's watertight structural support
- **Fiberglass insert** – separates vessel into upper and lower chambers
- **Weir** – directs incoming stormwater and oil spills into the lower chamber
- **Orifice plate** – prevents scour of accumulated pollutants
- **Inlet drop tee** – conveys stormwater into the lower chamber
- **Fiberglass skirt** – provides double-wall containment of hydrocarbons
- **Outlet riser pipe** – conveys treated water to the upper chamber; primary vacuum line access port for sediment removal
- **Oil inspection port** – primary access for measuring oil depth and oil removal
- **Safety grate** – safety measure to cover riser pipe in the event of manned entry into vessel

3 – Stormceptor Identification

Stormceptor is available in both precast concrete and fiberglass vessels, with precast concrete often being the dominant material of construction.

In the Stormceptor, a patented, engineered fiberglass insert separates the structure into an upper chamber and lower chamber. The lower chamber will remain full of water, as this is where the pollutants are sequestered for later removal. Multiple Stormceptor model (STC, OSR, EOS, MAX and STF) configurations exist, each to be inspected and maintained in a similar fashion.

Each unit is easily identifiable as a Stormceptor by the trade name "Stormceptor" embossed on each access cover at the surface. To determine the location of "inlet" Stormceptor units with horizontal catch basin inlet, look down into the grate as the Stormceptor insert will be visible. The name "Stormceptor" is not embossed on inlet models due to the variability of inlet grates used/ approved across North America.

Once the location of the Stormceptor is determined, the model number may be identified by comparing the measured depth from the fiberglass insert level at the outlet pipe's invert (water level) to the bottom of the tank using **Table 1**.

In addition, starting in 1996 a metal serial number tag containing the model number has been affixed to the inside of the unit, on the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the unit using depth measurements, please contact your local Stormceptor Representative for assistance.

Sizes/Models

Typical general dimensions and capacities of the standard precast STC, EOS & OSR Stormceptor models in both USA and Canada/International (excluding South East Asia and Australia) are provided in **Tables 1 and 2**. Typical rim to invert measurements are provided later in this document. The total depth for cleaning will be the sum of the depth from outlet pipe invert (generally the water level) to rim (grade) and the depth from outlet pipe invert to the precast bottom of the unit. Note that depths and capacities may vary slightly between regions.

Table 1A. (US) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (in.)	EOS Model	Insert to Base (in.)	OSR Model	Insert to Base (in.)	Typical STF m (in.)
450	60	4-175	60	65	60	1.5 (60)
900	55	9-365	55	140	55	1.5 (61)
1200	71	12-590	71			1.8 (73)
1800	105	18-1000	105			2.9 (115)
2400	94	24-1400	94	250	94	2.3 (89)
3600	134	36-1700	134			3.2 (127)
4800	128	48-2000	128	390	128	2.9 (113)
6000	150	60-2500	150			3.5 (138)
7200	134	72-3400	134	560	134	3.3 (128)
11000*	128	110-5000*	128	780*	128	
13000*	150	130-6000*	150			
16000*	134	160-7800*	134	1125*	134	

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

*Consist of two chamber structures in series.

Table 1B. (CA & Int'l) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (m)	EOS Model	Insert to Base (m)	OSR Model	Insert to Base (m)	Typical STF m (in.)
300	1.5	300	1.5	300	1.7	1.5 (60)
750	1.5	750	1.5	750	1.6	1.5 (61)
1000	1.8	1000	1.8			1.8 (73)
1500	2.8					2.9 (115)
2000	2.8	2000	2.8	2000	2.6	2.3 (89)
3000	3.7	3000	3.7			3.2 (127)
4000	3.4	4000	3.4	4000	3.6	2.9 (113)
5000	4.0	5000	4.0			3.5 (138)
6000	3.7	6000	3.7	6000	3.7	3.3 (128)
9000*	3.4	9000*	3.4	9000*	3.6	
11000*	4.0	10000*	4.0			
14000*	3.7	14000*	3.7	14000*	3.7	

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

**Consist of two chamber structures in series.*

Table 2A. (US) Storage Capacities

STC Model	Hydrocarbon Storage Capacity gal	Sediment Capacity ft ³	EOS Model	Hydrocarbon Storage Capacity gal	OSR Model	Hydrocarbon Storage Capacity gal	Sediment Capacity ft ³
450	86	46	4-175	175	065	115	46
900	251	89	9-365	365	140	233	58
1200	251	127	12-590	591			
1800	251	207	18-1000	1198			
2400	840	205	24-1400	1457	250	792	156
3600	840	373	36-1700	1773			
4800	909	543	48-2000	2005	390	1233	465
6000	909	687	60-2500	2514			
7200	1059	839	72-3400	3418	560	1384	690
11000*	2797	1089	110-5000*	5023	780*	2430	930
13000*	2797	1374	130-6000*	6041			
16000*	3055	1677	160-7800*	7850	1125*	2689	1378

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

**Consist of two chamber structures in series.*

Table 2B. (CA & Int'l) Storage Capacities

STC Model	Hydrocarbon Storage Capacity L	Sediment Capacity L	EOS Model	Hydrocarbon Storage Capacity L	OSR Model	Hydrocarbon Storage Capacity L	Sediment Capacity L
300	300	1450	300	662	300	300	1500
750	915	3000	750	1380	750	900	3000
1000	915	3800	1000	2235			
1500	915	6205					
2000	2890	7700	2000	5515	2000	2790	7700
3000	2890	11965	3000	6710			
4000	3360	16490	4000	7585	4000	4700	22200
5000	3360	20940	5000	9515			
6000	3930	26945	6000	12940	6000	5200	26900
9000*	10555	32980	9000*	19010	9000*	9300	33000
11000*	10555	37415	10000*	22865			
14000*	11700	53890	14000*	29715	14000*	10500	53900

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

**Consist of two chamber structures in series.*

4 – Stormceptor Inspection & Maintenance

Regular inspection and maintenance is a proven, cost-effective way to maximize water resource protection for all stormwater pollution control practices, and is required to insure proper functioning of the Stormceptor. Both inspection and maintenance of the Stormceptor is easily performed from the surface. Stormceptor's patented technology has no moving parts, simplifying the inspection and maintenance process.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess the sediment accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

When is maintenance cleaning needed?

- For optimum performance, the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, which is approximately 15% of the unit's total storage capacity (see **Table 2**). The frequency should be adjusted based on historical inspection results due to variable site pollutant loading.

- Sediment removal is easier when removed on a regular basis at or prior to the recommended maintenance sediment depths, as sediment build-up can compact making removal more difficult.
- The unit should be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise Stormceptor performance?

- If construction sediment and debris is not removed prior to activating the Stormceptor unit, maintenance frequency may be reduced.
- If the system is not maintained regularly and fills with sediment and debris beyond the capacity as indicated in **Table 2**, pollutant removal efficiency may be reduced.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured.
- If debris clogs the inlet of the system, removal efficiency of sediment and hydrocarbons may be reduced.
- If a downstream blockage occurs, a backwater condition may occur for the Stormceptor and removal efficiency of sediment and hydrocarbons may be reduced.

What training is required?

The Stormceptor is to be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. For typical inspection and maintenance activities, no specific supplemental training is required for the Stormceptor. Information provided within this Manual (provided to the site owner) contains sufficient guidance to maintain the system properly.

In unusual circumstances, such as if a damaged component needs replacement or some other condition requires manned entry into the vessel, confined space entry procedures must be followed. Only professional maintenance service providers trained in these procedures should enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically 3/4-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

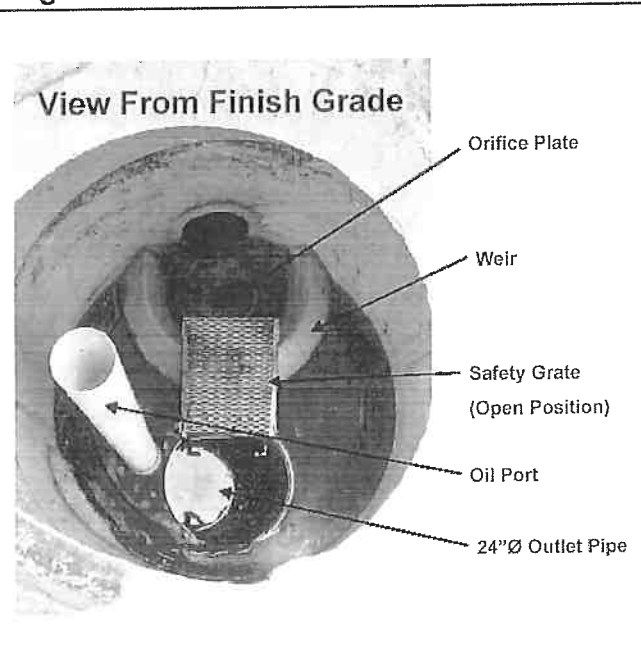
Recommended Stormceptor Inspection Procedure:

- Stormceptor is to be inspected from grade through a standard surface manhole access cover.
- Sediment and oil depth inspections are performed with a sediment probe and oil dipstick.
- Oil depth is measured through the oil inspection port, either a 4-inch (100 mm) or 6-inch (150 mm) diameter port.
- Sediment depth can be measured through the oil inspection port or the 24-inch (610 mm) diameter outlet riser pipe.
- Inspections also involve a visual inspection of the internal components of the system.

Figure 3.



Figure 4.



What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required

Recommended Stormceptor Maintenance Procedure

Maintenance of Stormceptor is performed using a vacuum truck.

No entry into the unit is required for maintenance. **DO NOT ENTER THE STORMCEPTOR CHAMBER** unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146 or Canada Occupational Safety and Health Regulations – SOR/86-304). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local, provincial, and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
 - For 6-ft (1800 mm) diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch (610 mm) outlet riser pipe.
 - For 4-ft (1200 mm) diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch (305 mm) drop tee hole.

Figure 5.

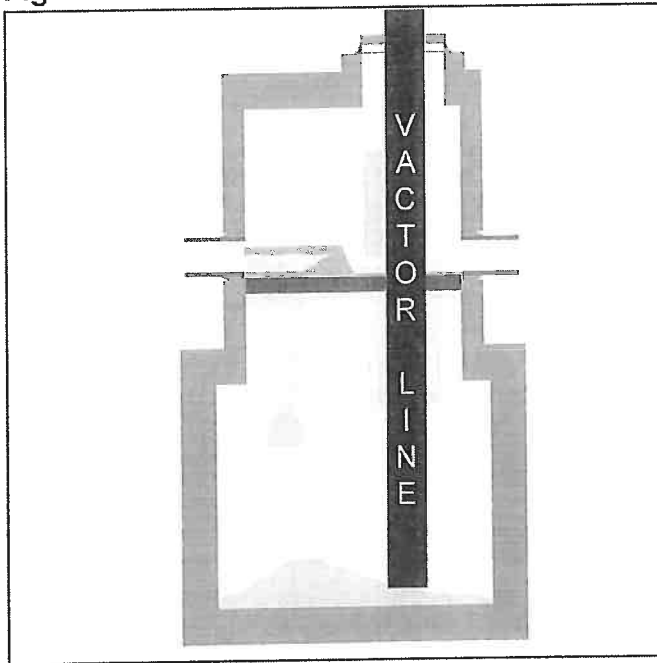
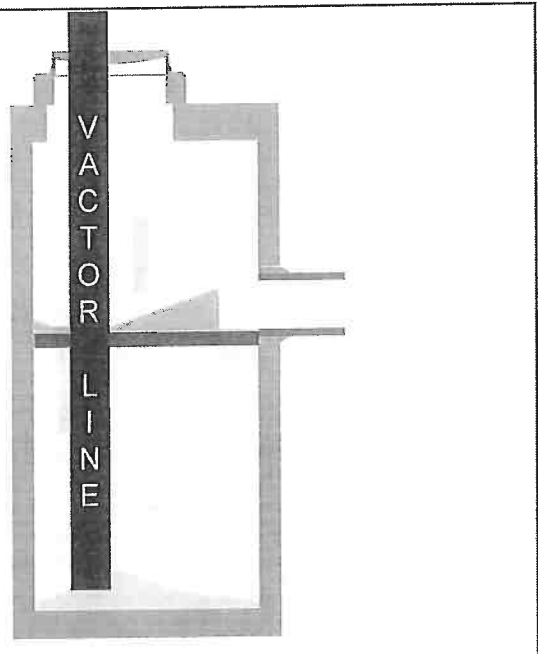


Figure 6.

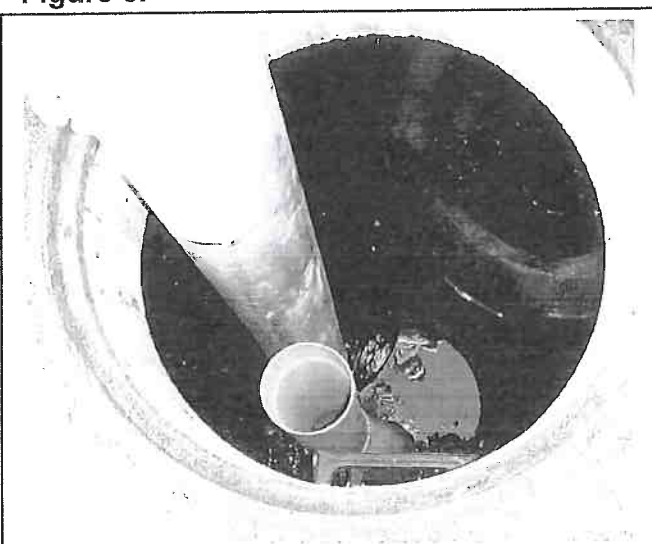


- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

Figure 7.



Figure 8.



A maintenance worker stationed at the above ground surface uses a vacuum hose to evacuate water, sediment, and debris from the system.

What is required for proper disposal?

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

What about oil spills?

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a hydrocarbon rainbow or sheen can be seen at

very small oil concentrations (< 10 ppm). Stormceptor is effective at removing 95% of free oil, and the appearance of a sheen at the outlet with high influent oil concentrations does not mean that the unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

What factors affect the costs involved with inspection/maintenance?

The Vacuum Service Industry for stormwater drainage and sewer systems is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean Stormceptor units will vary. Inspection and maintenance costs are most often based on unit size, the number of units on a site, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations.

What factors predict maintenance frequency?

Maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, site activity and use, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high from an unstable site or sediment loads transported from upstream catchments, maintenance may be required semi-annually. Conversely once a site has stabilized, maintenance may be required less frequently (for example: two to seven year, site and situation dependent). Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in **Table 3** based on the unit size.

Table 3A. (US) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (in)	EOS Model	Maintenance Sediment depth (in)	Oil Storage Depth (in)	OSR Model	Maintenance Sediment depth (in)
450	8	4-175	9	24	065	8
900	8	9-365	9	24	140	8
1200	10	12-590	11	39		
1800	15					
2400	12	24-1400	14	68	250	12
3600	17	36-1700	19	79		
4800	15	48-2000	16	68	390	17
6000	18	60-2500	20	79		
7200	15	72-3400	17	79	560	17
11000*	17	110-5000*	16	68	780*	17
13000*	20	130-6000*	20	79		
16000*	17	160-7800*	17	79	1125*	17

Note:

1. The values above are for typical standard units.

**Per structure.*

Table 3B. (CA & Int'l) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (mm)	EOS Model	Maintenance Sediment depth (mm)	Oil Storage Depth (mm)	OSR Model	Maintenance Sediment depth (mm)
300	225	300	225	610	300	200
750	230	750	230	610	750	200
1000	275	1000	275	990		
1500	400					
2000	350	2000	350	1727	2000	300
3000	475	3000	475	2006		
4000	400	4000	400	1727	4000	375
5000	500	5000	500	2006		
6000	425	6000	425	2006	6000	375
9000*	400	9000*	400	1727	9000*	425
11000*	500	10000*	500	2006		
14000*	425	14000*	425	2006	14000*	425

Note:

1. The values above are for typical standard units.

*Per structure.

Replacement parts

Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. Therefore, inspection and maintenance activities are generally focused on pollutant removal. However, if replacements parts are necessary, they may be purchased by contacting your local Stormceptor Representative, or Imbrium Systems.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to Stormceptor's long and effective service life.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Allowable Sediment Depth: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Other Comments: _____

Contact Information

Questions regarding the Stormceptor can be addressed by contacting your area Stormceptor Licensee, Imbrium Systems, or visit our website at www.stormceptor.com.

Stormceptor Licensees:

CANADA

Lafarge Canada Inc.

www.lafargepipe.com

403-292-9502 / 1-888-422-4022

780-468-5910

204-958-6348

Calgary, AB

Edmonton, AB

Winnipeg, MB, NW. ON, SK

Langley Concrete Group

www.langleyconcretegroup.com

604-502-5236

BC

Hanson Pipe & Precast Inc.

www.hansonpipeandprecast.com

519-622-7574 / 1-888-888-3222

ON

Lécuyer et Fils Ltée.

www.lecuyerbeton.com

450-454-3928 / 1-800-561-0970

QC

Strescon Limited

www.strescon.com

902-494-7400

506-633-8877

NS, NF

NB, PE

UNITED STATES

Rinker Materials

www.rinkerstormceptor.com

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Email

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www.imbriumsystems.com

www.stormceptor.com

CHAPTER 12: STORMWATER MANAGEMENT STANDARD 10

Chapter 12:

Standard 10: Prohibition of Illicit Discharges

- The Long Term Pollution Prevention Plan includes the required measures to prevent the illicit discharges.
- All Catch basins and drain inlets shall be labeled with signage to prohibit the release of any illicit substance into the drainage system.
- No floor drains will be connected to the drainage system.
- No washing of vehicles shall be permitted
- All operations and managers of the facility will be provided with training and education concerning the danger of illicit discharges into the drainage system.

Illicit Discharge Certification

I have read Standard 10 of the Massachusetts Stormwater Management Policy regarding Illicit Discharges. I have also studied the Proposed Site Plans and Stormwater Operation and Maintenance Plan and am aware of the components of the Stormwater Management System proposed at the proposed Windsor Place residential development at 24 School Street in Wayland, Massachusetts. I hereby certify that there will be no illicit discharges, as defined by the Policy, from the site through any part of the Stormwater Management System.

Signature

Name and Title

Date