

Appendix A: Wastewater Disposal Area Soil and Percolation Testing
and Groundwater Monitoring and Mounding Analysis

To: Sherborn BOH
Ben Stevens Bruce Saluk
From: Desheng Wang
Re: 247A Washington Street, Sherborn

Revisions
11/14/2014 2/10/2015 7/3/2015 7/8/2015 7/11/2015

Summary of Soil Evaluation
247A Washington Street, Sherborn

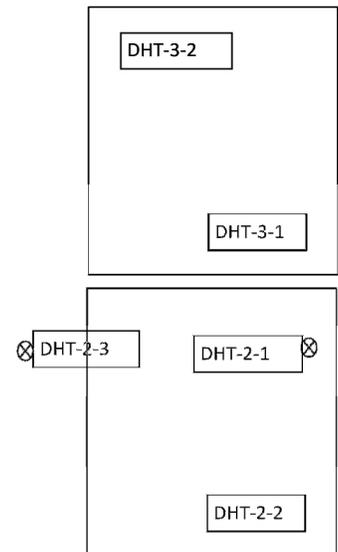
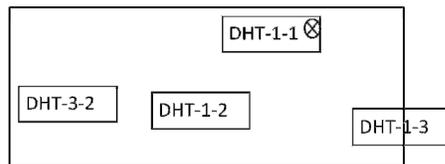
Lot	TP#	Soil	Date	TP Depth Inches	H.G.W. Inches	Percolation rate* MPI	Percoation Depth Inches	Notes	Corrected HW ft
Area 1	DHT-1-1	co. m. s	04/11/14	276	156	<2	66		179.36
	DHT-1-2	co. m. s	04/11/14	192	168	<2	60		
	DHT-1-3	co. m. s	04/11/14	192	168			observation	
Area 2	DHT-2-1	co. m. s	04/11/14	300	156	<2	78		177.7
	DHT-2-2	co. m. s	04/11/14	180	180+	<2	54		
	DHT-2-3	co. m. s	04/11/14	276	144			observation	
Area 3	DHT-3-1	co. m. s	06/25/15	132	132+	<2	58		172.4
	DHT-3-2	co. m. s	06/25/15	132	120+	<2	54		
Area 1	DHT-3-3	co. m. s	06/25/15	180	180+			observation	
Ground water mound:		0.2	ft						

+ estimated high water tables.

Witnessed by: Mark Oram



⊗ Monitoring well



Testing Area Sketch

Notes:

1. The referenced USGS well for ground water correction was measured on the same day as the onsite water measurement, which was measured together with Mr. Mark Oram.
2. The ground water correction was calculated using Flimptner Method. In addition, we have monitored the site for two high water season. The monitored max water table does not exceed the calculated probable high water table. Therefore, we believe that our correction is reasonable and conservative for this site to be used for design purpose. The monitored water table is attached for reference.

Creative Land & Water Engineering, LLC*Environmental Science and Engineering Service***P.O. Box 584, Southborough, MA 01772**

Tel: (508)281-4370

Email: desheng@yahoo.com

Subject: Estimate Hi-WT by USGS (Frimpter) Method247A Washington StSherborn, MA**By:** DSW**Date:** 8-Apr-15**Chkd:** _____**Date:** _____**Location:** _____**Job No.:** J269-1**Sheet:** 1**Formulation**

$$Sc - Sh / OWc - OWmax = Sr / OWr$$

$$Sh = Sc - Sr / OWr (OWc - OWmax)$$

in which, Sc = measured depth to water at the site;

Sh = estimated depth to probable high water level at the site;

OWc = measured depth to water in the observation well;

OWmax = depth to recorded maximum water table at the observation well;

Sr = range of water where the site is located;

OWr = recorded upper limit of annual range of water level at the observation well.

Input Report**USGS observation well: WKW 2 WAYLAND, MA**

Date	MW	Soil Type	Sc ft	Sr ft	OWc ft	OWmax ft	OWr ft	Ground Elev. ft
4/23/2014	HDT 1-1	Valley sand	15.38	3.7	14.93	13.39	3.7	193.2
	DHT 2-1	Valley sand	13.84	3.7	14.93	13.39	3.7	190
	DHT 2-3	Valley sand	16.24	3.7	14.93	13.39	3.7	187.1

Output Report

Date	MW	Depth to High Water Table on-site (Sh, ft)	High Water Table Elev. (ft)
Oct. 20, 1998	HDT 1-1	13.84	179.36
	DHT 2-1	12.30	177.70
	DHT 2-3	14.70	172.40
	0		
	0		
	0		

Notes:

1. Groundwater level in WKW2 was measured on 4/23/2014.
2. Onsite ground water was measured with Mr. Mark Oram on 4/23/2014

Groundwater Mounding Calculation under Soil Absorption (Leaching) Area

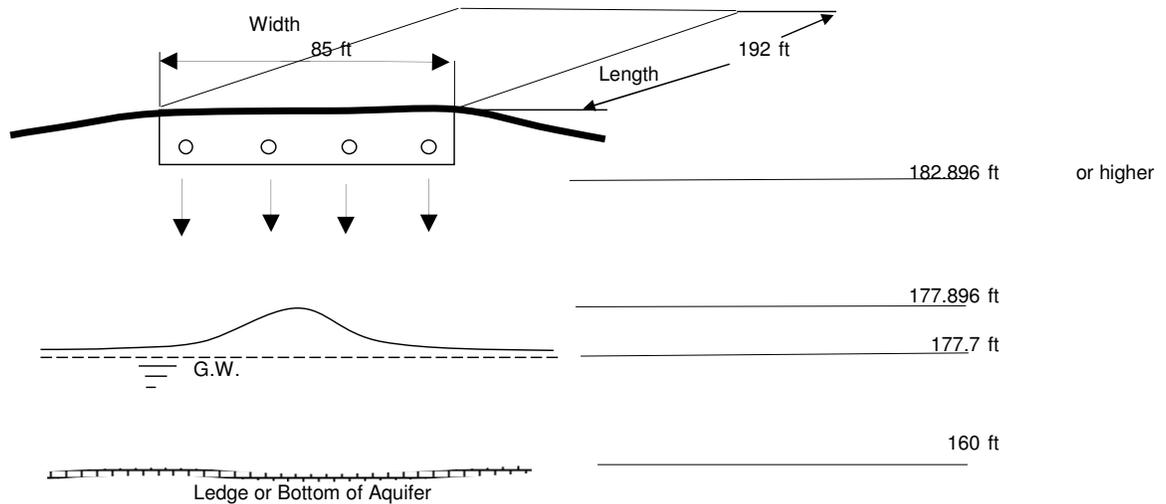
The minimum vertical separation from top of the mound shall comply with 310 CMR 15.212 or applied rules and regulations.
 The detailed method of calculations can be found in [4].

Input Report:

Application Flow (GPD):	6160	0.00953	cfs
Euler's Constant:	0.57722	Time (days):	90.00
Aquifer Specific Yield	0.26	Max. Mounding (H, ft) [3]:	0.196
Soil Conductivity (ft/s):	1.45E-03	Width of SAS (ft):	85
Aquifer bottom elevation(ft):	160	Length of SAS (ft):	192
Water table (ft):	177.7		
Mimimum separation from GW(ft):	5		

Output Report:

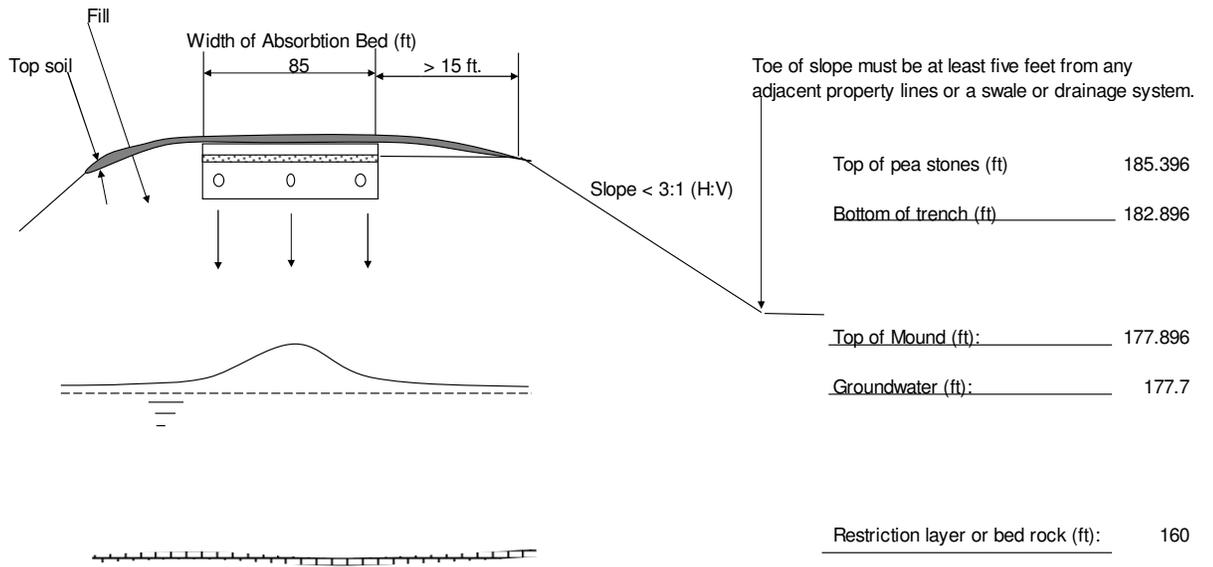
Mounding elevation (ft):	177.896	Trench bottom ele. (ft):	182.896
Aspect ratio r= L/W:	2.259	J(r) function:	1.45231
Average aquifer depth (ft):	17.7	u function:	0.00359
Maximum infiltration (GPD):	6190.569	Minimum Time(days):	4.32236
Design infiltration (GPD):	6160	Actual time (days):	90



References:

- [1] Schueler, T. R. (1987) "Controlling Urban Runoff," Metropolitan Council of Governments, Washington D.C.
- [2] Urbonas, B. and Stahre, P. (1993) "Stormwater Best Management Practices and Detention for Water Quality, Drainage, and CSO Management" PTR Prentice Hall, Englewood Cliffs, New Jersey 07632.
- [3] U.S. D. I. (1974) "Earth Manual -A Water Resources Technical Publication", Washington D. C.
- [4] Finnemore, J. (1993) "Estimation of Groundwater Mounding Beneath Septic Drain Fields," Ground Water, Associ. of Ground Water Scientists and Engineers, Vol. 31, No. 6, 884-889.
- [5] Williams, J. R. and Tasker, G. D. (1974) "Water Resources of the Coastal Drainage Basins of Southeastern Mass., Weir River, Higham, to Jones River, Kingston, Atlas HA-504, USGS.

Designer: Desheng Wang
 Creative Land & Water Engineering, LLC
 P.O. Box 584, Southborough, MA 01772
 Tel: (508)281-4370 email: deshengw@yahoo.com



Cross Section of the Mounding System and Slope Requirements for Construction
 310 CMR 15.255

Groundwater Monitoring

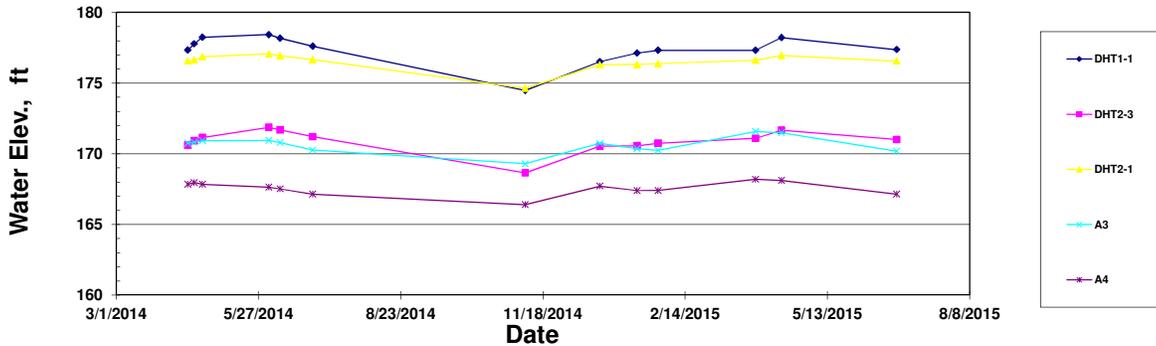
Checked: 4/9/2015 4/15/2015 7/3/2015

Site: 247 Washington Street, Sherborn, MA

Location	Standing pipe	Rim or Well Top	Ground surface	Depth to Bottom	4/14/2014	4/18/2014	4/23/2014	6/3/2014	6/10/2014	6/30/2014	#####	12/24/2014	1/16/2015	1/29/2015	3/30/2015	4/15/2015	6/25/2015	diff	Perc rate
TP#	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	mpi
DHT 1-1	4.11	197.31	193.2		19.98	19.54	19.08	18.89	19.15	19.71	22.84	20.8	20.19	20	20	19.1	19.95	3.95	<-2
DHT 1-2			196.6																
DHT 1-3			196.3																
DHT 2-3	3.5	190.6	187.1		20.00	19.68	19.46	18.74	18.92	19.40	21.97	20.08	20.05	19.87	19.52	18.95	19.60	3.23	<-2
DHT 2-2			198																
DHT 2-1	3.6	193.6	190		17.05	16.98	16.74	16.55	16.68	16.95	18.97	17.31	17.3	17.23	17	16.65	17.05	2.42	<-2
A3	1.7	182.8	181.1		12.06	12	11.89	11.87	12.02	12.55	13.52	12.08	12.45	12.57	11.24	11.32	12.63	2.28	
A4	1.3	170.3	169		2.47	2.35		2.68	2.8	3.18	3.92		2.6	2.92	2.92	2.12	2.2	3.18	1.8
STP-1	1.25	182.45	181.2				13.62					13.58	14.19	14.26		12.79	14.62	1.47	
STP-2	3.47	189.17	185.7											22.35	21.92	20.75	23.13	1.6	
STP-3	2.1	178.7	176.6											10.39	8.83	8.98	11.2	1.56	
STP-4	3.5	171.8	168.3											8.11	6.58	7.25	9.14	1.53	
STP-5	2.3	171.8	169.5											7.99	6.86	6.84	9.04	1.15	
STP-6	0.99	171.79	170.8											8	8.56	8.22	9.81	0.56	
STP-7	1	172.2	171.2											7.28	6.67	6.48	7.67	0.8	
STP-8	1.84	173.74	171.9											5.67	4.37	4.47	5.77	1.3	
STP-9	1.06	185.16	184.1											17.43	15.85	15.92	17.24	1.58	

Location	Standing pipe	Rim or Well Top	Ground surface	Depth to Bottom	4/14/2014	4/18/2014	4/23/2014	6/3/2014	6/10/2014	6/30/2014	#####	12/24/2014	1/16/2015	1/29/2015	3/30/2015	4/15/2015	6/25/2015	Max WL	GS to HGW	Corrected HGW	Max waterdept	
TP#	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
DHT 1-1	4.11	197.31	193.2		177.33	177.77	178.23	178.42	178.16	177.6	174.47	176.51	177.12	177.31	177.31	178.21	177.36	178.42	-14.78	179.36	-14.78	
DHT 1-2			196.6																			
DHT 1-3			196.3																			
DHT 2-3	3.5	190.6	187.1		170.6	170.92	171.14	171.86	171.68	171.2	168.63	170.52	170.55	170.73	171.08	171.65	171	171.86	-15.24	172.4	-15.24	
DHT 2-2			198																			
DHT 2-1	3.6	193.6	190		176.55	176.62	176.86	177.05	176.92	176.65	174.63	176.29	176.3	176.37	176.6	176.95	176.55	177.05	-12.95	177.7	-12.95	
A3	1.7	182.8	181.1		170.74	170.8	170.91	170.93	170.78	170.25	169.28	170.72	170.35	170.23	171.56	171.48	170.17	171.56	-9.54		-9.54	
A4	1.3	170.3	169		167.83	167.95	167.82	167.62	167.5	167.12	166.38	167.7	167.38	167.38	168.18	168.1	167.12	168.18	-0.82		-0.82	
STP-1	0.25	182.45	181.2				168.83							168.87	168.26	168.19	169.66	167.83	169.66	-11.54		-11.54
STP-2	3.47	189.17	185.7											166.82	167.25	168.42	166.04	168.42	-17.28		-17.28	
STP-3	2.1	178.7	176.6											168.31	169.87	169.72	167.5	169.87	-6.73		-6.73	
STP-4	3.5	171.8	168.3											163.69	165.22	164.55	162.66	165.22	-3.08		-3.08	
STP-5	2.3	171.8	169.5											163.81	164.94	164.96	162.76	164.96	-4.54		-4.54	
STP-6	0.99	171.79	170.8											163.79	163.23	163.57	161.98	163.79	-7.01		-7.01	
STP-7	1	172.2	171.2											164.92	165.53	165.72	164.53	165.72	-5.48		-5.48	
STP-8	1.84	173.74	171.9											168.07	169.37	169.27	167.97	169.37	-2.53		-2.53	
STP-9	1.06	185.16	184.1											167.73	169.31	169.24	167.92	169.31	-14.79		-14.79	

**Groundwater Table Chart
Washington Street, Sherborn, MA**



Stormwater:	Depth	Soil	Perc rate	date	DEP allowed	Test based (estimate)	Half rate to apply	times of DEP rate
STP-1	14 m.s.	11 spi	1/17/2014	8.27 iph	1.62E-03 ft/s	34.99 iph	4.23	
STP-2	12 m.co. s	16 spi	1/17/2014	8.27 iph	1.27E-03 ft/s	27.43 iph	3.32	
					1.45E-03 ft/s			
					1.55E-03 ft/s			
STP-11			1/19/2015	constant head test	3.10E-03 ft/s	66.92 iph	13.72 iph	
			6/25/2015	8.27 iph			8.09	

Groundwater Mounding Calculation under Soil Absorption (Leaching) Area

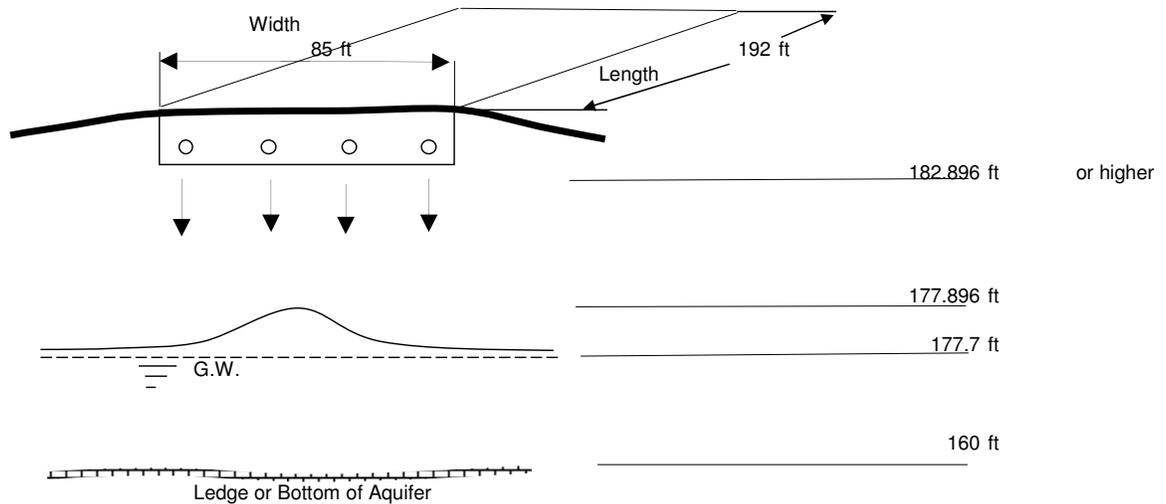
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 The detailed method of calculations can be found in [4].

Input Report:

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Euler's Constant:	0.57722	Time (days):	90.00
Aquifer Specific Yield	0.26	Max. Mounding (H, ft) [3]:	0.196
Soil Conductivity (ft/s):	1.45E-03	Width of SAS (ft):	85
Aquifer bottom elevation(ft):	160	Length of SAS (ft):	192
Water table (ft):	177.7		
Mimimum separation from GW(ft):	5		

Output Report:

Mounding elevation (ft):	177.896	Trench bottom ele. (ft):	182.896
Aspect ratio r= L/W:	2.259	J(r) function:	1.45231
Average aquifer depth (ft):	17.7	u function:	0.00359
Maximum infiltration (GPD):	6190.569	Minimum Time(days):	4.32236
Design infiltration (GPD):	6160	Actual time (days):	90



References:

- [1] Schueler, T. R. (1987) "Controlling Urban Runoff," Metropolitan Council of Governments, Washington D.C.
- [2] Urbonas, B. and Stahre, P. (1993) "Stormwater Best Management Practices and Detention for Water Quality, Drainage, and CSO Management" PTR Prentice Hall, Englewood Cliffs, New Jersey 07632.
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- [5] Williams, J. R. and Tasker, G. D. (1974) "Water Resources of the Coastal Drainage Basins of Southeastern Mass., Weir River, Higham, to Jones River, Kingston, Atlas HA-504, USGS.

FORM 11 - SOIL EVALUATOR FORM

No. DHT 1-1

Date: 2/9/2015

Commonwealth of Massachusetts

Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.

Date: 4/11/2014

Witnessed By: Mark Oram

Location Address <u>Washington Street</u> or Lot # <u>1</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn

Publication Scale: 1: 25,000

Soil Map Unit: 253C

Drainage Class: Hinckley

Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____

Publication Scale: _____

Geologic Material(Map Unit): _____

Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:

No Yes

Within 500 year flood boundary:

No Yes

Within 100 year flood boundary:

No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____

Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal

Month: April
Below Normal

Other References Revised: USGS Quadangle

FORM 11 - SOIL EVALUATOR FORM
Page 2 of 3

Location Address or Lot No. Washington Street

ON-SITE REVIEW

Deep Hole #: DHT 1-1 Date: 4/11/2014 Time: _____ Weather: suny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 8-15% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body: 100+ ft Drainageway: 100+ ft
Possible wet area: 200 ft Property line: 20+ ft
Drinking water well: 100+ ft other: _____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 10	A	S.L.	10 YR 2/1	none	friable
10 - 42	Bw	S.L.	2.5 Y 6/6	none	friable
42 - 156	C1	m. co. S	2.5Y 6/4	none	loose, 15% gravel
156 - 276	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

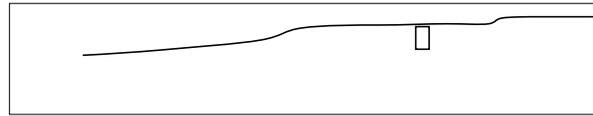
Parent Material (geologic): outwash Depth to Bedrock: 30+
Depth to Groundwater (ft): none Standing Water in the Hole (ft): none Weeping from Pit Face (ft): none
Estimated Seasonal High Ground Water (inches): _____ 180

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street

Determination for Seasonal High Water Table

Method Used: DHT 1-1



Depth observed standing in observation hole: None inches

Depth weeping from side of observation hole: None inches

Depth to soil mottles: _____ inches

Ground water adjustment: 15.38 feet

Index Well Number WKW 2 WAYLAND, MA Reading Date 4/23/14 Index Well Level 14.93

Adjustment Factor -1.54 Adjusted Ground Water Level 13.84 ft

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang

Date 2/9/2015

Determination for Seasonal High Water Table

Method Used:

- Depth observed standing water in observation hole no inches
- Depth weeping from side of observation hole no inches
- Depth to soil mottles no inches
- Ground water adjustment -1.54 feet

Index Well number:
Adjustment factor:

Reading Date 4/23/2014
Adjusted ground water level

Index well level:

Percolation Test		
Date:	4/11/2014	Time: 12:35 PM
Observation Hole #	DHT 1-1	
Depth of Perc, in	66	
Start Pre-soak	12:35 PM	
End Pre-soak	12:50 PM	
Time at 12"	could not maintain level	
Time at 9"	used 24 gallons	
Time at 6"		
Time (9"-6")		
Rate Min./Inch	<2 mpi	

Site Suitability Assessment:

Site passed

Site Failed

Additional Testing Needed:

Performed By: Desheng Wang
Witnessed By: Mark Oram

Certification Number:

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 1-2

Date: 2/9/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 4/11/2014

Location Address <u>Washington Street</u> or Lot # <u>1</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 251A
Drainage Class: Haven
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal
Other References Revised: USGS Quadangle

Month: April
Below Normal

FORM 11 - SOIL EVALUATOR FORM
Page 2 of 3

Location Address or Lot No. Washington Street

ON-SITE REVIEW

Deep Hole #: DHT 1-2 Date: 4/11/2014 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 0-3% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body:	<u>100+</u> ft	Drainageway:	<u>100+</u> ft
Possible wet area:	<u>200</u> ft	Property line:	<u>20+</u> ft
Drinking water well:	<u>100+</u> ft	other:	_____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 12	A	S.L.	10 YR 2/1	none	friable
12 - 36	Bw	S.L.	2.5 Y 6/6	none	friable
36 - 168	C1	Co m S	2.5 Y 6/4	none	loose, 15% gravel
168 - 196	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

Parent Material (geologic):	<u>outwash</u>	Depth to Bedrock:	<u>30+</u>
Depth to Groundwater (ft):	<u>none</u>	Standing Water in the Hole (ft):	<u>none</u>
	Estimated Seasonal High Ground Water (inches):	Weeping from Pit Face (ft):	<u>160</u>
			<u>none</u>

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street

Determination for Seasonal High Water Table

Method Used: DHT 1-2 

Depth observed standing in observation hole: None inches

Depth weeping from side of observation hole: None inches

Depth to soil mottles: _____ inches

Ground water adjustment: _____ feet

Index Well Number WKW 2 WAYLAND, MA Reading Date 4/23/14 Index Well Level 14.93

Adjustment Factor -1.54 Adjusted Ground Water Level 13.84 ft

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang Date 2/9/2015

Determination for Seasonal High Water Table

Method Used:

- Depth observed standing water in observation hole no inches
- Depth weeping from side of observation hole no inches
- Depth to soil mottles no inches
- Ground water adjustment -1.54 feet

Index Well number:
Adjustment factor:

Reading Date 4/23/2014
Adjusted ground water level

Index well level:

Percolation Test		
Date:	4/11/2014	Time: 1:00 PM
Observation Hole #	DHT 1-2	
Depth of Perc, in	66	
Start Pre-soak	1:00 PM	
End Pre-soak	1:15 PM	
Time at 12"	could not maintain level	
Time at 9"	used 24 gallons	
Time at 6"		
Time (9"-6")		
Rate Min./Inch	<2 mpi	

Site Suitability Assessment:

Site passed Site Failed

Additional Testing Needed:

Performed By: Desheng Wang

Certification Number:

Witnessed By: Mark Oram

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 1-3 - deep hole only

Date: 2/9/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 4/11/2014

Location Address <u>Washington Street</u> or Lot # <u>1</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 251A
Drainage Class: Haven
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal
Other References Revised: USGS Quadangle

Month: April
Below Normal

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 1-3 - deep hole only Date: 4/11/2014 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 0-3% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body:	<u>100+</u> ft	Drainageway:	<u>100+</u> ft
Possible wet area:	<u>200</u> ft	Property line:	<u>20+</u> ft
Drinking water well:	<u>100+</u> ft	other:	_____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 12	A	S.L.	10 YR 2/1	none	friable
12 - 36	Bw	S.L.	2.5 Y 6/6	none	friable
36 - 168	C1	Co m S	2.5 Y 6/4	none	loose, 15% gravel
168 - 196	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

Parent Material (geologic): <u>outwash</u>	Depth to Bedrock: <u>30+</u>
Depth to Groundwater (ft): <u>none</u>	Standing Water in the Hole (ft): <u>none</u>
Estimated Seasonal High Ground Water (inches): _____	Weeping from Pit Face (ft): <u>none</u>
	<u>180+</u>

DEP APPROVED FROM - 12/07/95

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 2-1

Date: 2/9/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 4/11/2014

Location Address <u>Washington Street</u> or Lot # <u>2</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 253C
Drainage Class: Hinckley
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal
Other References Revised: USGS Quadangle

Month: April
Below Normal

FORM 11 - SOIL EVALUATOR FORM

Page 2 of 3

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 2-1 Date: 4/11/2014 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 0-3% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body:	<u>100+</u> ft	Drainageway:	<u>100+</u> ft
Possible wet area:	<u>200</u> ft	Property line:	<u>20+</u> ft
Drinking water well:	<u>100+</u> ft	other:	_____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 6	A	S.L.	10 YR 2/1	none	friable
6 - 24	Bw	S.L.	2.5 Y 6/6	none	friable
24 - 156	C1	Co m S	2.5 Y 6/4	none	loose, 15% gravel
156 - 300	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

Parent Material (geologic): <u>outwash</u>	Depth to Bedrock: <u>30+</u>
Depth to Groundwater (ft): <u>none</u>	Standing Water in the Hole (ft): <u>none</u>
Estimated Seasonal High Ground Water (inches): _____	Weeping from Pit Face (ft): <u>none</u>
	<u>160</u>

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street

Determination for Seasonal High Water Table

Method Used:

DHT 2-1



Depth observed standing in observation hole: none inches

Depth weeping from side of observation hole: none inches

Depth to soil mottles: _____ inches

Ground water adjustment: 13.84 feet

Index Well Number WKW 2 WAYLAND, MA Reading Date 4/23/14 Index Well Level 14.93

Adjustment Factor -1.54 Adjusted Ground Water Level 12.3

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang Date 2/9/2015

Determination for Seasonal High Water Table

Method Used:

- Depth observed standing water in observation hole no inches
- Depth weeping from side of observation hole no inches
- Depth to soil mottles no inches
- Ground water adjustment -1.54 feet

Index Well number:
Adjustment factor:

Reading Date 4/23/2014
Adjusted ground water level

Index well level:

Percolation Test		
Date:	4/11/2014	Time: 1:15 PM
Observation Hole #	DHT 2-1	
Depth of Perc, in	78	
Start Pre-soak	1:15 PM	
End Pre-soak	1:30 PM	
Time at 12"	could not maintain level	
Time at 9"	used 24 gallons	
Time at 6"		
Time (9"-6")		
Rate Min./Inch	<2 mpi	

Site Suitability Assessment:

Site passed

Site Failed

Additional Testing Needed:

Performed By: Desheng Wang
Witnessed By: Mark Oram

Certification Number:

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 2-2

Date: 2/9/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 4/11/2014

Location Address <u>Washington Street</u> or Lot # <u>2</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 251A
Drainage Class: Haven
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal

Month: April
Below Normal

Other References Revised: USGS Quadangle

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 2-2 Date: 7/30/2013 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 0-3% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body: <u>100+</u> ft	Drainageway: <u>100+</u> ft
Possible wet area: <u>200</u> ft	Property line: <u>20+</u> ft
Drinking water well: <u>100+</u> ft	other: _____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 10	A	S.L.	10 YR 3/2	none	friable
10 - 36	Bw	S.L.	2.5 Y 6/6	none	friable
36 - 132	C1	Co m S	2.5 Y 6/4	none	loose, 15% gravel
132 - 180	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

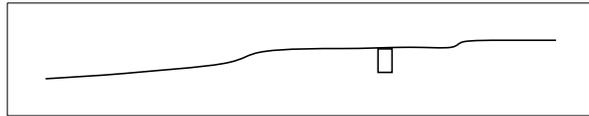
Parent Material (geologic): <u>outwash</u>	Depth to Bedrock: <u>30+</u>
Depth to Groundwater (ft): <u>none</u>	Standing Water in the Hole (ft): <u>none</u>
Estimated Seasonal High Ground Water (inches): _____	Weeping from Pit Face (ft): <u>none</u>
	<u>180+</u>

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street

Determination for Seasonal High Water Table

Method Used: DHT 2-2



- Depth observed standing in observation hole: none inches
- Depth weeping from side of observation hole: none inches
- Depth to soil mottles: _____ inches
- Ground water adjustment: _____ feet

Index Well Number WKW 2 WAYLAND, MA Reading Date 4/23/14 Index Well Level 14.93
 Adjustment Factor -1.54 Adjusted Ground Water Level 15

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang Date 2/9/2015

Determination for Seasonal High Water Table

Method Used:

- Depth observed standing water in observation hole no inches
- Depth weeping from side of observation hole no inches
- Depth to soil mottles inches
- Ground water adjustment -1.54 feet

Index Well number:
Adjustment factor:

Reading Date
Adjusted ground water level

Index well level:

Percolation Test			
Date:	4/11/2014	Time:	11:31 AM
Observation Hole #	DHT 2-2		
Depth of Perc, in	54		
Start Pre-soak	1:20 PM		
End Pre-soak			
Time at 12"	could not maintain level		
Time at 9"	used 24 gallons		
Time at 6"			
Time (9"-6")			
Rate Min./Inch	<2		

Site Suitability Assessment:

Site passed

Site Failed

Additional Testing Needed:

Performed By: Desheng Wang

Certification Number:

Witnessed By: Mark Oram

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 2-3 deep hole only

Date: 2/9/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 4/11/2014

Location Address <u>Washington Street</u> or Lot # <u>2</u>	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 253C
Drainage Class: Hinckley
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal

Month: April
Below Normal

Other References Revised: USGS Quadangle

FORM 11 - SOIL EVALUATOR FORM

Page 2 of 3

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 2-3 Date: 4/11/2014 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 0-3% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body: <u>100+</u> ft	Drainageway: <u>100+</u> ft
Possible wet area: <u>200</u> ft	Property line: <u>20+</u> ft
Drinking water well: <u>100+</u> ft	other: _____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 8	A	S.L.	10 YR 3/2	none	friable
8 - 36	Bw	S.L.	2.5 Y 6/6	none	friable
36 - 144	C1	Co m S	2.5 Y 6/4	none	loose, 15% gravel
144 - 276	C2	f m S	2.5 YR 6/2	none	loose

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

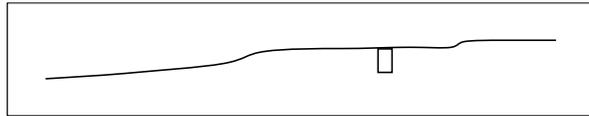
Parent Material (geologic): <u>outwash</u>	Depth to Bedrock: <u>30+</u>
Depth to Groundwater (ft): <u>none</u>	Standing Water in the Hole (ft): <u>none</u>
Estimated Seasonal High Ground Water (inches): _____	Weeping from Pit Face (ft): <u>none</u>
	<u>180</u>

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street

Determination for Seasonal High Water Table

Method Used: DHT 2-3



Depth observed standing in observation hole: none inches

Depth weeping from side of observation hole: none inches

Depth to soil mottles: _____ inches

Ground water adjustment: 16.24 feet

Index Well Number WKW 2 WAYLAND, MA Reading Date 4/23/14 Index Well Level 14.93

Adjustment Factor -1.54 Adjusted Ground Water Level 14.7

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang Date 2/9/2015

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 3-1

Date: 7/3/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 6/25/2015

Location Address <u>Washington Street</u> or Lot #	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 253C
Drainage Class: Hinckley
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal

Month: June
Below Normal

Other References Revised: USGS Quadangle

FORM 11 - SOIL EVALUATOR FORM

Page 2 of 3

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 3-1 Date: 6/25/2015 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 3-15% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body: 100+ ft Drainageway: 100+ ft

Possible wet area: 200 ft Property line: 20+ ft

Drinking water well: 100+ ft other: _____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other Structure, stone, boulders, Consistency, % gravel
0 - 12	A	S.L.	10 YR 3/2	none	friable
12 - 24	Bw	S.L.	2.5 Y 6/6	none	friable
24 - 132	C	Co m S	2.5Y 6/4	none	loose, 15% gravel

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

Parent Material (geologic): outwash

Depth to Groundwater (ft): none Standing Water in the Hole (ft): _____
Estimated Seasonal High Ground Water (inches): _____

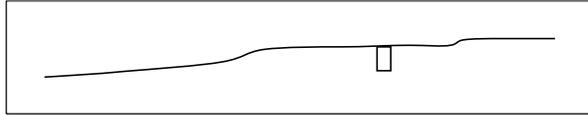
Depth to Bedrock: 30+
none Weeping from Pit Face (ft): none
132+

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

Determination for Seasonal High Water Table

Method Used: DHT 3-1



Depth observed standing in observation hole: none inches

Depth weeping from side of observation hole: none inches

Depth to soil mottles: 132+ inches

Ground water adjustment: _____ feet

Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Ground Water Level _____

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang Date 7/3/2015

Determination for Seasonal High Water Table

Method Used: _____

- | | | | |
|--|------|--------|--|
| <input type="checkbox"/> Depth observed standing water in observation hole | | inches | |
| <input type="checkbox"/> Depth weeping from side of observation hole | | inches | |
| <input checked="" type="checkbox"/> Depth to soil mottles | 132+ | inches | |
| <input type="checkbox"/> Ground water adjustment | n/a | feet | |

Index Well number:
Adjustment factor:

Reading Date
Adjusted ground water level

Index well level:

Percolation Test		
Date:		Time:
Observation Hole #	DHP 3-1	
Depth of Perc, in	58	
Start Pre-soak	2:31 PM	
End Pre-soak	2:39 PM	
Time at 12"	can not sustain 12" level	
Time at 9"		
Time at 6"		
Time (9"-6")		
Rate Min./Inch	<2 mpi (10 spi in 17" hole)	

Site Suitability Assessment:

Site passed

Site Failed

Additional Testing Needed:

Performed By: Desheng Wang

Certification Number:

Witnessed By: Mark Oram

Comments:

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 3-2

Date: 7/3/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 6/25/2015

Location Address <u>Washington Street</u> or Lot #	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 253C
Drainage Class: Hinckley
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal Below Normal
Other References Revised: USGS Quadangle Month: June

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 3-2 Date: 6/25/2015 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 3-15% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body:	<u>100+</u> ft	Drainageway:	<u>100+</u> ft
Possible wet area:	<u>200</u> ft	Property line:	<u>20+</u> ft
Drinking water well:	<u>100+</u> ft	other:	_____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture	Soil Color	Soil Mottling		Other Structure, stone, boulders, Consistency, % gravel
		(USDA)	(Munsell)			
0 - 14	A	S.L.	10 YR 3/2	none		friable
14 - 36	Bw	S.L.	2.5 Y 6/6	none		friable
36 - 132	C	Co m S	2.5Y 5/4	none	10'+	loose, 15% gravel

* MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic): outwash Depth to Bedrock: 30+

Depth to Groundwater (ft): 11.00 Standing Water in the Hole (ft): _____ 11 Weeping from Pit Face (ft): none

Estimated Seasonal High Ground Water (inches): _____ 120+

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

Determination for Seasonal High Water Table

Method Used: DHT 3-2 

Depth observed standing in observation hole: none inches

Depth weeping from side of observation hole: none inches

Depth to soil mottles: 120+ inches

Ground water adjustment: _____ feet

Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Ground Water Level _____

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 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 Desheng Wang

Date 7/3/2015

Determination for Seasonal High Water Table

Method Used:

- Depth observed standing water in observation hole inches
- Depth weeping from side of observation hole inches
- Depth to soil mottles 120+ inches
- Ground water adjustment n/a feet

Index Well number:
Adjustment factor:

Reading Date
Adjusted ground water level

Index well level:

Percolation Test		
Date:	Time:	
Observation Hole #	DHP 3-2	
Depth of Perc, in	54	
Start Pre-soak	2:10 AM	
End Pre-soak	2:15 AM	
Time at 12"	can not sustain 12" level	
Time at 9"		
Time at 6"		
Time (9"-6")		
Rate Min./Inch	<2 mpi (5 spi in 12" hole)	

Site Suitability Assessment: Site passed Site Failed

Additional Testing Needed:

Performed By: Desheng Wang

Witnessed By: Mark Oram

Certification Number:

Comments:

FORM 11 - SOIL EVALUATOR FORM
Page 1 of 3

No. DHT 3-3 deep hole only

Date: 7/3/2015

Commonwealth of Massachusetts
Town of: Sherborn

Soil Suitability Assessment for On-site Sewage Disposal

Performed By: Desheng Wang, Ph.D., P.E.
Witnessed By: Mark Oram

Date: 6/25/2015

Location Address <u>Washington Street</u> or Lot #	Owner's Name: <u>Ben Stevens</u> Address: _____ _____
New Construction: <input checked="" type="checkbox"/> Repair: <input type="checkbox"/>	Telephone #: _____

Office Review

Published Soil Survey Available:

No Yes

Year Published: 1989 Middlesex County, Sherborn
Publication Scale: 1: 25,000
Soil Map Unit: 253C
Drainage Class: Hinckley
Soil Limitations: Very permeable soil

Surficial Geologic Report Available:

No Yes

Year Published: _____
Publication Scale: _____
Geologic Material(Map Unit): _____
Landform: _____

Flood Insurance Rate Map:

Above 500 year flood boundary:
No Yes
Within 500 year flood boundary:
No Yes
Within 100 year flood boundary:
No Yes

Wetland Area:

National Wetland Inventory Map (map unit): _____
Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):

Range: Above Normal Normal

Month: June
Below Normal

Other References Revised: USGS Quadangle

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

ON-SITE REVIEW

Deep Hole #: DHT 3-3 Date: 6/25/2015 Time: _____ Weather: sunny

Location (identify on site plan): See site plan

Land use: hay field Slope (%): 3-15% Surface Stone: no

Vegetation: hay field

Landform: Terrace

Position on landscape (sketch on the back): middle of slope



Distance from (ft):

Open water body: 100+ ft Drainageway: 100+ ft
 Possible wet area: 200 ft Property line: 20+ ft
 Drinking water well: 100+ ft other: _____

DEEP OBSERVATION HOLE LOG

Depth from surface (Inches)	Soil Horizon	Soil Texture	Soil Color	Soil Mottling		Other Structure, stone, boulders, Consistency, % gravel
		(USDA)	(Munsell)			
0 - 12	A	S.L.	10 YR 3/2	none		friable
12 - 24	Bw	S.L.	2.5 Y 6/6	none		friable
24 - 180	C	Co m S	2.5 Y 6/4	none	180+	loose, 15% gravel

*** MINIMUM OF 4 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA**

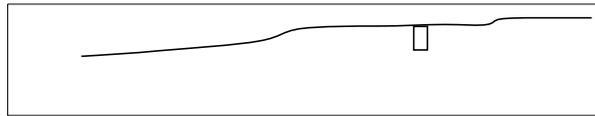
Parent Material (geologic): outwash Depth to Bedrock: 30+
 Depth to Groundwater (ft): none Standing Water in the Hole (ft): none Weeping from Pit Face (ft): none
 Estimated Seasonal High Ground Water (inches): 180+

DEP APPROVED FROM - 12/07/95

Location Address or Lot No. Washington Street - Map 3 Lots 88B and 88C

Determination for Seasonal High Water Table

Method Used: DHT 3-3



Depth observed standing in observation hole: _____ inches

Depth weeping from side of observation hole: _____ inches

Depth to soil mottles: 180+ inches

Ground water adjustment: _____ feet

Index Well Number _____

Reading Date _____

Index Well Level _____

Adjustment Factor _____

Adjusted Ground Water Level _____

Depth of Naturally Occurring Pervious Material

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

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

Note:

Certification

I certify that on June 8, 1995 I have passed the soil evaluator examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature _____

Date _____

Soil Testing Log in Stormwater Recharge Area:

STP-1 (1/17/2014)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 - 36	Bw	m.l.s	10 YR 5/6	friable
36 - 96	C1	m.S.	2.5 Y 6/4	Loose
96 - 168	C2	f.m.s	2.5 Y 6/3	loose

Weeping = none

Standing water = none

Percolation rate = 11 spi, estimated infiltration rate 34.99 in/hour

Estimated high ground water = 10+ ft

STP-2 (1/17/2014 percolation, 1/19/2015 infiltration)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 8	Ap	S.L.	10 YR 3/2	Friable
8 – 24	Bw	m.l.s	10 YR 5/6	friable
24 – 96	C1	Co. m.S.	2.5 Y 6/4	Loose
96 - 120	C2	f.s	2.5 Y 5/4	loose
120 - 252	C3	f.m.s	2.5 Y 6/4	loose
252+	C4	v.f.s.	2.5 Y 5/2	Blocky, fraible

Weeping = none

Standing water = none

Percolation rate =16 spi, equivalent infiltration rate 27.43 in/hr (design rate using half of the value)

Constant head infiltration rate testing = 1.55E-03 ft/s

Estimated high ground water = 10+ ft

STP-3 (1/20/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 – 24	Bw	m.l.s	2.5Y 6/6	friable
24 – 72	C1	Co. m.S.	2.5 Y 6/4	Loose
72 – 156+	C2	f.s	2.5 Y 5/4	Blocky, firm

Weeping = 10 ft

Standing water = none

Percolation rate = Not tested

Constant head infiltration rate testing = Not tested

Estimated high ground water = 6+ ft

STP-4 (1/20/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 – 32	Bw	m.l.s	2.5Y 6/6	friable
32 – 132	C	f.s	2.5 Y 5/4	Blocky, firm, mottles @36"

Weeping = none

Standing water = none

Percolation rate = Not tested

Constant head infiltration rate testing = Not tested

Estimated high ground water = 3 ft

STP-5 (1/20/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 10	Ap	S.L.	10 YR 3/2	Friable
10 – 48	C1	f.m.s	2.5Y 6/4	friable
48 – 120	C2	f.s	2.5 Y 5/2	Blocky, firm, mottles @36"

Weeping = no

Standing water = no

Percolation rate = Not tested

Constant head infiltration rate testing = Not tested

Estimated high ground water = 5 ft

STP-6 (1/20/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/1	Friable
12 – 24	Bw	m.l.s	2.5 Y 6/6	friable
24 – 42	C1	f.s.	2.5 Y 5/4	Loose
42 – 132	C2	m.s.	2.5 Y 6/4	loose
132 - 168	C3	v.f.s.	2.5 Y 5/4	loose

Weeping = none

Standing water = none

Percolation rate = NT

Constant head infiltration rate testing = NT

Estimated high ground water = 7+ ft

STP-7 (1/20/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 – 24	Bw	m.l.s	2.5Y 6/6	friable
24 – 72	C1	Co. m.S.	2.5 Y 6/4	Loose
72 – 96+	C2	f.s	2.5 Y 5/4	Blocky, firm

Weeping = 6 ft
 Standing water = 7 ft
 Percolation rate = Not tested
 Constant head infiltration rate testing = Not tested
 Estimated high ground water = 6+ ft

STP-8 (1/19/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 2/1	Friable
12 – 24	Bw	S.L.	2.5Y 6/6	friable
24 – 36	C1	m.l.s.	2.5 Y 6/4	Loose
72 – 96+	C2	Co. M. S	2.5 Y 5/4	Blocky, firm

Weeping = 5 ft
 Standing water = 6 ft
 Percolation rate = Not tested
 Constant head infiltration rate testing = Not tested
 Estimated high ground water = 5 ft

STP-9 (1/19/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 7	Ap	S.L.	10 YR 3/2	Friable
7 – 18	Bw	f.m.l.s	2.5 Y 6/6	friable
18 – 96	C1	Co. m.S.	2.5 Y 6/4	Loose
96 - 120	C2	f.s	2.5 Y 5/4	loose
120 - 240	C3	f.m.s	2.5 Y 5/4	loose
240 – 288+	C4	v.f.s.	2.5 Y 5/2	Blocky, friable

Weeping = 24
 Standing water = none
 Percolation rate = NT
 Constant head infiltration rate testing = NT
 Estimated high ground water = 15+ ft

STP-10 (6/25/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 – 22	Bw	f.m.l.s	2.5 Y 6/6	friable
22 – 108	C1	Co. m.S.	2.5 Y 6/4	Loose
108 - 144	C2	f.s – m.s.	2.5 Y 5/4	loose
144 - 180	C3	m.s	2.5 Y 5/4	loose

Weeping = 14

Standing water = 14

Percolation rate =NT

Constant head infiltration rate testing = no tested

Estimated high ground water = 12 ft

STP-11 (6/25/2015)

Depth, inches	Horizon	Texture	Matrix Color	Remarks
0 – 12	Ap	S.L.	10 YR 3/2	Friable
12 – 24	Bw	f.m.l.s	2.5 Y 6/6	friable
24 – 84	C1	Co. m.S.	2.5 Y 6/4	Loose
84 - 108	C2	f.s	2.5 Y 5/4	loose
108 - 156	C3	f.m.s	2.5 Y 5/4	loose

Weeping = none

Standing water = none

Percolation rate =NT

Constant head infiltration rate testing = 0.003098 ft/s at 66"

Estimated high ground water = 15+ ft

Site Condition

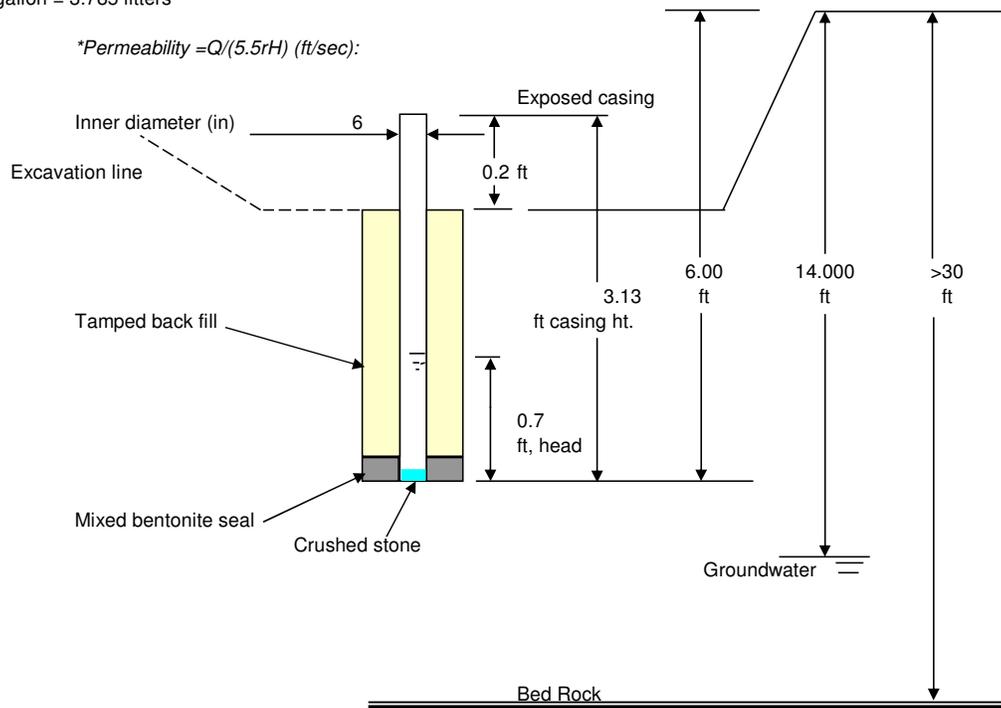
Hole #: STP-1
 Soil: co. m. sand
 Depth to Bed Rock (ft): >30
 Depth to GW (ft): 14.00
 Landform: sloped land
 Position: see plan
 Casing Dia., 2r, (in): 6
 Casing height (ft): 3.13
 Depth to the bottom (ft): 6.00
 Exposed casing (ft): 0.2

Summary of Constant Head Test (Method E-18, USDI)

Standard Temperature for Permeability Calculation (oC): 20 (68 F)

Test #	Time sec	Head ft	Volume gallon	Temp. oC	Correct. Coef.	Permeability (ft/sec)*	
						Field	Standard
1	35.350	0.700	0.264	4.5	1.5242	1.0381E-03	1.5823E-03
2	35.79	0.700	0.264	4.5	1.5242	1.0253E-03	1.5628E-03
3	35.84	0.700	0.264	4.5	1.5242	1.0239E-03	1.5606E-03
4	35.98	0.700	0.264	4.5	1.5242	1.0199E-03	1.5546E-03
5	36	0.700	0.264	4.5	1.5242	1.0194E-03	1.5537E-03

1 gallon = 3.785 liters



Permeability Rate at 95% Confidence Level		degree of freedom	t _{0.05}
No. of tests, n:	5	1	6.314
Degree of freedom, n-1:	4	2	2.920
Mean permeability (ft/sec), m:	1.56E-03	3	2.353
Standard deviation (ft/sec), s:	1.16E-05	4	2.132
t distribution, α=0.05:	2.132	5	2.015
Permeability at 95% confidence level (ft/sec):	0.001552	6	1.943
		7	1.895

Site Condition

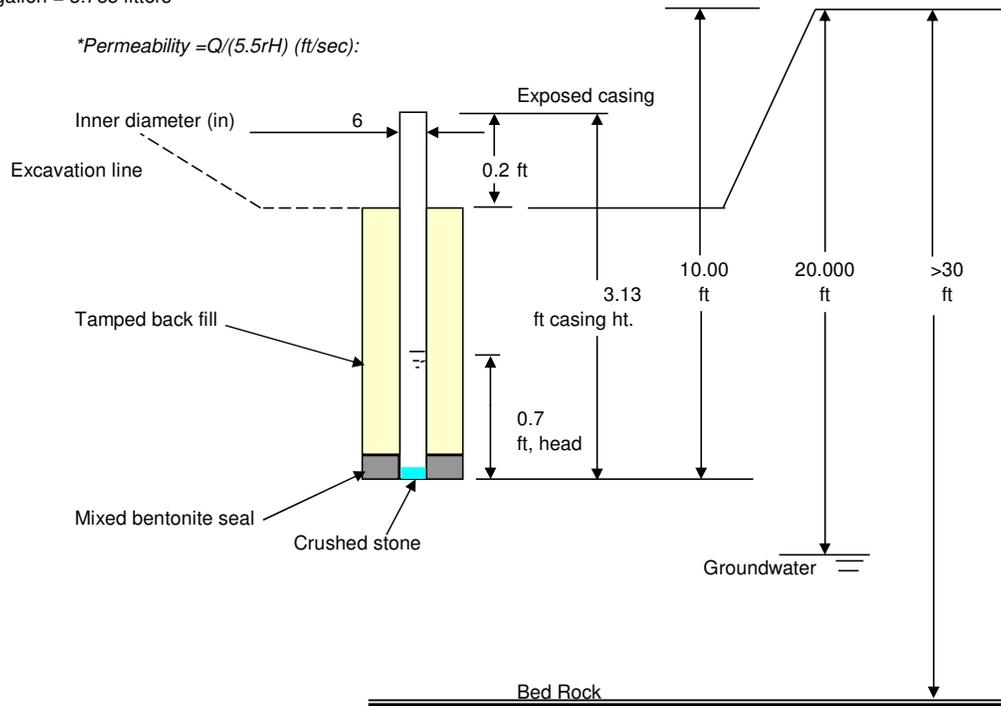
Hole #: STP-2
 Soil: f. m. sand
 Depth to Bed Rock (ft): >30
 Depth to GW (ft): 20.00
 Landform: sloped land
 Position: see plan
 Casing Dia., 2r, (in): 6
 Casing height (ft): 3.13
 Depth to the bottom (ft): 10.00
 Exposed casing (ft): 0.2

Summary of Constant Head Test (Method E-18, USDI)

Standard Temperature for Permeability Calculation (oC): 20 (68 F)

Test #	Time sec	Head ft	Volume gallon	Temp. oC	Correct. Coef.	Permeability (ft/sec)*	
						Field	Standard
1	69.670	0.700	0.264	4.5	1.5242	5.2673E-04	8.0282E-04
2	99.67	0.700	0.264	4.5	1.5242	3.6819E-04	5.6118E-04
3	136.72	0.700	0.264	4.5	1.5242	2.6841E-04	4.0910E-04
4	137.72	0.700	0.264	4.5	1.5242	2.6646E-04	4.0613E-04
5	159.84	0.700	0.264	4.5	1.5242	2.2959E-04	3.4993E-04

1 gallon = 3.785 liters



Permeability Rate at 95% Confidence Level		degree of freedom	t _{0.05}
No. of tests, n:	5	1	6.314
Degree of freedom, n-1:	4	2	2.920
Mean permeability (ft/sec), m:	5.06E-04	3	2.353
Standard deviation (ft/sec), s:	0.000184	4	2.132
t distribution, α=0.05:	2.132	5	2.015
Permeability at 95% confidence level (ft/sec):	0.000331	6	1.943
		7	1.895

Site Condition

Hole #: STP-11
 Soil: Co. M. Sand
 Depth to Bed Rock (ft): >30
 Depth to GW (ft): 13+
 Landform: sloped land
 Position: see plan
 Casing Dia., 2r, (in): 6
 Casing height (ft): 3.13
 Depth to the bottom (ft): 10.00
 Exposed casing (ft): 0.5

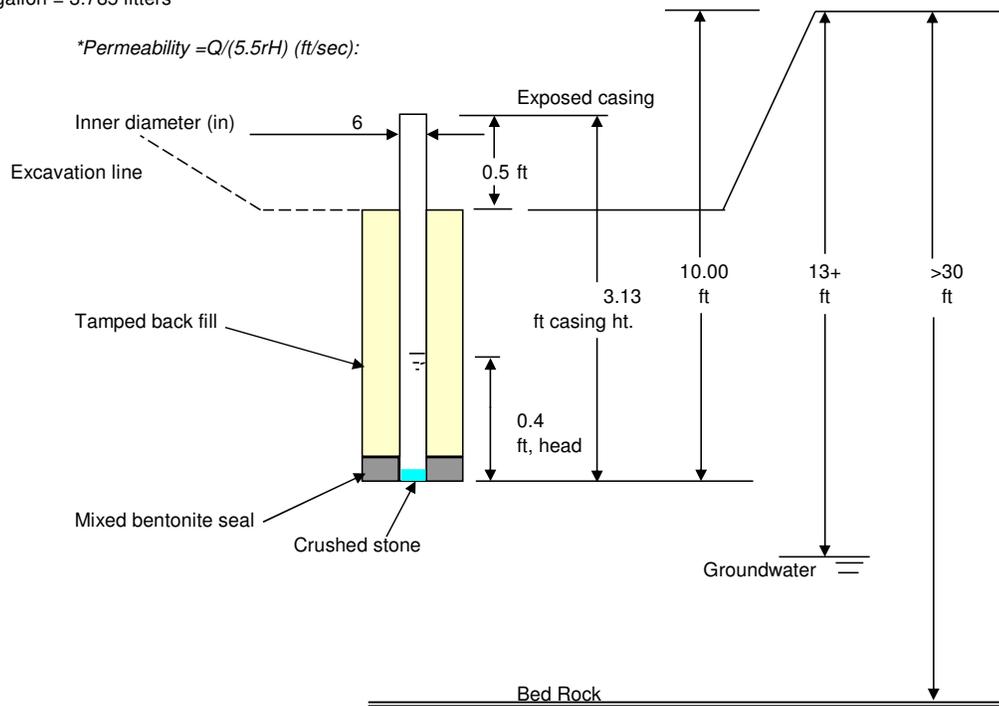
Summary of Constant Head Test (Method E-18, USDI)

Standard Temperature for Permeability Calculation (oC): 20 (68 F)

Test #	Time sec	Head ft	Volume gallon	Temp. oC	Correct. Coef.	Permeability (ft/sec)*	
						Field	Standard
1	11.730	0.400	0.132	12	1.2270	2.7374E-03	3.3589E-03
2	12	0.400	0.132	12	1.2270	2.6758E-03	3.2833E-03
3	12.6	0.400	0.132	12	1.2270	2.5484E-03	3.1270E-03
4	12.61	0.400	0.132	12	1.2270	2.5464E-03	3.1245E-03
5	12.61	0.400	0.132	12	1.2270	2.5464E-03	3.1245E-03

1 gallon = 3.785 liters

*Permeability = $Q/(5.5rH)$ (ft/sec):



Permeability Rate at 95% Confidence Level		degree of freedom	t _{0.05}
No. of tests, n:	5	1	6.314
Degree of freedom, n-1:	4	2	2.920
Mean permeability (ft/sec), m:	3.20E-03	3	2.353
Standard deviation (ft/sec), s:	0.000111	4	2.132
t distribution, α=0.05:	2.132	5	2.015
Permeability at 95% confidence level (ft/sec):	0.003098	6	1.943
		7	1.895