



M.A. KABLACK & ASSOCIATES, P.C.

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MARK A. KABLACK
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March 1, 2018

Via Email and Hand Delivery

Linda Hansen
Conservation Administrator
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Elizabeth Reef
Zoning Board of Appeals
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Re: 24 School Street, Wayland, MA (the "Property")
Windsor Place (the "Project")

Dear Commission and Board Members:

As a result specific inquiries regarding groundwater mounding on the Property, and specifically, how mounding may be affected by the proposed on-site septic system and groundwater infiltration system, we have commissioned Creative Land & Water Engineering, LLC to conduct a thorough on-site monitoring study. This study, originally intended to have been completed toward the end of 2017, was delayed due to seasonally low groundwater readings in December, 2017, followed by extreme weather conditions in early January, 2018. Field work was recently completed on February 9, 2018, and a detailed mounding analysis report, dated February 28, 2018 (the "Mounding Report"), is hereby submitted for your review.

The Mounding Report concludes that the on-site septic system as designed provides for adequate groundwater separation. However, the Mounding Report concludes that the stormwater infiltration system should be raised approximately two feet (2') in order to maintain adequate groundwater separation under certain worse-case rainfall and groundwater table circumstances. The Mounding Report further recommends, if practical, that the infiltration system be increased in area, in order to accelerate dewatering during excessive storm events. The practical impacts of increasing the area of the infiltration system will need to be measured against other site limitations including overall site-grading, preferred unit locations and access requirements.

Given that modifications in the elevation and area of the infiltration system will likely result in changes to general site plan improvements, we would like to proceed with the finalization of the site plan in two steps. The first step will be for the Commission and Board to review the attached Mounding

Conservation Commission
Zoning Board of Appeals
March 1, 2018
Page 2

Report, including peer review, the scope and cost of which will be subject to review and approval by the Applicant. Once this review is completed, the Applicant will then modify the balance of site plan improvements consistent with the mounding analysis review. We understand that the other pending site plan changes may impact certain plans and studies submitted and reviewed to date. Based upon the extent of these modifications, the Applicant will entertain the town's requests for further peer review and an extended hearing schedule as may be necessary.

Sincerely,

Mark A. Kablack

A handwritten signature in black ink, appearing to read 'Mark A. Kablack', written over the printed name.

cc: Board of Health
Joseph Peznola
Carolyn Murray, Esq.



CREATIVE LAND & WATER ENGINEERING, LLC

Environmental Scientist and Engineers

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Effective, Affordable, and Sustainable Solutions for Land & Water Environment

February 28, 2018

Revised March 1, 2018

Slug Test and Groundwater Mounding Analysis Report 24 School Street, Wayland, MA

A 12-unit 40B residential development is under review with Wayland ZBA and Wayland Conservation Commission. The project will use an on-site wastewater septic system and stormwater subsurface infiltration. The project will generate a daily design flow of 2860 gpd to the septic system under Title 5 310 CMR15.00. The Town expressed concern about the possible mutual impact between the stormwater infiltration system and the septic system. At public hearings and in their staff review comments, Wayland Conservation Commission requested that the applicant provide a detailed groundwater mounding analysis to assess and mitigate the mounding impact if any for septic leaching field and the stormwater subsurface infiltration area. This report provides the mounding analysis and supporting field testing data. Our goals are as follows:

1. Analyze the groundwater mounding distribution under both systems using reasonable and conservative parameters based on in-situ hydrogeological evaluation and testing.
2. Recommend modifications for the siting of the septic and stormwater systems if needed to avoid any impact to each system and to the environment.

The work includes field evaluation of the underlying aquifer and soil hydraulic conductivity; computer modeling of the groundwater mounding height and distribution in space and in time for design sewage flow and 2-year to 100-year stormwater runoff recharge events. The results are presented in the following.

Hydrogeological Evaluation

On December 4, 2017, three borings were sunk to monitor the water table and to conduct slug tests to determine the hydraulic conductivity of soil under the proposed septic leaching field and the stormwater infiltration area. On January 10, 2018 staff of Creative Land & Water Engineering, LLC performed slug tests in three monitoring wells, namely MW1 to MW3, to collect hydraulic conductivity data. The drilling and well logs are attached for reference. The locations of drilling and monitoring wells are presented in the attached monitoring well plan.

Technical Drilling Services, Inc. drilled and installed the three wells using hollow stemmed auger mounted on a track ATV. See Figure 1 for location of the wells. In general, the diameter of the boring measures 6 inches, and the wells 2 inches. Bedrock or

refusal was encountered from 15 feet to 25 feet. The soils are very sandy outwash material, except at the bottom of MW 3, where finer till material was observed. Details of the well profile are attached to the end of the report¹. The NRCS soil map showed the site has Hinckley loam and Narragansett silt loam soil, which are rated as hydrological group A soils, very permeable soils. This is consistent with our onsite evaluation. See attached NRCS soil report for reference. The water tables in the three monitoring wells was monitored and presented in Table 1. On January 29, 2018, the site had the highest ground water table, which is consistent with soil evaluation information or higher than soil mottling at Well 3. We will use data from this testing for our mounding analysis.

Table 1. Water table monitoring

Monitoring well	Top of case, ft	Top of well, ft	Bottom of well	Ground elev., ft	Depth to water from TOW, ft			
					12/4/2017	1/10/2018	1/29/2018	2/9/2018
MW 1	170.18	169.97	142.7	167.7	11.9	14.12	11.81	12.02
MW 2	166.13	165.69	146.2	164.2	9.57	11.12	9.67	9.8
MW 3	165.08	164.91	148.1	163.1	6.76	8.85	6.07	6.19

Monitoring well	Top of case, ft	Top of well, ft	Bottom of well	Ground elev., ft	Water Table Elev, ft			
					12/4/2017	1/10/2018	1/29/2018	2/9/2018
MW 1	170.18	169.97	142.7	167.7	158.07	155.85	158.16	157.95
MW 2	166.13	165.69	146.2	164.2	156.12	154.57	156.02	155.89
MW 3	165.08	164.91	148.1	163.1	158.15	156.06	158.84	158.72

Given the topography, the aquifer bottom was calculated based upon the drilling depth at MW 1.

There was no significant precipitation three days prior to the testing day, to allow relative stable water table. A level TROLL was used to log data following standard test method ASTM 4044. In general, the following procedures were followed:

- Measure the initial water table;
- Slowly submerge the level TROLL until at least 1 foot below the water surface;
- Wait 5-10 minutes for the water level to stable; and
- Start logging, quickly drop into the well a metal rod or about 300 ml of water.

The data were then analyzed using the method presented in ASTM D5912 (Bouwer and Rice method). The data and detailed calculation sheets are in the Appendix. Table 2 is a summary of the results.

¹ Based on the drill log, it appears that some large boulders or refusal were hit at MW 2 and MW 3 prior to each the bedrock.

Table 2. Slug test summary

	<i>Well Profile</i>				<i>Slug used</i>	<i>Hydraulic Conductivity (ft/s)</i>
	<i>Depth to bottom (ft)</i>	<i>Depth to Water Table (ft)</i>	<i>Depth of Aquifer (ft)</i>	<i>Length of Screen (ft)</i>		
<i>MW 1</i>	25	14.12	13.15	20	Metal	3.01×10^{-4}
<i>MW 2</i>	18	11.12	8.37	15	Metal	3.60×10^{-4}
<i>MW 3*</i>	15	8.85	7.96	10	Metal	7.54×10^{-5}

Note Only the screened length under water was used for analysis.

Groundwater Mounding Analysis

Given that the onsite septic system has a daily design flow of 2860 gpd, per 310 CMR 15.202 (4) (g) and as required by the Town Board of Health and Conservation Commission, we calculated the groundwater mounding heights for the septic system leaching field (SAS area) in accordance with DEP technical guidance. A Hydrogeocycle Computer model using Hantush (1967) method was used to analyze the ground water mounding height and distribution under the SAS area and stormwater management infiltration area. Given that MA DEP requires 3 day dewatering of stormwater detention and infiltration area, we calculated the maximum and residual groundwater mounding heights for 2-year and 100-year storm events for the stormwater infiltration system. The goals of the analysis are

- 1) to show the bottom of SAS area will have at least 4 feet groundwater separation from the mounded groundwater table;
- 2) to show that the stormwater infiltration system will meet the DEP stormwater guidelines for the hydrogeological requirements under the following conditions:
 1. The stormwater infiltration shall have a minimum of 2 ft groundwater separation from the existing high groundwater
 2. The system will dewater in less than 72 hours (3 days) (i.e. the 3-day residual mounding height will be less than 2 ft). The maximum height is only a reference and does not need to be considered as it will be temporally stored in the infiltration chambers.
 3. As 2-year storm event counts for 96% of total annual precipitation, it would be adequate for normal operation to use the 2-year storm event for evaluating the longer term groundwater mounding impact.
 4. As the 100-year storm is the worst condition, it would be adequate if the infiltration storage chambers can be dewatered in less than 5 days. It will be

even better if we can manage to dewater the chambers in 72 hours, i.e. below the bottom of the infiltration galley.

5. If the above requirement has been met, the design for stormwater management is considered to satisfy the DEP stormwater management guidelines for the hydrogeological requirements.

The saturated aquifer parameters based on the boring and testing and the results of the analyses are presented in Tables 3 and detailed in the attached printouts. As we also know, the real mounding heights would be even smaller as we used the lowest hydraulic conductivity value tested and assumed that the water table is flat. Under a sloped water table condition, groundwater mounding would be lowered.

The groundwater mounding analysis renders the following conclusions:

1. The maximum mounding height under the SAS area is 0.24 ft and the extension of impact to the stormwater infiltration area will be about 0.12 ft.
2. The stormwater infiltration will be dewatered in 3 days for up to 100-year storm. For 2-year storm event, all runoff will be recharged. For 100-year storm, some water will be bypassed through overflow to prevent surcharge breakout.
3. Under 100-year storm condition, groundwater mounding would go above the proposed grade without overflow. As the observed high ground water table in this area is at 158.84 ft, therefore, we recommend that the current infiltration system bottom be raised approximately 2 ft from 159 ft to 161 ft and spread over in a larger area to reduce the surcharge. The stormwater infiltration area is recommended to increase to 56 ft by 35.5 ft. The mounding height and 3-day residual mounding height will be reduced using the new dimension.
4. Both the existing and recommended dimensions will have 3-day residual mounding height less than 2 ft of the required groundwater separation requirements in the DEP Stormwater Management guidelines for 2-year. Under a 100-year storm event, existing dimension will have larger than 2 ft 3-day residual mounding height but less than 2 ft 5-day mounding height. Both conditions are acceptable but the new dimension is a little better. Other grading and access needs may dictate or restrict the recommended infiltration field dimensions.

Table 3. Summary of groundwater mounding analysis

Parameters	Stormwater - 2 Year		100-year Storm		Wastewater
Recharge area	Infiltration-ex	Infiltration-rev	Infiltration- ex	Infiltration-rev	SAS
Dimension, ft	31.5x40	35.5x56	31.5x40	35.5x56	86 x 72
Area, sq. ft	1260	1988	1260	1988	6192
Recharge Vol. Cu ft (per day or event)	3199	3199	5318	5318	358.24
Duration, day	0.6	0.6	0.6	0.6	90
Recharge rate, cu ft/day/sq. ft	4.23	2.68	7.03	4.46	0.0579
Dewater time, day	3	3	3	3	90
GW Separation, ft	2.4	2.16	2.4	2.16	4
Maximum mounding height, ft	6.2	4.5	10.63	7.48	0.24
Estimated effective Max MH, ft	3.16	2.628	4.046	3.224	0.24
Impact mounding height by other systems, ft	0	0	0	0	0
3-day residual height, ft	1	1	3.2	1.38	
5-day residual height, ft	0.58	0.58	1.84	0.86	
Estimated effective 3d MH, ft	1	0.85	1.65	1.38	
Estimated effective 5d MH, ft	0.58	0.5	0.96	0.86	0.24
Bottom of stones, ft	159	161	159	161	163.25 to 166 156.12 to 158.16 (162.44) 142.7
Top of stones, ft					
EHGW, ft	156.6	158.84	156.6	158.84	
Bottom aquifer, ft	142.7	142.7	142.7	142.7	
3 day elevation, ft	157.6	159.69	158.25	160.22	
Flood routing elev, ft	162.16	163.63	163.05	164.22	
Top of grade, ft	163.5	165.5	165.5	163.5	

Summary and Conclusions

1. Three boring holes were drilled and monitoring wells installed for collection of aquifer and soil data.
2. Saturated hydraulic conductivity was tested in each well.
3. Using the collected soil and water table data, the groundwater mounding under the SAS area and the infiltration area were analyzed.
4. The mounding analysis shows that the SAS area is adequately sized with adequate groundwater separation above the mounded groundwater for proper treatment.
5. The stormwater infiltration area will need to be raised about 2 ft and we recommend if possible, that the infiltration area will better serve to be enlarged to 56 ft by 35.5 ft to reduce mounding surcharge impacts.

If you have any questions regarding this study, please feel free to contact us.

Sincerely,

Creative Land & Water Engineering, LLC
by:



Desheng Wang, Ph.D., P.E.
Hydrogeological Engineer and,
Wetland Scientist

MONITORING WELL PROFILE

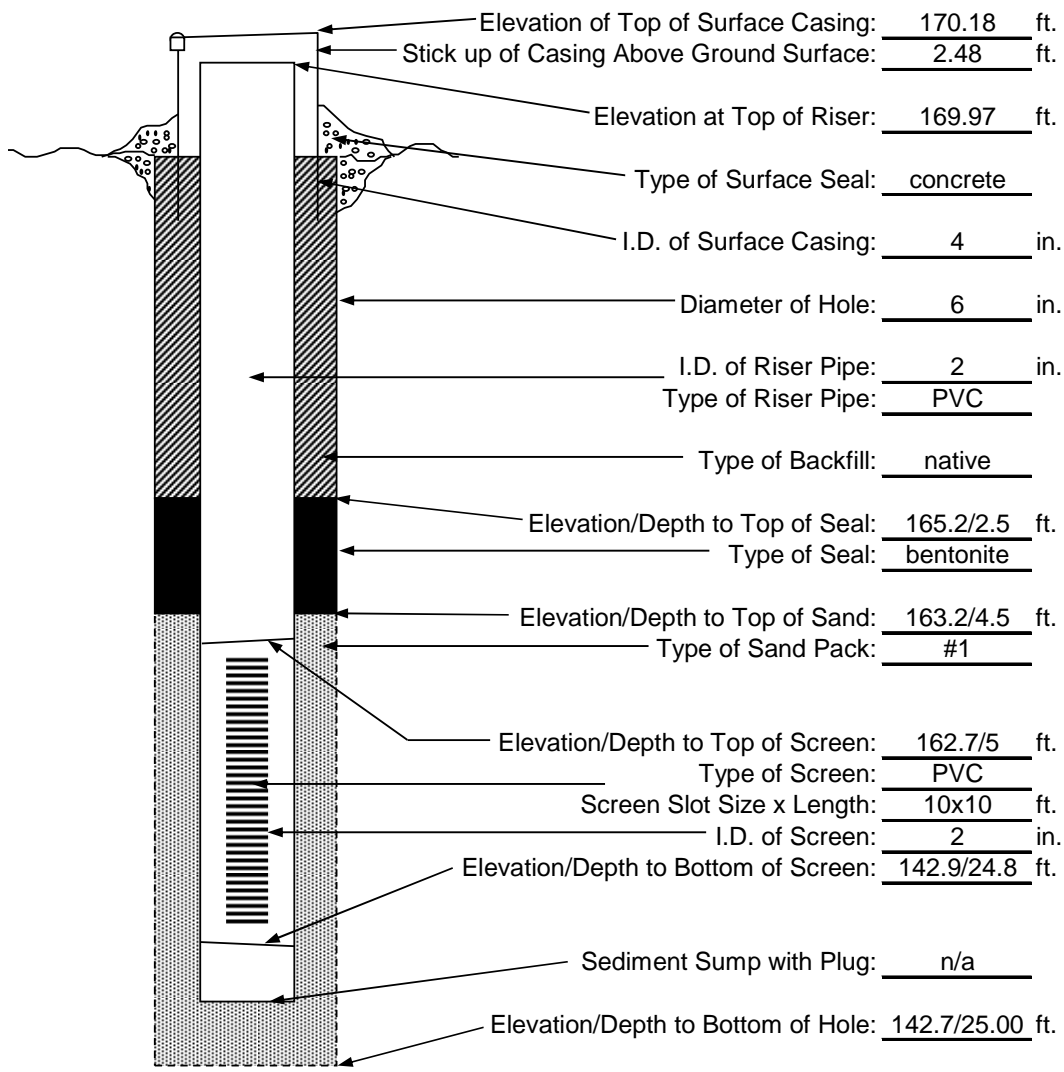
Project #: J315-5
Date: 12/4/2017

Project: Windsor Place
Location: 24 School Street, Wayland, MA

Driller: T & K Drilling, Inc.

Drilling Method: Hallow Stem Auger

Boring: 1



MONITORING WELL PROFILE

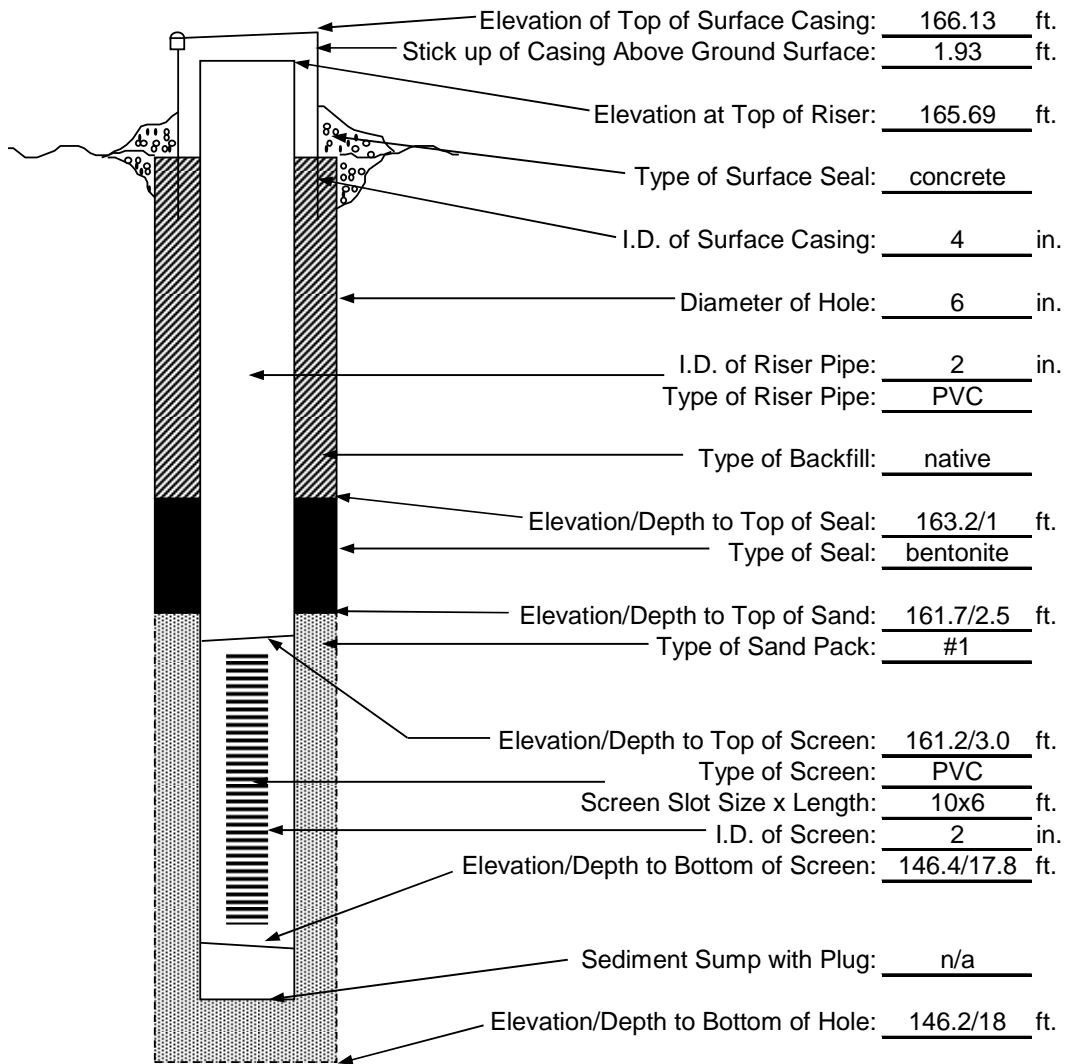
Project #: J315-5
Date: 12/4/2017

Project: Windsor Place
Location: 24 School Street, Wayland, MA

Driller: T & K Drilling, Inc.

Drilling Method: Hollow Stem Auger

Boring: 2



MONITORING WELL PROFILE

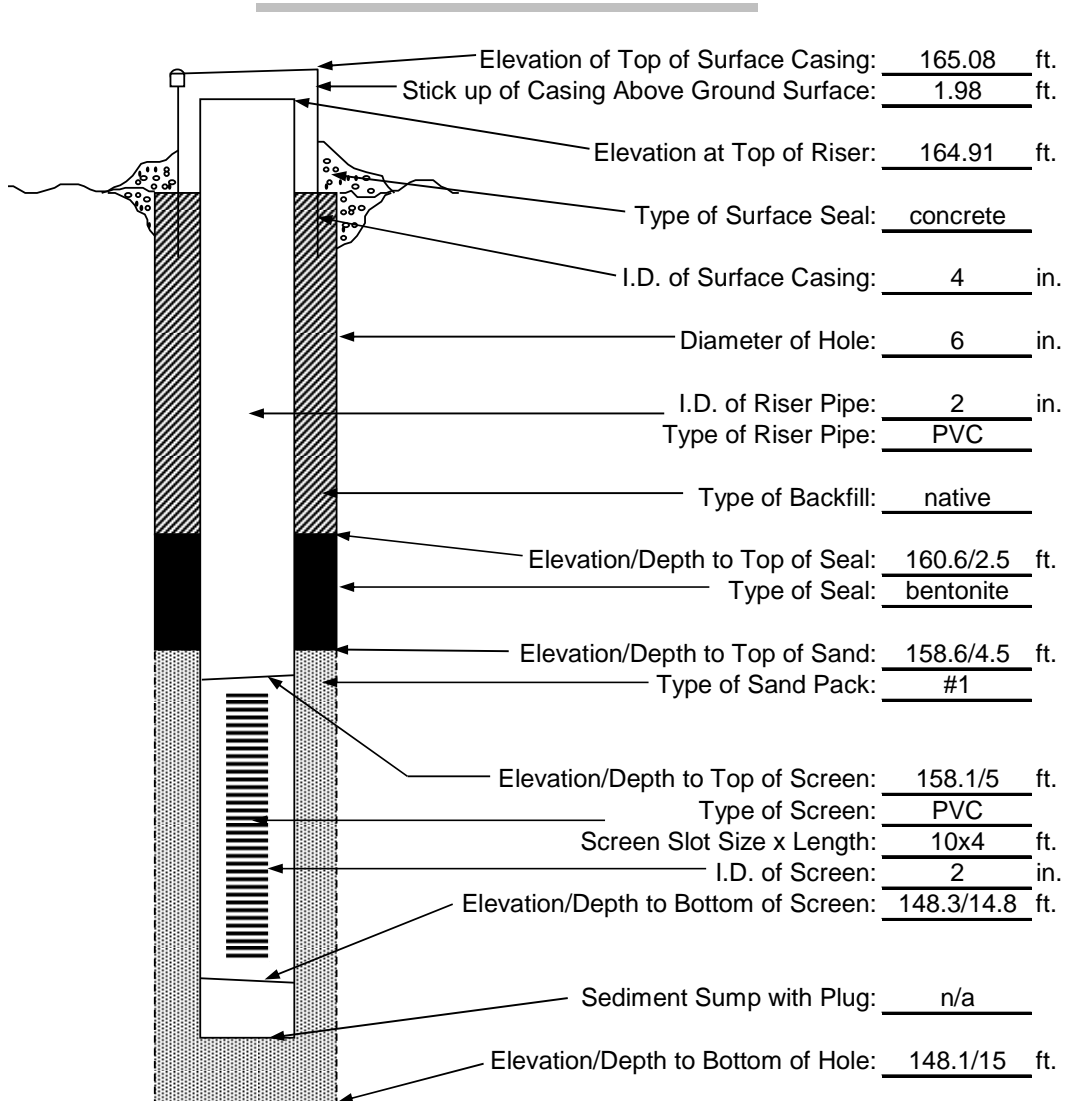
Project #: J315-5
Date: 12/4/2017

Project: Windsor Place
Location: 24 School Street, Wayland, MA

Driller: T & K Drilling, Inc.

Drilling Method: Hollow Stem Auger

Boring: 3



Calculation Sheet for Hydraulic Conductivity using Bouwer & Rice 1976 Method

MW 1 (B1)

Site: 24 School Street, Wayland, MA

Date: 1/10/2018

Performed by: wjc

Checked by: dsw 2/5/2018

$$K = r_w^2 \ln(Re/R) / (2Le) \quad (1/h) \ln(H_0/H_t)$$

$$r_c = [(1-n)r_a^2 + n R^2]^{0.5}$$

where,

n is the short-term specific yield of the filter pack=

r_a is uncorrected well casing radius=

R is borehole radius=

L_s is the total length of well screen =

L_e is length of open aquifer =

L_w is depth of aquifer=

R_e is the effective radial distance over which head is dissipated

r_c is corrected casing radius =

$Le/R =$

*Dimensionless number, $C =$

$$\ln(Re/R) = (1.1 \ln(L_w/R) + C / (Le/R))^{-1} =$$

$t_1 =$

$t_2 =$

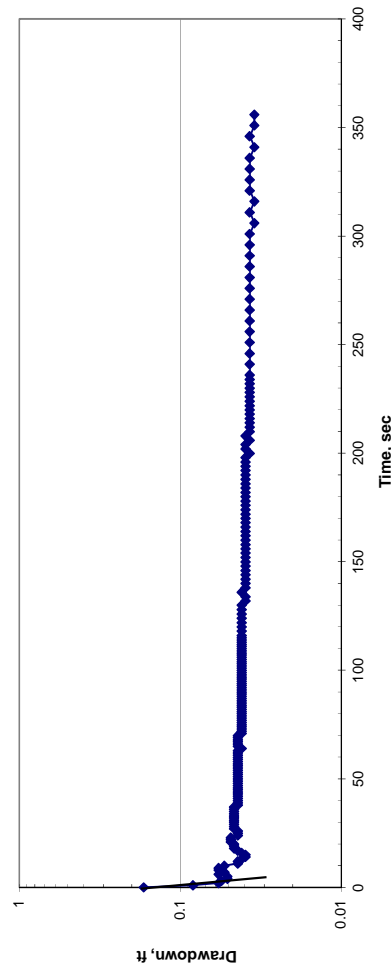
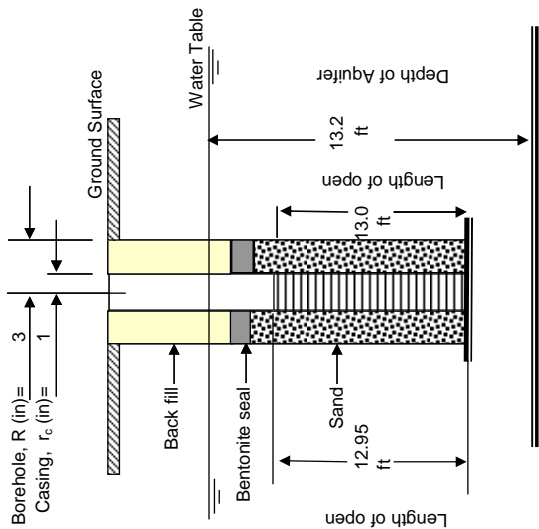
$H_1 =$

$H_2 =$

$$(1/h) \ln(H_0/H_t) = (1/(2-t)) \ln(H_1/H_2) =$$

Hydraulic Conductivity, $K =$

3.01E-04 ft/s
25.97 ft/day



References:

1. Applied Hydrogeology, C.W. Fetter, 3rd Edition.
2. ASTM Standard Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug), D5912-96
3. ASTM Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers, D4044-96

Calculation Sheet for Hydraulic Conductivity using Bouwer & Rice 1976 Method

MW 2 (B2)

Site: 24 School Street, Wayland, MA
Date: 1/10/2018
Performed by: wjc
Checked by: dsw
2/5/2018

$K = r_c^2 \ln(Re/R) / (2Le) (1/t) \ln(H_0/H_t)$

$r_c = [(1-n)r_a^2 + n R^{2.0.5}]$

where,

r_a is the short-term specific yield of the filter pack=

R is uncorrected well casing radius=

L_s is the total length of well screen =

L_e is length of open aquifer =

L_w is depth of aquifer=

R_e is the effective radial distance over which head is dissipated

r_c is corrected casing radius =

$Le/R =$

*Dimensionless number, $C =$

$\ln(Re/R) = (1.1/\ln(L_w/R) + C/(Le/R))^{-1} =$

$t_1 =$

$t_2 =$

$H_1 =$

$H_2 =$

$(1/t) \ln(H_0/H_t) = (1/(t_2 - t_1)) \ln(H_1/H_2) =$

$H_1/H_2 =$

$H_2/H_1 =$

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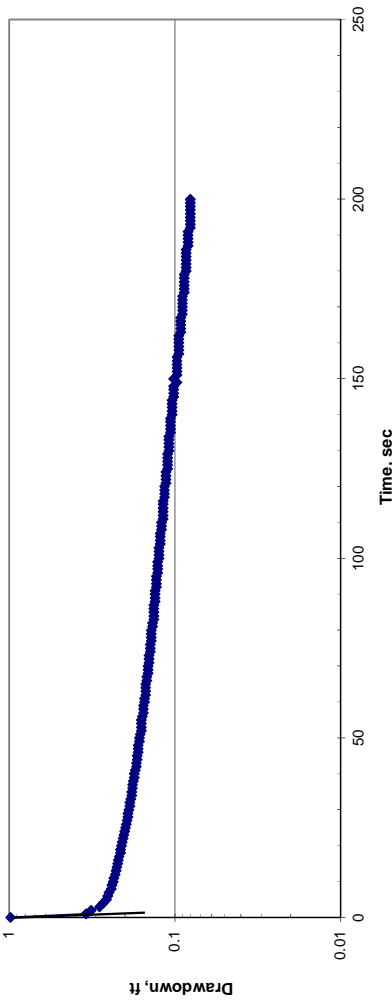
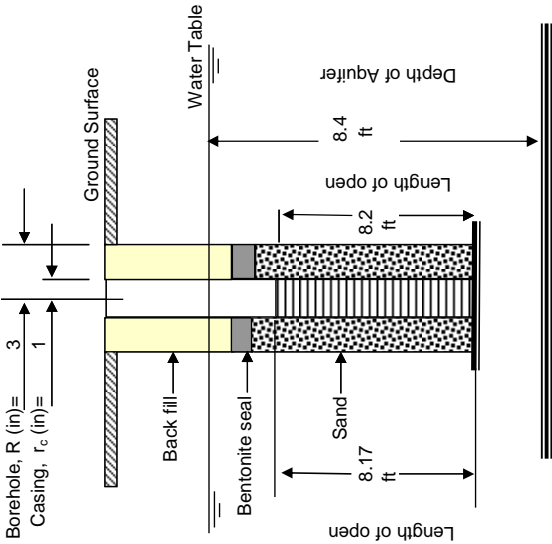
$H_2/H_1 =$

$H_1/H_2 =$

$H_2/H_1 =$

$H_1/H_2 =$

$H_2/H_1 =$



References:

1. Applied Hydrogeology, C.W. Fetter, 3rd Edition.
2. ASTM Standard Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug), D5912-96
3. ASTM Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers, D4044-96

Calculation Sheet for Hydraulic Conductivity using Bouwer & Rice 1976 Method

MW 3 (B3)

Site: 24 School Street, Wayland, MA

Date: 1/10/2018

Performed by: wjc

Checked by: dsw 2/5/2018

$$K = \frac{r_c^2 \ln(Re/R)}{2Le} \left(\frac{1}{h} \right) \ln(H_0/H_t)$$

$$r_c = \left[\frac{(1-n)r_s^2}{2} + n R^2 \right]^{0.5}$$

where,

n is the short-term specific yield of the filter pack=

r_s is uncorrected well casing radius=

R is borehole radius=

L_s is the total length of well screen =

L_e is length of open aquifer =

L_w is depth of aquifer=

R_e is the effective radial distance over which head is dissipated

r_c is corrected casing radius =

$Le/R =$

*Dimensionless number, $C =$

$$\ln(Re/R) = (1/\ln(L_w/R) + C/(Le/R))^{-1} =$$

$t_1 =$

$t_2 =$

$H_1 =$

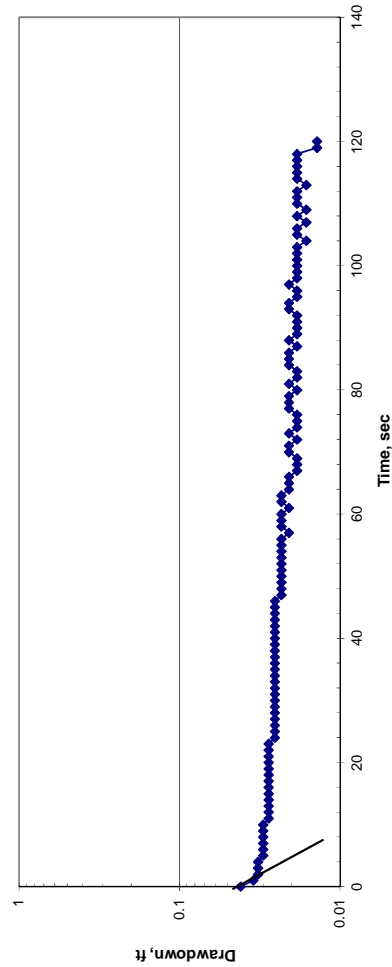
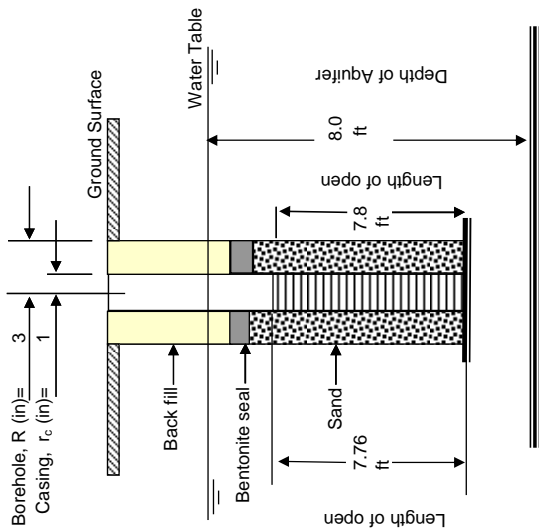
$H_2 =$

$$\left(\frac{1}{h} \right) \ln(H_0/H_t) = (1/(t_2 - t_1)) \ln(H_1/H_2) =$$

Hydraulic Conductivity, $K =$

7.54E-05 ft/s

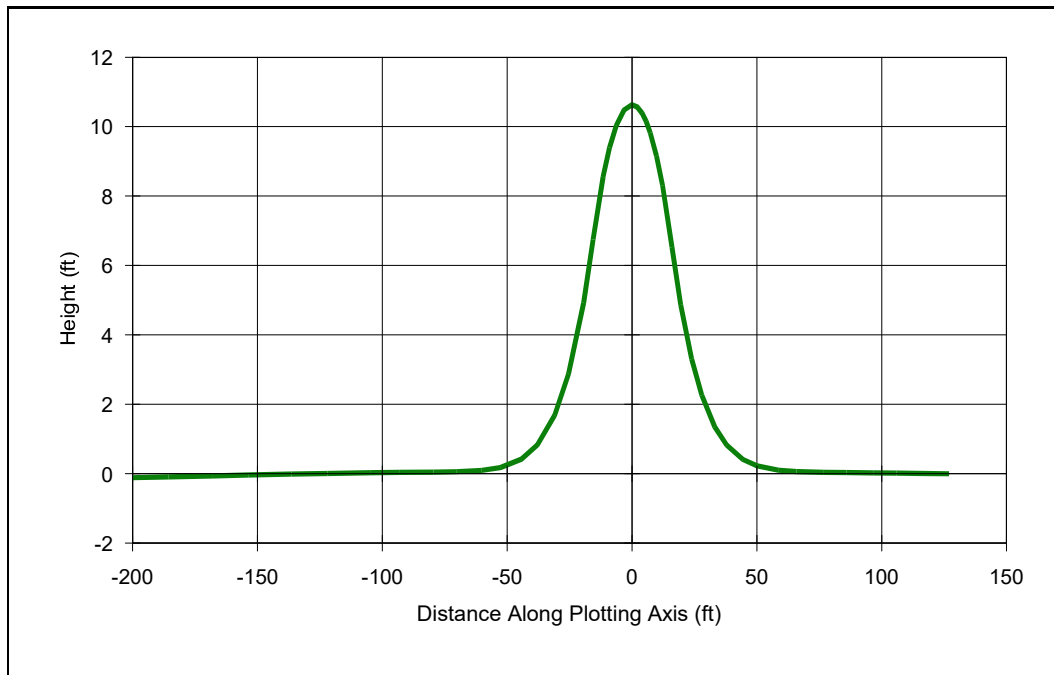
6.51 ft/day



References:

1. Applied Hydrogeology, C.W. Fetter, 3rd Edition.
2. ASTM Standard Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug), D5912-96
3. ASTM Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers, D4044-96

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 100yr

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:09:59 PM

INPUT PARAMETERS

Application rate: 7.03 c.ft/day/sq. ft

Duration of application: 0.6 days

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 13.9 ft

Length of application area: 40 ft

Width of application area: 31.5 ft

Constant head boundary used at: 126 ft

Plotting axis from Y-Axis: 90 degrees

Edge of recharge area:

positive X: 15.8 ft

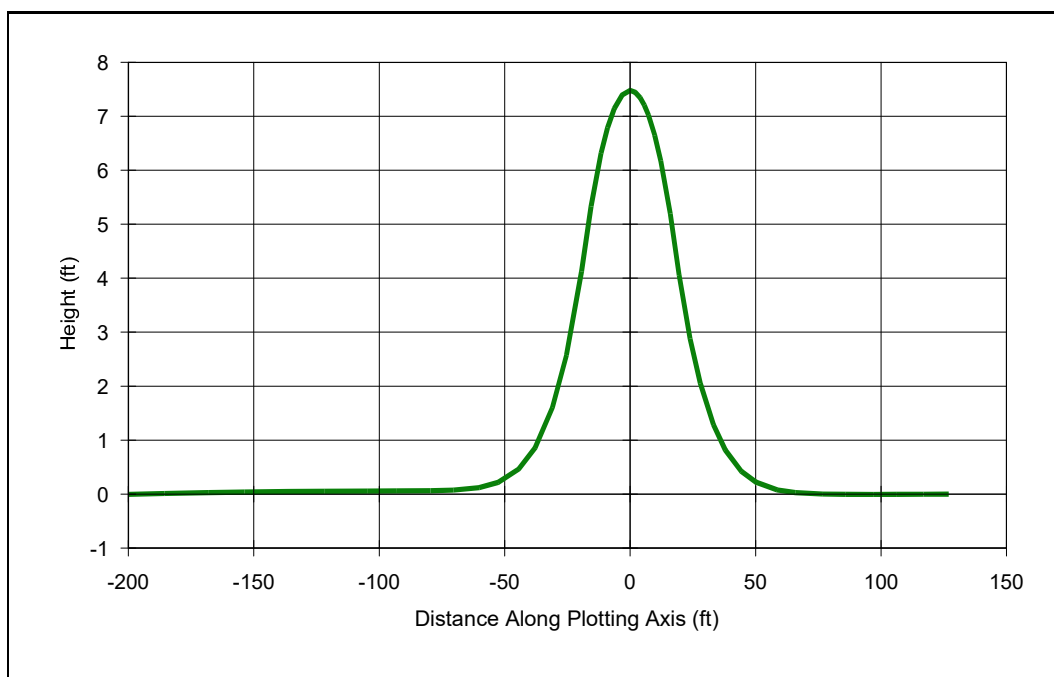
positive Y: 0 ft

Total volume applied: 5314.68 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-200	0	-200	-0.11
-168.2	0	-168	-0.06
-136.4	0	-136	-0.01
-104.6	0	-105	0.03
-79.6	0	-80	0.05
-60.2	0	-60	0.1
-44.4	0	-44	0.42
-31	0	-31	1.68
-19.4	0	-19	4.92
-11.6	0	-12	8.55
-6.3	0	-6	10.03
0	0	0	10.63
4	0	4	10.4
7.3	0	7	9.82
12.2	0	12	8.31
19.5	0	20	4.86
27.9	0	28	2.26
37.9	0	38	0.82
50.1	0	50	0.22
65.9	0	66	0.06
85.9	0	86	0.03
106	0	106	0.02
126	0	126	0

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 100yr -rev

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 10:58:22 PM

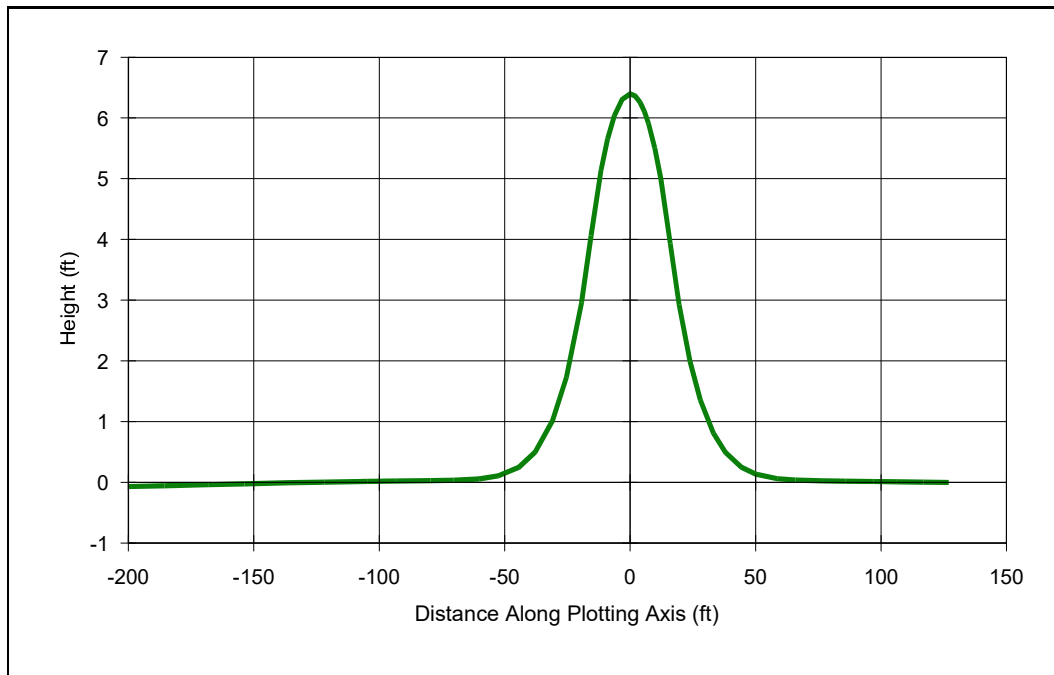
INPUT PARAMETERS

Application rate: 4.46 c.ft/day/sq. ft
 Duration of application: 0.6 days
 Fillable porosity: 0.26
 Hydraulic conductivity: 6.51 ft/day
 Initial saturated thickness: 15.9 ft
 Length of application area: 56 ft
 Width of application area: 35.5 ft
 Constant head boundary used at: 126 ft
 Plotting axis from Y-Axis: 90 degrees
 Edge of recharge area:
 positive X: 17.8 ft
 positive Y: 0 ft
 Total volume applied: 5319.888 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-200	0	-200	0
-168.2	0	-168	0.03
-136.4	0	-136	0.05
-104.6	0	-105	0.06
-79.6	0	-80	0.06
-60.2	0	-60	0.12
-44.4	0	-44	0.47
-31	0	-31	1.61
-19.4	0	-19	4.12
-11.6	0	-12	6.32
-6.3	0	-6	7.14
0	0	0	7.48
4	0	4	7.34
7.3	0	7	7.02
12.2	0	12	6.18
19.5	0	20	4.06
27.9	0	28	2.05
37.9	0	38	0.82
50.1	0	50	0.22
65.9	0	66	0.03
85.9	0	86	0
106	0	106	0
126	0	126	0

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 2yr

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:14:47 PM

INPUT PARAMETERS

Application rate: 4.23 c.ft/day/sq. ft

Duration of application: 0.6 days

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 13.9 ft

Length of application area: 40 ft

Width of application area: 31.5 ft

Constant head boundary used at: 126 ft

Plotting axis from Y-Axis: 90 degrees

Edge of recharge area:

positive X: 15.8 ft

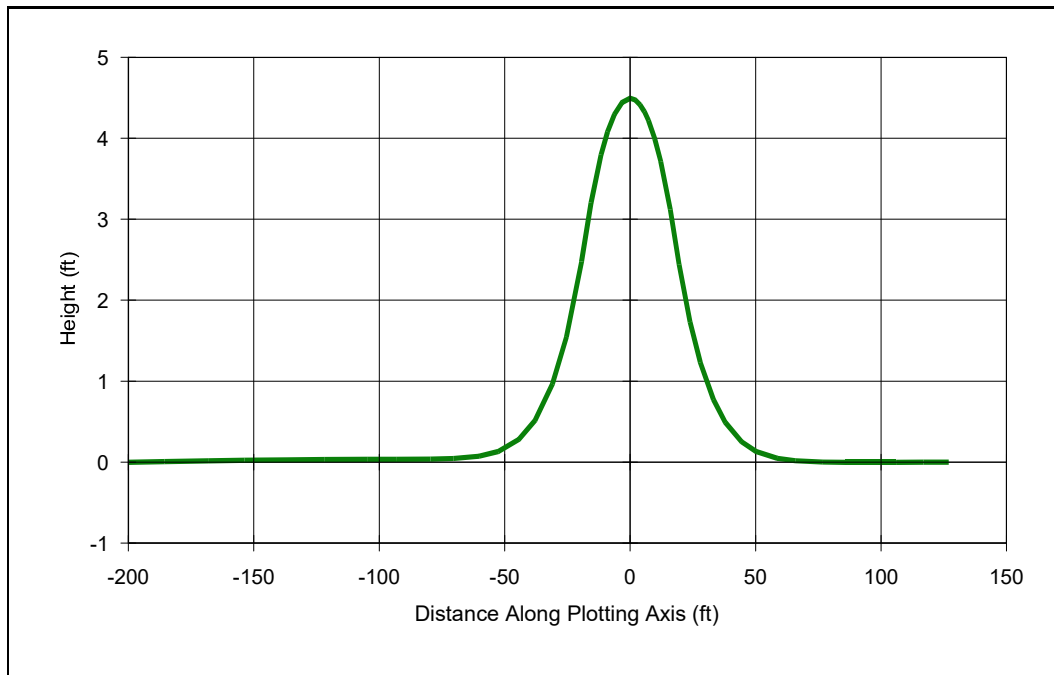
positive Y: 0 ft

Total volume applied: 3197.88 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-200	0	-200	-0.07
-168.2	0	-168	-0.04
-136.4	0	-136	-0.01
-104.6	0	-105	0.02
-79.6	0	-80	0.03
-60.2	0	-60	0.06
-44.4	0	-44	0.25
-31	0	-31	1.01
-19.4	0	-19	2.96
-11.6	0	-12	5.14
-6.3	0	-6	6.04
0	0	0	6.4
4	0	4	6.26
7.3	0	7	5.91
12.2	0	12	5
19.5	0	20	2.93
27.9	0	28	1.36
37.9	0	38	0.5
50.1	0	50	0.14
65.9	0	66	0.04
85.9	0	86	0.02
106	0	106	0.01
126	0	126	0

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 2yr rev

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:16:28 PM

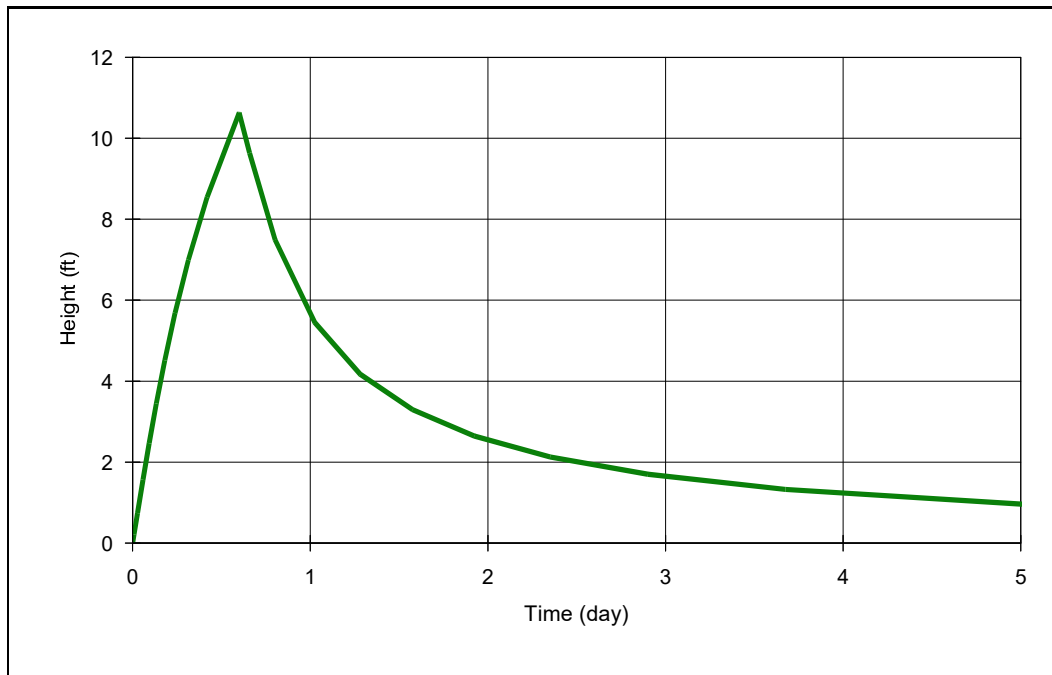
INPUT PARAMETERS

Application rate: 2.68 c.ft/day/sq. ft
 Duration of application: 0.6 days
 Fillable porosity: 0.26
 Hydraulic conductivity: 6.51 ft/day
 Initial saturated thickness: 15.9 ft
 Length of application area: 56 ft
 Width of application area: 35.5 ft
 Constant head boundary used at: 126 ft
 Plotting axis from Y-Axis: 90 degrees
 Edge of recharge area:
 positive X: 17.8 ft
 positive Y: 0 ft
 Total volume applied: 3196.704 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-200	0	-200	0
-168.2	0	-168	0.02
-136.4	0	-136	0.03
-104.6	0	-105	0.03
-79.6	0	-80	0.04
-60.2	0	-60	0.07
-44.4	0	-44	0.28
-31	0	-31	0.96
-19.4	0	-19	2.48
-11.6	0	-12	3.8
-6.3	0	-6	4.29
0	0	0	4.49
4	0	4	4.41
7.3	0	7	4.22
12.2	0	12	3.71
19.5	0	20	2.44
27.9	0	28	1.23
37.9	0	38	0.49
50.1	0	50	0.13
65.9	0	66	0.02
85.9	0	86	0
106	0	106	0
126	0	126	0

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 100yr

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:10:37 PM

INPUT PARAMETERS

Application rate: 7.03 c.ft/day/sq. ft

Duration of application: 0.6 day

Total simulation time: 5 day

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 13.9 ft

Length of application area: 40 ft

Width of application area: 31.5 ft

Constant head boundary used at: 126 ft

Groundwater mounding @

X coordinate: 0 ft

Y coordinate: 0 ft

Total volume applied: 5314.68 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.21
0	0.74
0.1	1.56
0.1	2.47
0.1	3.45
0.2	4.52
0.2	5.68
0.3	6.99
0.4	8.54
0.6	10.63
0.7	9.64
0.8	7.49
1	5.44
1.3	4.17
1.6	3.3
1.9	2.64
2.4	2.13
2.9	1.7
3.7	1.33
5	0.96

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 100yr -rev

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:03:17 PM

INPUT PARAMETERS

Application rate: 4.46 c.ft/day/sq. ft

Duration of application: 0.6 day

Total simulation time: 10 day

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 15.9 ft

Length of application area: 56 ft

Width of application area: 35.5 ft

Constant head boundary used at: 126 ft

Groundwater mounding @

X coordinate: 0 ft

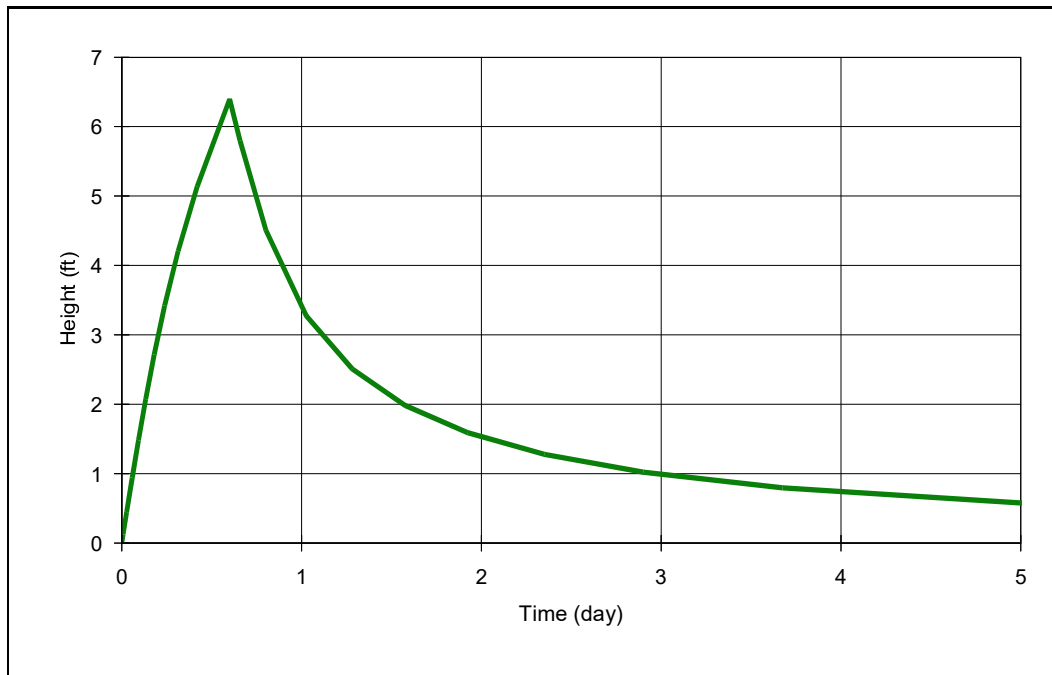
Y coordinate: 0 ft

Total volume applied: 5319.888 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.14
0	0.47
0.1	1
0.1	1.58
0.1	2.22
0.2	2.94
0.2	3.76
0.3	4.71
0.4	5.86
0.6	7.48
0.7	6.32
1	4.29
1.5	2.85
2.1	2.07
2.7	1.57
3.4	1.22
4.3	0.96
5.5	0.75
7.2	0.57
10	0.4

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 2yr

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:15:08 PM

INPUT PARAMETERS

Application rate: 4.23 c.ft/day/sq. ft

Duration of application: 0.6 day

Total simulation time: 5 day

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 13.9 ft

Length of application area: 40 ft

Width of application area: 31.5 ft

Constant head boundary used at: 126 ft

Groundwater mounding @

X coordinate: 0 ft

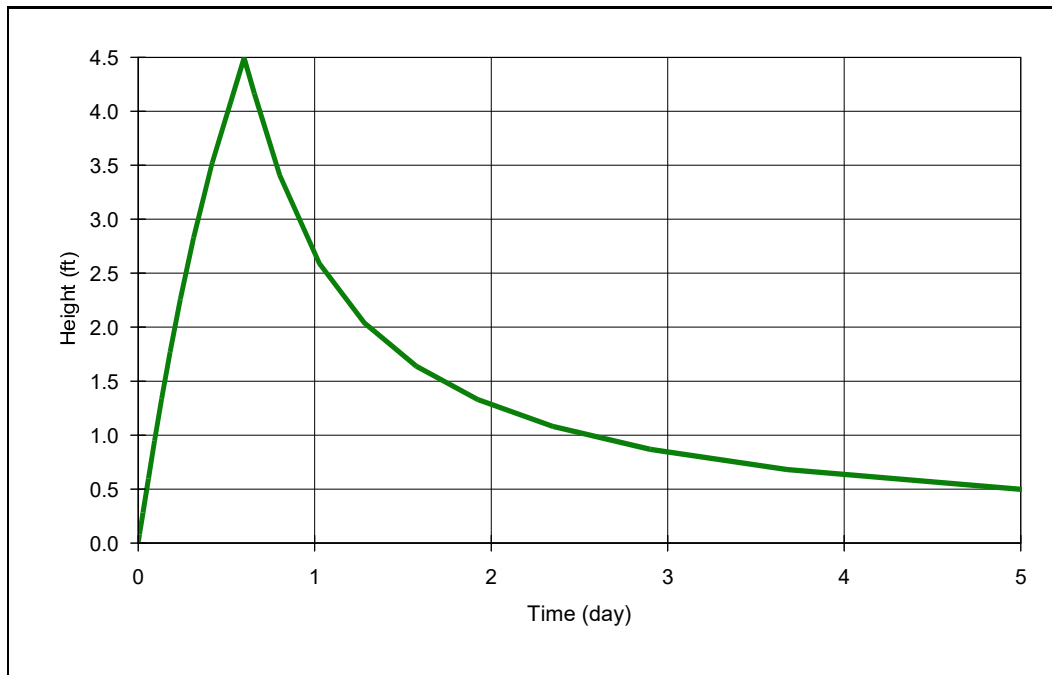
Y coordinate: 0 ft

Total volume applied: 3197.88 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.13
0	0.45
0.1	0.94
0.1	1.48
0.1	2.08
0.2	2.72
0.2	3.42
0.3	4.21
0.4	5.14
0.6	6.4
0.7	5.8
0.8	4.51
1	3.28
1.3	2.51
1.6	1.98
1.9	1.59
2.4	1.28
2.9	1.02
3.7	0.8
5	0.58

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School St Wayland- STM 2yr rev

ANALYST: Desheng Wang

DATE: 2/8/2018 TIME: 11:16:48 PM

INPUT PARAMETERS

Application rate: 2.68 c.ft/day/sq. ft

Duration of application: 0.6 day

Total simulation time: 5 day

Fillable porosity: 0.26

Hydraulic conductivity: 6.51 ft/day

Initial saturated thickness: 15.9 ft

Length of application area: 56 ft

Width of application area: 35.5 ft

Constant head boundary used at: 126 ft

Groundwater mounding @

X coordinate: 0 ft

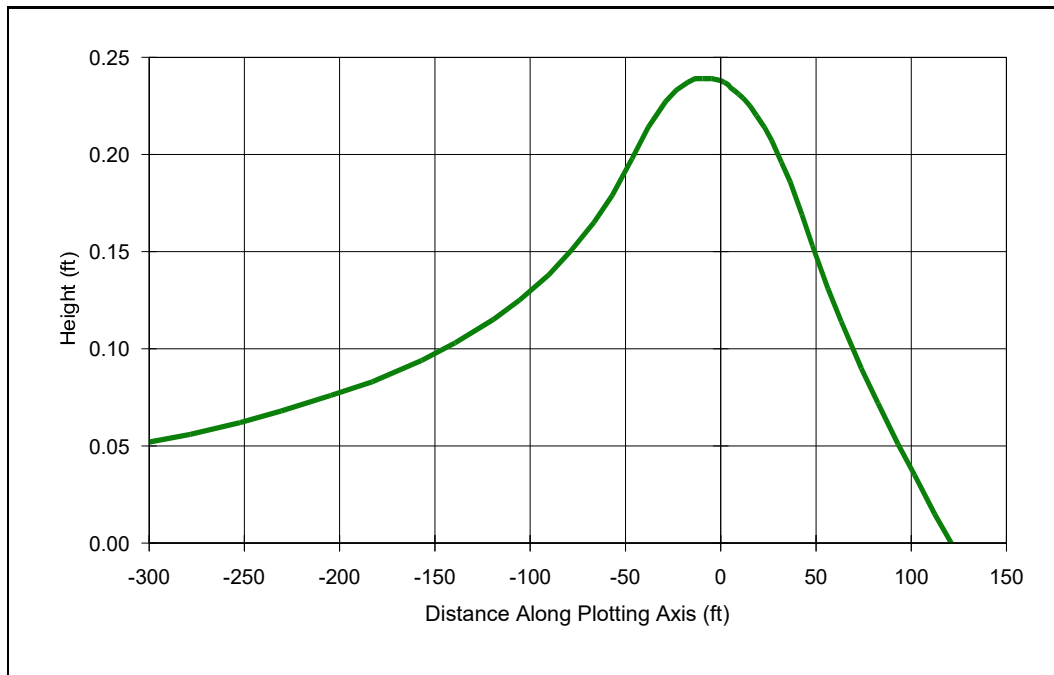
Y coordinate: 0 ft

Total volume applied: 3196.704 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.08
0	0.28
0.1	0.6
0.1	0.95
0.1	1.34
0.2	1.77
0.2	2.26
0.3	2.83
0.4	3.52
0.6	4.49
0.7	4.16
0.8	3.41
1	2.59
1.3	2.04
1.6	1.64
1.9	1.33
2.4	1.08
2.9	0.87
3.7	0.68
5	0.5

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLAWE

PROJECT: 24 School Street - SAS

ANALYST: Desheng Wang

DATE: 2/9/2018 TIME: 12:51:42 PM

INPUT PARAMETERS

Application rate: 0.0579 c.ft/day/sq. ft

Duration of application: 90 days

Fillable porosity: 0.26

Hydraulic conductivity: 25.97 ft/day

Initial saturated thickness: 19.74 ft

Length of application area: 86 ft

Width of application area: 72 ft

Constant head boundary used at: 121 ft

Plotting axis from Y-Axis: 0 degrees

Edge of recharge area:

positive X: 0 ft

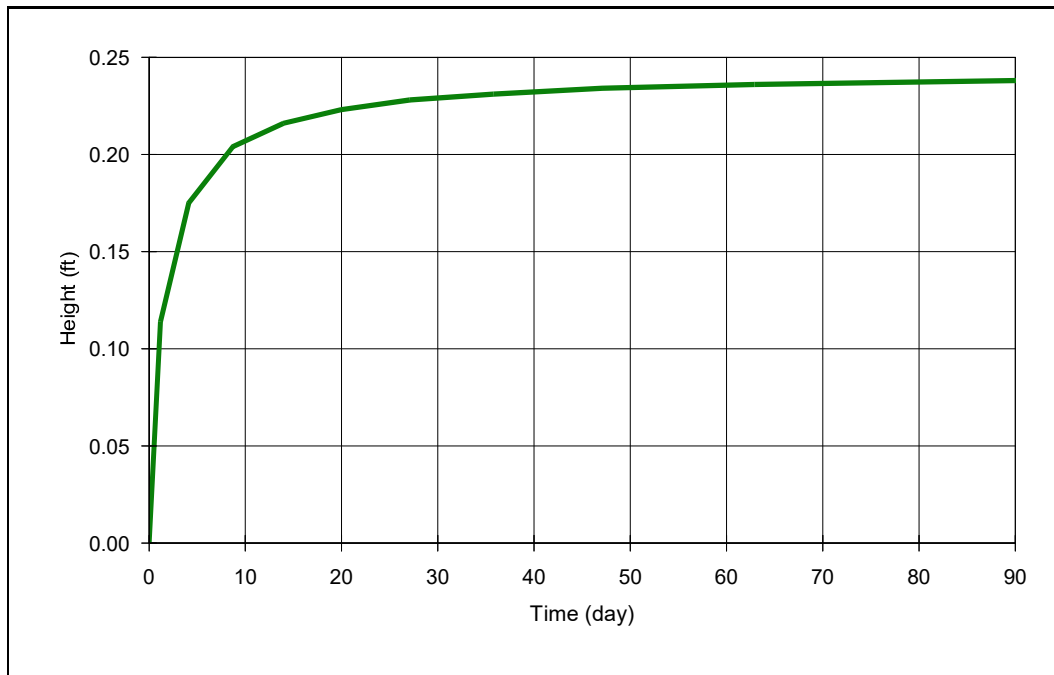
positive Y: 43 ft

Total volume applied: 32266.51 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
0	-300	-300	0.05
0	-252.3	-252	0.06
0	-204.6	-205	0.08
0	-156.9	-157	0.09
0	-119.4	-119	0.12
0	-90.3	-90	0.14
0	-66.5	-67	0.16
0	-46.5	-46	0.20
0	-29.1	-29	0.23
0	-17.4	-17	0.24
0	-9.4	-9	0.24
0	0	0	0.24
0	3.8	4	0.24
0	7	7	0.23
0	11.7	12	0.23
0	18.7	19	0.22
0	26.8	27	0.21
0	36.4	36	0.19
0	48.1	48	0.15
0	63.3	63	0.11
0	82.5	83	0.07
0	101.8	102	0.04
0	121	121	0

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CLawe

PROJECT: 24 School Street - SAS

ANALYST: Desheng Wang

DATE: 2/9/2018 TIME: 12:52:29 PM

INPUT PARAMETERS

Application rate: 0.0579 c.ft/day/sq. ft

Duration of application: 90 day

Total simulation time: 90 day

Fillable porosity: 0.26

Hydraulic conductivity: 25.97 ft/day

Initial saturated thickness: 19.74 ft

Length of application area: 86 ft

Width of application area: 72 ft

Constant head boundary used at: 121 ft

Groundwater mounding @

X coordinate: 0 ft

Y coordinate: 0 ft

Total volume applied: 32266.51 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
1	0.11
4	0.18
9	0.2
14	0.22
20	0.22
27	0.23
36	0.23
47	0.23
63	0.24
90	0.24



United States
Department of
Agriculture

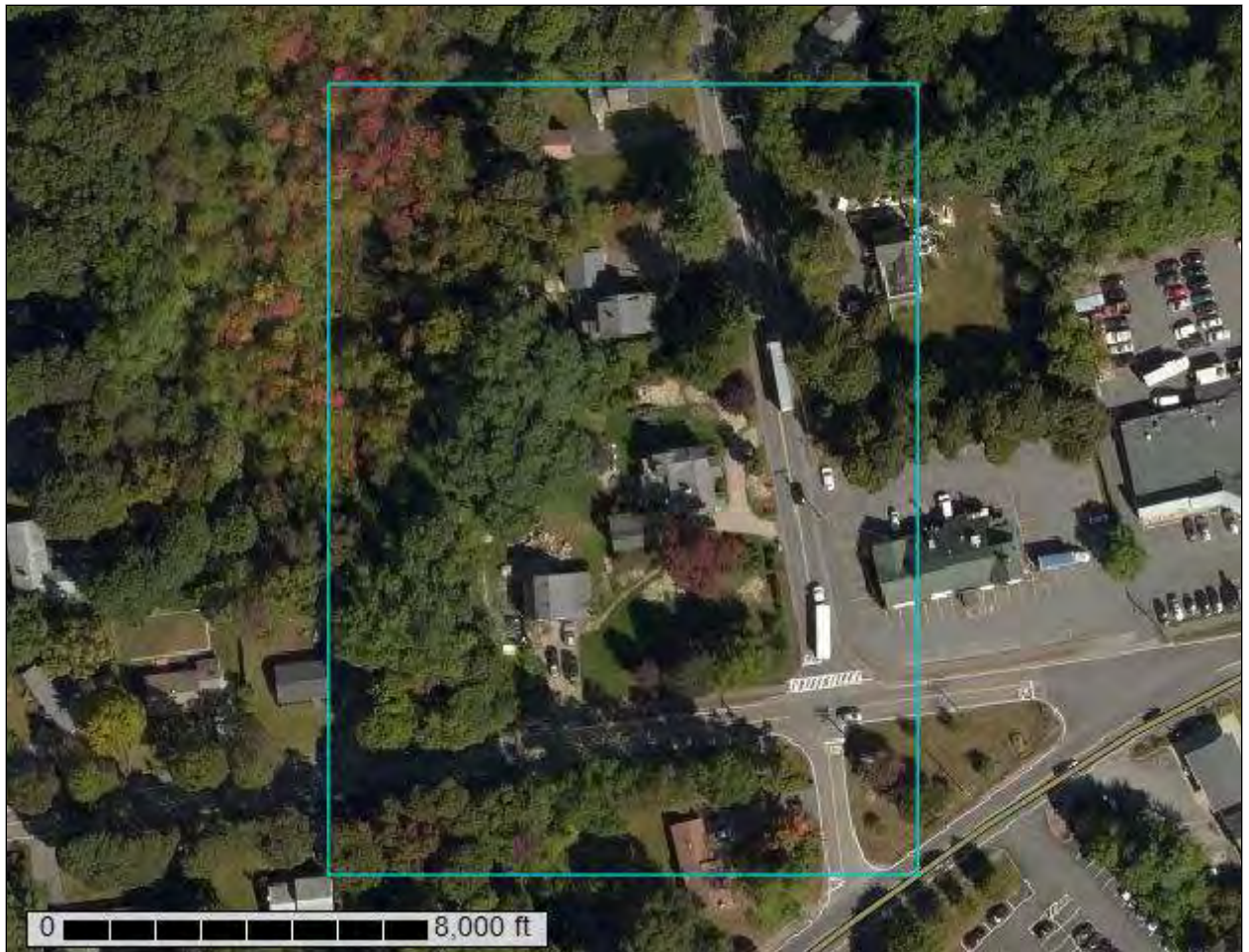
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Middlesex County, Massachusetts**

24 School Street, Wayland, MA



February 28, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 17, Oct 6, 2017

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

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	1.3	25.7%
52A	Freetown muck, 0 to 1 percent slopes	0.1	2.2%
251B	Haven silt loam, 3 to 8 percent slopes	0.1	1.3%
253C	Hinckley loamy sand, 8 to 15 percent slopes	0.9	18.9%
415B	Narragansett silt loam, 3 to 8 percent slopes	2.1	41.6%
602	Urban land	0.2	4.1%
624B	Haven-Urban land complex, 0 to 8 percent slopes	0.3	6.0%
Totals for Area of Interest		5.0	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip

Custom Soil Resource Report

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9
Elevation: 0 to 1,110 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Freetown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown

Setting

Landform: Bogs, depressions, depressions, kettles, marshes, swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 1 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 5 percent
Landform: Bogs, depressions, depressions, kettles, marshes, swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

251B—Haven silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 990d
Elevation: 100 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Haven and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haven

Setting

Landform: Terraces, plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 20 inches: silt loam
H3 - 20 to 32 inches: very fine sandy loam
H4 - 32 to 65 inches: stratified coarse sand to sand to fine sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 9 percent
Landform: Terraces, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Scio

Percent of map unit: 5 percent
Landform: Depressions, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent

253C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Shoulder, toeslope, footslope, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Custom Soil Resource Report

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Eskers, kames, outwash plains, outwash terraces, moraines
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, head slope, nose slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread

Custom Soil Resource Report

Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

415B—Narragansett silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: vqrp
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits and/or friable silty eolian deposits over loose sandy glaciofluvial deposits derived from metamorphic rock and/or friable sandy basal till derived from metamorphic rock

Typical profile

H1 - 0 to 2 inches: slightly decomposed plant material
H2 - 2 to 7 inches: silt loam
H3 - 7 to 35 inches: silt loam
H4 - 35 to 60 inches: very gravelly loamy sand
H5 - 60 to 65 inches: very gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 35 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 10 percent

Landform: Hills

Landform position (two-dimensional): Backslope, toeslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Haven

Percent of map unit: 10 percent

Landform: Terraces, plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, rise

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

602—Urban land

Map Unit Setting

National map unit symbol: 9950

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Udorthents, wet substratum

Percent of map unit: 5 percent
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent
Hydric soil rating: No

624B—Haven-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9956
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Haven and similar soils: 40 percent
Urban land: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haven

Setting

Landform: Terraces, plains
Landform position (two-dimensional): Foothlope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 20 inches: silt loam
H3 - 20 to 32 inches: very fine sandy loam
H4 - 32 to 65 inches: stratified coarse sand to sand to fine sand

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

Minor Components

Tisbury

Percent of map unit: 10 percent

Landform: Terraces, plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Eskers, ridges, terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Terraces, plains

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread, rise

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

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NOTES:

- SUBJECT PARCEL IS SHOWN AS ASSESSORS MAP 52, LOT 189. RECORD TITLE FROM BOOK 69050, PAGE 394.
- UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE- AND BELOW-GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT-INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN-MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.
- CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING EXISTING LOCATIONS OF ALL SUB-SURFACE UTILITIES AND MAN-MADE IMPROVEMENTS AND FOR THE REQUIREMENTS TO REPLACE, RELOCATE OR REPAIR EXISTING UTILITIES IN THE EVENT OF DAMAGE OCCURRING DURING CONSTRUCTION. MWE IS NOT RESPONSIBLE OR LIABLE FOR DELAYS OR COSTS ASSOCIATED WITH REMOVING/REPLACING/RELOCATING OF EXISTING UTILITIES REGARDLESS OF WHETHER SAID UTILITIES ARE ACCURATELY DEPICTED ON THIS SURVEY.
- THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE "X" OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NUMBER 25017C0528F, BEARING AN EFFECTIVE DATE OF JULY 7, 2014.

BENCHMARKS

ELEVATIONS SHOWN ON THIS PLAN REFER TO RM 11 (ELEV.=163.84'), A CHISELED SQUARE IN THE NORTH HEADWALL OF THE CULVERT UNDER COMMONWEALTH ROAD FOR SNAKE BROOK N.G.V.D. 1929.)

T.B.M.	DESCRIPTION	ELEVATION
C	DHN SET IN 14" BLACK LOCUST	161.89'
D	DHN SET IN 10" NORWAY MAPLE	168.74'



CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG-SAFE BEFORE YOU DIG 811.

ZONING:

RESIDENCE ZONE 20,000 - 120' FRONT

MINIMUM LOT AREA= 20,000[±] S.F.
MINIMUM LOT COVERAGE= 20%
MINIMUM FRONTAGE= 200 FT.
SETBACKS:
FRONT LOT LINE= 30[±] FT.
FRONT ROW CENTER LINE= 55 FT.
SIDE YARD= 15[±] FT.
REAR YARD=30 FT.
MAX. HEIGHT = 35 FT./2½ STORIES

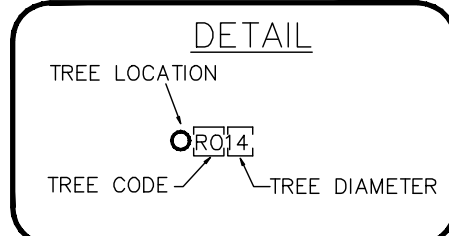
2) IF §198-702 SHALL REQUIRE A GREATER SETBACK OR PERMIT A LESSER SETBACK, THE PROVISIONS OF SAID §198-702 SHALL PREVAIL OVER THIS TABLE.

3) SIDE YARDS SHALL MEET THE REQUIREMENTS OF §§198-702.4 AND 703.2, AND THE REQUIRED MINIMUM SIDE YARD MAY BE REDUCED IN ACCORDANCE WITH PROVISIONS OF §198-703.2

15) MINIMUM FRONT YARD WIDTH SHALL BE CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF §198-705.1 OF THE ZONING BYLAW.

EXISTING TREE DESCRIPTION LEGEND

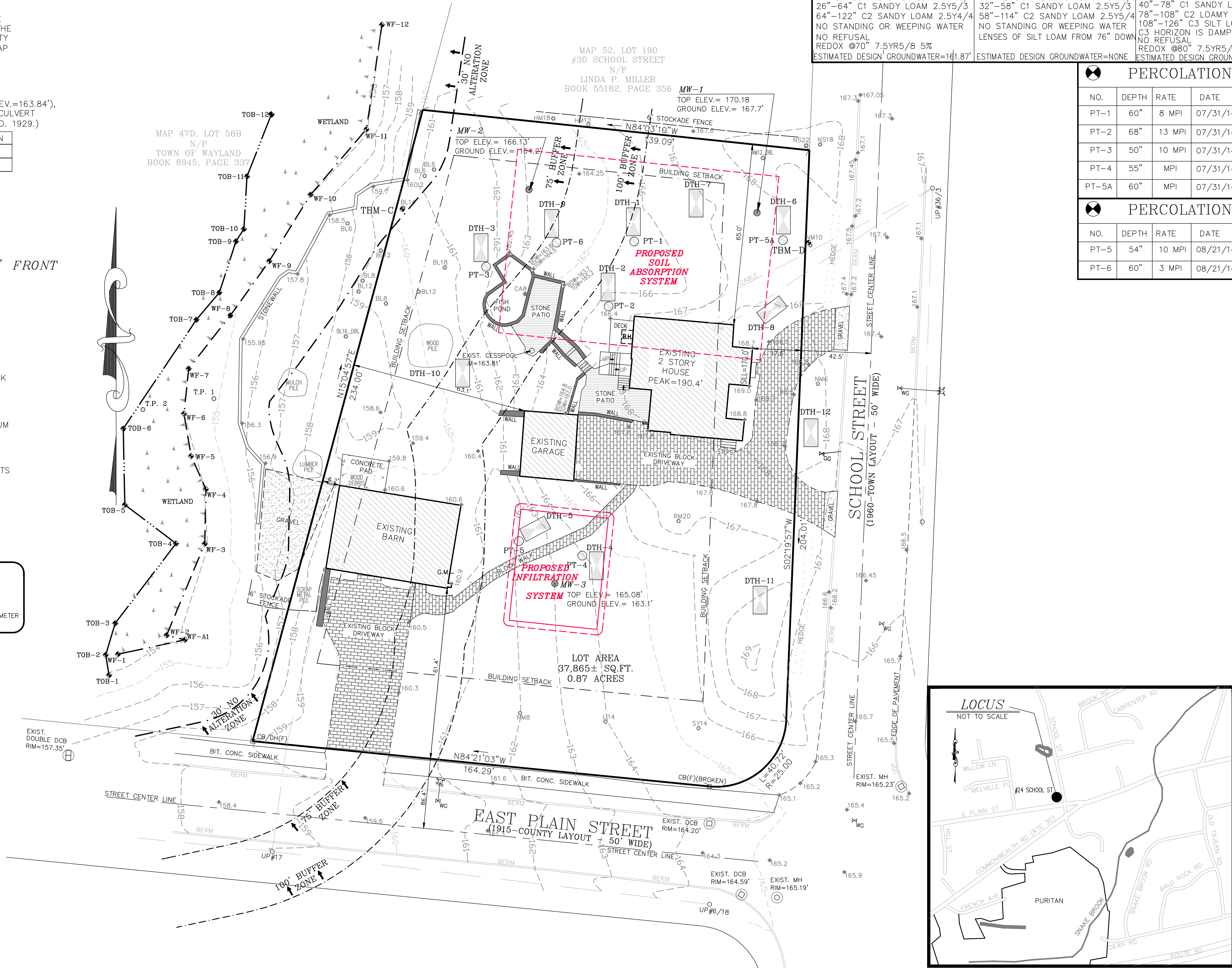
CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE



LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
WVG	WATER GATE
GG	GAS GATE
HY	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
±200.0	EXISTING SPOT GRADE
---200---	EXISTING GRADING
---	EXISTING OVERHANG WIRE

No.	DATE	REVISION
2	07/29/15	ADD TOP OF BANK
3	11/01/15	ADD ELEVATION DATUM REFERENCE REVISE WF#11, WF#12
4	01/05/18	ADD MONITOR WELLS



SOIL LOGS SOIL TEST RESULTS

DTH-1 ELEV=165.7'	DTH-2 ELEV=165.9'	DTH-3 ELEV=161.7'	DTH-4 ELEV=164.1'	DTH-5 ELEV=162.6'
0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-24" Bw FINE SANDY LOAM 10YR5/6 24"-62" C1 SANDY LOAM 2.5Y5/3 62"-126" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER NO REFUSAL, C2 HORIZON IS TIGHT REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=159.87'	0"-22" Ap FINE SANDY LOAM 10YR3/3 22"-42" Bw FINE SANDY LOAM 10YR5/6 42"-96" C1 SANDY LOAM 2.5Y5/3 96"-118" C2 SILT LOAM 2.5Y6/3 WATER WEEPING @106" NO STANDING WATER, NO REFUSAL REDOX @80" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=159.23'	0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-22" Bw FINE SANDY LOAM 10YR5/6 22"-84" C1 SANDY LOAM 2.5Y5/3 84"-110" C2 SILT LOAM 2.5Y6/3 NO STANDING WATER, NO REFUSAL C2 HORIZON IS DAMP REDOX @82" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=154.87'	0"-20" FILL 20"-28" Ap FINE SANDY LOAM 10YR3/3 28"-40" Bw FINE SANDY LOAM 10YR5/6 40"-86" C1 SANDY LOAM 2.5Y5/4 86"-116" C2 SANDY LOAM 2.5Y4/4 NO REFUSAL, NO STANDING OR WEEPING WATER NO REDOX ESTIMATED DESIGN GROUNDWATER=NONE	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-34" Bw FINE SANDY LOAM 10YR5/6 34"-84" C1 SANDY LOAM 2.5Y5/4 84"-118" C2 SANDY LOAM 2.5Y4/3 WEEPING WATER @112" NO REFUSAL REDOX @72" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=156.6'

BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)

INSPECTOR: BILL MURPHY, WAYLAND BOARD OF HEALTH

SOIL LOGS SOIL TEST RESULTS

DTH-6 ELEV=167.7'	DTH-7 ELEV=166.8'	DTH-8 ELEV=168.2'	DTH-9 ELEV=163.0'	DTH-10 ELEV=160.75'
0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-26" Bw FINE SANDY LOAM 10YR5/6 26"-64" C1 SANDY LOAM 2.5Y5/3 64"-122" C2 SANDY LOAM 2.5Y4/4 NO STANDING OR WEEPING WATER NO REFUSAL REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.87'	0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-32" Bw FINE SANDY LOAM 10YR5/6 32"-58" C1 SANDY LOAM 2.5Y5/3 58"-114" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER LENSES OF SILT LOAM FROM 76" DOWN ESTIMATED DESIGN GROUNDWATER=NONE	0"-26" FILL 26"-40" Bw FINE SANDY LOAM 10YR5/6 40"-78" C1 SANDY LOAM 2.5Y5/4 78"-108" C2 LOAMY SAND 2.5Y5/3 108"-126" C3 SILT LOAM 2.5Y6/3 C3 HORIZON IS DAMP NO REFUSAL REDOX @80" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=161.53'	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-30" Bw FINE SANDY LOAM 10YR5/6 30"-46" Bw SANDY LOAM 2.5Y5/4 46"-98" C1 SANDY LOAM 2.5Y5/3 98"-118" C2 SANDY LOAM 2.5Y4/4 WATER STANDING @108" WATER WEEPING @88" REDOX SEEN @62", NO REFUSAL ESTIMATED DESIGN GROUNDWATER=157.8'	0"-15" Ap FINE SANDY LOAM 10YR3/3 15"-30" Bw FINE SANDY LOAM 10YR5/6 30"-66" C1 LOAMY SAND 2.5Y5/3 66"-112" C2 SILT LOAM 2.5Y5/4 WATER STANDING @120" WATER WEEPING @98" NO REFUSAL REDOX SEEN @68" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=155.08'

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	NSP.
PT-1	60"	8 MPI	07/31/14	B.N.	B.M.
PT-2	68"	13 MPI	07/31/14	B.N.	B.M.
PT-3	50"	10 MPI	07/31/14	B.N.	B.M.
PT-4	55"	MPI	07/31/14	B.N.	B.M.
PT-5A	60"	MPI	07/31/14	B.N.	B.M.

PERCOLATION

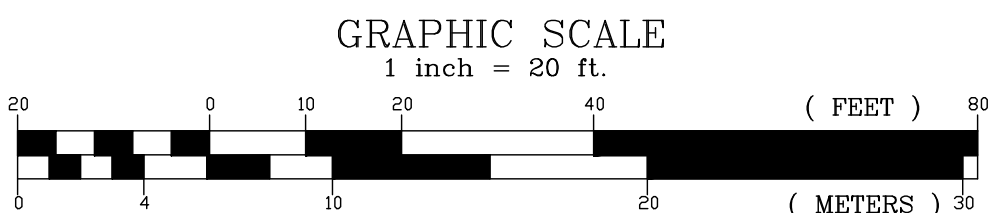
NO.	DEPTH	RATE	DATE	BY	NSP.
PT-5	54"	10 MPI	08/21/14	B.N.	J.J.
PT-6	60"	3 MPI	08/21/14	B.N.	J.J.

DTH-11 ELEV=166.0'	DTH-12 ELEV=168.2'
0"-18" FILL 18"-30" Ap FINE SANDY LOAM 10YR3/3 30"-36" Bw FINE SANDY LOAM 10YR5/6 36"-58" C1 SANDY LOAM 2.5Y5/3 58"-128" C2 SANDY LOAM 2.5Y6/3 WATER STANDING @125" NO WEEPING WATER REDOX SEEN @60" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.0'	0"-54" FILL 58"-82" C1 SANDY LOAM 2.5Y4/4 82"-114" C2 SANDY LOAM 2.5Y5/4 C2 HORIZON HAS LENSES OF SILT LOAM NO STANDING OR WEEPING WATER NO REFUSAL REDOX SEEN @64" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=161.0'

BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)

INSPECTOR: JULIA JUNGHANNS, WAYLAND BOARD OF HEALTH

FOR METROWEST ENGINEERING, INC. DATE
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046



EXISTING CONDITIONS SITE PLAN

#24 SCHOOL STREET

IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

PREPARED FOR:

WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:

WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:

MWE METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
FRAMINGHAM, MA 01702
TEL.: (508)626-0063
FAX: (508)875-6440

SHEET 1 OF 1

DATE: MAY 23, 2017

CALC'D BY: RAG

FIELD BK: 621

CAD FILE: CHADWICK_EXIST COND_R5.dwg

DRAFTER:

PROJECT: WY_SCH

DWG FILE: SP051815_R5.dwg