Appendix 14

Septic Mounding Analysis

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUND-WATER AND
ENVIRONMENTAL ENGINEERING SERVICES

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February 16, 2012

Mr. Michael Plottel
Jo-Flo of North Salem
300 East 74th Street
New York, NY 10021

RE: Septic Mounding Analysis
Woodlands at North Salem
North Salem, New York

Dear Mr. Plottel:

Leggette, Brashears & Graham, Inc. (LBG) has completed a mounding analysis utilizing data gathered to date from the proposed subsurface effluent disposal areas (PSDA) at the above-referenced property. As part of this analysis, LBG reviewed all available hydrogeologic data, supervised the drilling of 12 test borings, conducted slug tests, completed sieve analyses and developed a simplified groundwater flow model to address issues related to groundwater mounding and travel times. The analysis also included a nitrate-nitrogen dilution analysis.

BACKGROUND

The Woodlands property is located north of the intersection of State Highway Route 138 and State Highway Route 22 in North Salem, New York (figure 1), at the end of Sun Valley Road. Three PSDA were designated by Keane Coppelman Engineers, P.C. (KCE). The PSDAs will serve a residential development. The final design flow to the proposed system (33,000 gpd (gallons per day)) was provided by KCE.

The PSDAs chosen by KCE are shown on figure 2. The disposal areas cover a total of approximately 122,235 square feet. Based on this area, the design flow of the systems distributed over the disposal areas represents a hydraulic loading rate of approximately 0.27 gpd/ft^2 (gallon per day per square foot).

As the effluent is discharged into the soil through a leaching system, a groundwater mound is formed. The goal of this analysis was to provide a conservative estimate of potential

groundwater mounding. Predictions from this analysis were used to determine: 1) if the soils could accept the design flow rate without excessive mounding up into the leaching system; 2) the potential for premature breakout on side slopes using conservative assumptions; 3) the estimated 21-day travel distance for groundwater as it flows from the mound, in order to make certain that any pathogenic bacteria in the effluent has sufficient time in the soil to die off; and 4) complete a nitrate-nitrogen dilution analysis.

The evaluation was based upon a review of published geologic and hydrogeologic data along with data from subsurface investigations conducted by KCE in July 1997 and LBG in June 2008 and from March through May 2009. This report addresses only issues related to mounding, travel times and nitrate-nitrogen dilution, and does not evaluate treatment levels. KCE is responsible for all issues related to the design of the systems.

PHYSICAL SETTING

The PSDAs selected by KCE are shown in figure 2. The bedrock beneath the disposal area is mapped as the Cortlandt Formation and a group of smaller mafic complexes consisting of gabbro, norite and hornblende diorite (Fisher, Isachsen, and Rickard, 1970). The nearest downgradient surface-water bodies to the PSDAs are an unnamed stream located approximately 525 feet to the south/southeast of PSDAs A and B and a wetland located approximately 250 feet to the north of PSDA C (figure 1).

The property is located in the Croton River drainage basin, and has significant topographic change over the study parcel. The highest elevation occurs in the midwest portion of the property and is 580 msl (ft above mean sea level). The property slopes from this point in all directions with the lowest elevation being 350 ft above msl. The middle portion of property has the least topographic change and relief.

The site is characterized by glacial till soils that were mapped by the Soil Conservation Service as Chatfield-Charlton complex, hilly, very rocky **(CsD)**, and Chatfield-Hollis-Rock outcrop complex, rollin, **(CtC)** (USDA:SCS 1994). According to the Soil Conservation Service, these soil types have typical shallow permeabilities of 0.6 to 6 inches per hour, which a hydrogeologist would convert to hydraulic conductivities of approximately 1.2 to 12 fpd (feet per day).

PREVIOUS SUBSURFACE INVESTIGATIONS

A previous subsurface investigation by KCE (July 1997), included 18 test holes, 23 borings and 23 percolation tests. The test pits were completed to a depth of 5 to 7 ft bg (feet below grade). The percolation test holes were augered to approximately 1 to 2 ft bg. The investigation showed that the unconsolidated materials in the PSDA areas are comprised of sandy and silty loam. The percolation rates from the tests ranged from 8 to 22 minutes per inch. None of the percolation test holes reached bedrock. No groundwater or mottling was observed in any of the test pits. Test pit locations are shown on figure 2 and the test pit logs are presented in Appendix I.

Other subsurface investigations were also completed by KCE in the time between July 1997 and June 2008. These investigations included test pits, test borings, and the installation of bedrock production wells. No boring, well or test pit logs from this series of investigations were made available to LBG at the time of this report.

SUBSURFACE INVESTIGATIONS

In June 2008, LBG completed an additional subsurface investigation in the PSDA areas. The investigation included the drilling of 12 test borings, and the installation of 6 overburden monitoring wells (MW-1, MW-3, MW-4, MW-7, MW-9, and MW-12). Slug tests were completed in monitoring wells MW-1, MW-3 and MW-12. The monitor wells were drilled to refusal, presumably on bedrock. The locations of these wells are presented on figure 2. Note, the locations and elevations of the monitor wells and borings were surveyed by Bunney Associates Land Surveyors.

The data obtained from this investigation indicate that the unconsolidated material in the proposed disposal area is comprised primarily of poorly-sorted, very fine to medium sand, with some fine to coarse gravel and trace silt and boulders (glacial till). Based on data collected from the test borings, the depth to rock beneath the PSDAs ranges from 5.5 ft bg to 29 ft bg. The geologic boring logs including descriptions of the overburden material and confirmed depths to bedrock are attached in Appendix II.

The nearest groundwater supply wells are deep bedrock wells; the closest is located approximately 100 feet to the north and topographically upgradient of PSDA B. Although additional bedrock production wells are in the process of being completed, none are located

within 500 feet or topographically downgradient of the identified PSDA. The bedrock production wells will be used for domestic water demands at the residential development.

Depth-to-Water

To determine the seasonal high groundwater elevation for the site, LBG installed pressure transducers in monitor wells MW-1, MW-4 and MW-12 to collect continuous water-level measurements from each of the proposed subsurface disposal areas at the site from mid-March through May 2009. Data collected from the transducers are shown on hydrographs presented in Appendix III.

To supplement the transducer data, water-level measurement were collected by hand for each monitor well every other week during the study period. Table 1 summarizes the depth-to-groundwater data collected from six monitor wells located in the PSDAs from March 18, 2009 through May 2009.

Table 1 – Depth-to-Groundwater Measurements

Well	Depth to Water (feet below grade)						
	6/19/2008	6/24/2008	3/19/2009	4/3/2009	4/13/2009	5/12/2009	5/28/2009
MW-1	14.85	Dry	12.11	12.88	11.64	8.74	11.13
MW-3	10.87	13.95	13.21	13.29	13.10	12.73	13.08
MW-4	21.40	20.32	19.08	19.66	19.02	16.18	15.73
MW-7	16.03	16.03	14.04	14.57	14.02	11.89	12.88
MW-9	14.20	Not Measured	10.57	11.32	10.08	8.86	11.13
MW-12	Mot measured	6.27	4.28	4.26	3.91	3.26	4.70
Groundwater Elevation (feet mean sea level)							
MW-1	473.85	dry	476.59	475.82	477.06	479.96	477.57
MW-3	476.23	473.15	473.89	473.81	474.00	474.37	474.02
MW-4	470.20	471.28	472.52	471.94	472.58	475.42	475.87
MW-7	458.37	458.37	460.36	459.83	460.38	462.51	461.52
MW-9	471.40	Not Measured	475.03	474.28	475.52	476.74	474.47
MW-12	Mot measured	421.93	423.92	423.94	424.29	424.94	423.50

Based on a review of the collected water-level data, the May 12, 2009 depth-to-water data was used to reflect the seasonal high groundwater level in the PSDAs. This date was selected because the water levels in most of the monitor wells are either at or near a seasonal high. Data collected from nearby United States Geologic Survey (stratified drift) monitor well P-1217 (see table 1A in Appendix III and figure 3) shows that the regional water level on

May 12, 2009 was higher than 85 percent of the daily water-level measurements collected between September 1, 2004 and March 28, 2010. This confirms that it is reasonable to use the May 12, 2009 groundwater elevation as the seasonal high.

Figure 4 is a plot of the seasonal high groundwater elevation contour map. The contour map was developed to identify the direction of groundwater flow in this area. Figure 4 shows that groundwater flows in a southeasterly direction across the study area. Figure 5 is a plot of the initial depth-to-groundwater contour map.

MOUNDING ANALYSIS

A computer model was developed to evaluate groundwater mounding beneath the PSDAs. The computer model was developed using the "Modular Three-Dimensional Finite-Difference Ground-Water Flow Model" (MODFLOW), by McDonald and Harbaugh (1988). This code, published by the USGS, is the most widely used and accepted groundwater modeling code in present use. Although an analytical model (such as TECMOUND, (Tecsoft, Inc., 1985-2001) is appropriate for this setting, MODFLOW was selected because the use of readily available pre- and post-processors expedites model development and analysis.

TECHMOUND is an analytical model that uses either the Glover (1961) or Hantush (1967) solution to model the growth and/or decay for an infinite, homogeneous, unconfined aquifer. Mound heights are generated on a user defined grid and recharge and noflow boundary conditions are handled using superposition of solutions in space and time. MODFLOW's modular format allows more flexibility in modeling specific groundwater/surface-water interactions, as wells, variable aquifer thickness, noflow boundaries, capabilities limited in TEMOUND and other analytical models.

Model Layers

The developed model is a two-dimensional, one-layer model. The model used for the analysis is a simplified model designed specifically to predict groundwater mounding in the study area. In order to remain conservative, saturated thickness was estimated from boring and water-level data observed in the six monitor wells. For areas outside the PSDA or were no data were available, the saturated thickness was conservatively established to be a constant 6 feet to account for the seasonal high groundwater elevation.

The model developed for this simulation was designed to be used like an analytical model. Therefore, the model is not suited to predictions of groundwater elevations, and no attempt was made to calibrate the model to measured heads or fluxes. Another one of these purposely conservative assumptions (or boundary conditions) was that the water table in the area is flat. The assumption of a flat water-table limits the potential horizontal gradient in the area, thus decreasing the amount of water that is transmitted horizontally away from the PSDAs.

Grid Design

Finite difference models, such as MODLFOW, require that the areas under investigation be divided into discrete sub-areas (blocks). The finite-difference grid developed for this model consists of 1384 rows and 1384 columns. The model utilized a variable-spaced grid. The grid spacing is finest in the PSDA areas, with node area dimensions of 2 feet by 2 feet. The distant areas have node area dimensions up to 950 feet by 950 feet. The boundaries of the model are located at least 1,200 feet from the study area in each direction and thus do not impact the solution.

Model Input

The simplified model requires three basic input parameters. The first of these parameters is the size and shape of the PSDA areas. The initial area and location of each of the proposed disposal areas are shown on table 2 and figure 2, respectively. The initial total discharge for each of the disposals areas are also shown on table 2. The PSDA areas were simulated using the recharge package in MODFLOW.

Table 2 - Discharge for Disposal Areas

PSED Locations	Area used in Simulation (ft^2)	Discharge (gpd)
Area 1	43,258	750
Area 2A-1	15,147	5,750
Area 2A-2	15,950	9,500
Area 2B	7,742	4,000
Area 3A	19,939	15,500
Area 3B	20,199	500
Total	122,235	36,000

The second and third input parameters required by the model are the horizontal hydraulic conductivity (referred to as hydraulic conductivity) and specific yield of the aquifer. The hydraulic conductivity value entered into the model was based on data derived from slug tests and sieve analyses completed during the 2008 LBG field investigation. The Bouwer-Rice Method (Bouwer and Rice, 1976) and Hvorslev Method (1951) for unconfined aquifers were used to calculate hydraulic conductivity (for saturated sediments) based on values obtained from the slug tests and the Slichter Method (Vukovic et al., 1992) was used to estimate hydraulic conductivity (for unsaturated sediments) based on data from the sieve analysis. The estimated hydraulic conductivities are summarized in the table below. The hydraulic conductivity calculations are shown in Appendix IV.

Table 3 - Hydraulic Conductivity Estimations

Well ID	Hydraulic Conductivity (feet per day)	Analysis Type
MW-1	6	Slug-Test
TB-2	36	Sieve-Analysis
MW-3	1	Slug-Test
MW-4	2	Sieve-Analysis
TB-5	41	Sieve-Analysis
TB-6	32	Sieve-Analysis
MW-7	5	Sieve-Analysis
TB-8	38	Sieve-Analysis
MW-9	29	Sieve-Analysis
TB-10	31	Sieve-Analysis
TB-11	63	Sieve-Analysis
MW-12	4	Slug-Test

The estimated hydraulic conductivities for the PSDS areas ranged from 1 to 63 ft/day (feet per day) with an average of 30 ft/day (excluding the highest and lowest values) and a median of 22 ft/day. To be conservative, a hydraulic conductivity of 6.3 ft/day was used for the model simulations. This value equals the estimated 95-percent lower confidence level of 6.3 ft/day calculated from the slug-test and sieve-analysis data (LBG, 2008).

Note the table above, illustrates that horizontal hydraulic conductivity values derived from the sieve analysis are in general an order of magnitude greater than the values derived from the in-situ slug test analysis. This is not unexpected considering that the sieve analysis values are not in-situ values and do not take into account compaction. For example, the locations with

the greatest estimated hydraulic conductivity based on the sieve-analysis (TB-5 and TB-11), were also locations in which the formation was relatively compact based on the number of blow counts observed during drilling (see logs in Appendix II). Because compaction could not be accounted for as part of the sieve analysis and, in this case, is critical to estimating a reasonable hydraulic conductivity; results from the slug-test were given more weight in assessing actual conditions observed at the site which is why 6.3 ft/day was used for the mounding analysis.

The specific yield of the unconsolidated deposits in the PSDAs was estimated to be 0.30 based upon the review of the geologic log, sieve data and profession judgment. This value is a value typical of glacial till deposits.

Note, the relevant MODFLOW input files are present on the attached DVD.

Initial Mounding Criteria

Prior to the analysis, criteria were developed to evaluate if mounding from the proposed discharge area would be excessive. For locations inside the PSDAs, the criterion was that mounding could not be within 2 feet of the bottom of the proposed leaching galleries or 4 ft bg (one of the model assumptions). This criterion was selected (for treatment purposes) to prevent mounding up into the proposed leaching beds. A typical system is constructed so that the leaching galleries are at least 2 feet above the seasonal high groundwater level. The criteria for outside the PSDA area were that the mounded water levels could only intersect land surfaces in areas in close proximity to existing surface-water bodies. This criterion was selected to ensure that any renovated breakout would enter directly into an existing surface-water body.

Initial Model Results

Results from the initial model simulation did not meet the mounding criteria outlined above. Under the conditions listed above, the resulting mound (as shown in figure 6) would break out to the surface in portions of the PSDA, as shown in figure 7.

Based upon the results of the initial model simulation, it was concluded that engineering controls would be required if the soils are to accept the design flow rate without excessive mounding up into the leaching system. The conceptual design of the engineering controls were provided by Keane Coppelman Engineers, P. C. and include adding 3.5 feet of fill (to raise land surface) to the PSDAs and installing curtain drains (to lower the water table) approximately 15 feet upgradient of each of the PSDAs. The proposed curtain drains would be set

approximately 2 feet below the seasonal high groundwater elevation for each of the PSDAs (figure 8). Based on information provided by Keane Coppelman Engineers, P. C., the thickness of the fill and location of the proposed curtain drains (see figure 8) are in compliance with all regulatory requirements. The concrete galley and curtain drain details are on Sheet 35 of 39 of the subdivision plan set.

Final Mounding Criteria

The addition of engineering controls required the mounding criteria to be modified to reflect the new conditions. For locations inside the PSDAs, to prevent mounding into the system, the modified criterion maintained the stipulation that mounding could not be within 2 feet of the bottom of the proposed leaching galleries. However, based on Keane Coppelman Engineers, P.C. preliminary design, the leaching galleries will be placed in the fill material approximately 1 foot below the new grade, thus the modified criterion is that mounding cannot be above the original land surface (or 0 ft bg).

No adjustments were required to the initial criteria set for outside the PSDA, which remained that the mounded water levels could not intersect land surfaces in areas not in close proximity to existing surface-water bodies.

Final Model Results

Additional simulations were run to evaluate the effect of the proposed engineering controls on the analysis. Progressive simulations demonstrated that due to variation in depth to water, depth-to-bedrock and saturated thickness within the PSDAs, not all of the PSDAs could be utilized without violating the above-referenced criteria. Therefore, discharge was distributed to specific parts of the PSDAs as seen on figure 9, utilizing a trail-and-error method. The hydraulic loading rates and areas used from the final model simulations are show on table 3. Note, because the entire PSDA could not be utilized, it was necessary because of regulatory criteria to decrease the design rate from 36,000 gpd (gallons per day) to 33,000 gpd.

The best result from the trial-and-error analysis is shown on figure 9. Figure 9 shows the predicted groundwater mound after 365 days of continuous discharge utilizing the distribution pattern shown on figure 9 and table 4. To evaluate if results from this final analysis were excessive, the updated mound was compared to the updated estimated depth-to-water in the study area. The results from this comparison (as shown on figure 10) indicate that that the

predicted mound would not break out to the surface in the PSDAs. This result suggests that the proposed system would be viable in the PSDAs, if fill and curtain drains are incorporated into the final design.

Table 4 – Final PSDAs and Discharge Rates

PSDA Location	Area Used in Simulation (ft^2)	Discharge (gpd)
1	43,258	758
2A-1	15,147	5,750
2A-2	15,950	9,500
2B	7,742	4,000
3A	19,939	9,000
3B	13,753	4,000

TRAVEL TIME ANALYSIS

A travel time analysis was conducted to ensure that there is sufficient time for full die-off of pathogenic bacteria, about 21 days (Healy & May, 1982), prior to reaching any downgradient sensitive receptors, including property boundaries, surface-water bodies, curtain drains, and the production wells. The analysis was completed in three phases. The first phase consisted of super-imposing the final simulated 365-day groundwater mound resulting from the trial-and-error analysis (figure 9) onto the pre-mounding groundwater elevation contour map (figure 8).

The post-mound groundwater elevation data were then analyzed using PATH3D (S.S. Papadopulos and Associates, Inc. 1989). PATH3D is a general particle-tracking program for calculating groundwater paths and travel times. The program incorporates a velocity, interpolator, which converts hydraulic heads, hydraulic conductivity and porosity into a velocity, and a numerical solver for tracing the movement of fluid particles in the groundwater flow system. Note, the relevant PATH3D files are present on the attached DVD.

Figure 10 is a plot showing the predicted flow paths and 21-day travel time of groundwater emanating from the proposed PSDAs. The hydraulic conductivity and porosity values used for the analysis were 6 ft/day and 30 percent, respectively. The post-mounding groundwater velocities ranged from 0.9 ft/day to 7 ft/day, which equate to 21-day travel distances of 17 feet and 140 feet. These results indicate that the groundwater will not cross a property boundary, enter a surface-water body or breakout at the identified locations before 21-days of travel time is reached.

To ensure that the evaluation was conservative, LBG completed a second travel time analysis utilizing a horizontal hydraulic conductivity value equal to the geometric mean (14.6 ft/day) of the values observed in the field (see table 3). The geometric mean was used for the analysis because the value is more representative of the potential high conductivity values for the formation than the higher values derived directly from the sieve analysis. As discuss the values from the sieve analyses are thought to be an order of magnitude too high because the method doesn't account for compaction. The methodology used to estimate the geometric mean is presented in the CTDEP's Guidance for Design of Large-scale On-site Wastewater Renovation Systems (Nathan L. Jacobson & Associates, Inc., 2006).

The high conductivity travel-time analysis was completed utilizing the method outlined above. Figure 11 shows the predicted flow paths and 21-day travel time of groundwater emanating from the proposed PSDA area. As discussed the hydraulic conductivity used for the analysis was 14.6 ft/day. The post-mounding groundwater velocities ranged from 0.3 ft/day to 17.3 ft/day, which equate to 21-day travel distances of 7.1 feet and 364.6 feet. The results for this conservative analysis show, with the exception of a small area to the east of PSDA 1, that the groundwater will not cross a property boundary, enter a surface-water body before the 21 days of travel time is reached. As document during the original mounding analysis, the groundwater will not cross a property boundary if the horizontal hydraulic conductivity is consistent with the values derived from the slug test analysis.

NITRATE-NITROGEN DILUTION ANALYSIS

Nitrogen in sewage originates as ammonia and organic nitrogen from human waste products. Some of the ammonia and organic nitrogen, about 40 percent, is lost to the atmosphere from the biologic digestion process in the septic tank and about 60 percent of these nitrogen forms are delivered to the soil by the leaching facility. In contact with the aerobic groundwater, the ammonia and organic nitrogen is quickly transformed to nitrite nitrogen (NO_2) and then to nitrate nitrogen (NO_3). The end product of this nitrification process, nitrate nitrogen, is a stable ion in groundwater and is only attenuated by dilution from infiltrating precipitation.

LBG uses a mass-balance equation, based on work at the University of Connecticut Civil Engineering Department and the CTDEP (Healy & May, 1982) to calculate the nitrate-nitrogen dilution, as follows:

$$N = \frac{[Q_s \times N_s] + [Q_p \times N_p]}{[Q_s + Q_p]}$$

in which: **N** = nitrate nitrogen leaving the property, as N, in mg/l;

Qs = average sewage flow in gpd;

Ns = nitrogen content of sewage leaving the leaching system;

Qp = average daily infiltration of precipitation entering the flowpath, in gpd;

Np = nitrogen content of suburban precipitation, taken as 0.5 mg/l.

Kean Coppelman Engineers, P.C. has provided an average daily sewage flow of 33,000 gpd and an average total nitrogen concentration for treated effluent leaving the septic tank during the winter months of 2.2 mg/l (milligrams per liter). Figure 12 shows the proposed location of the leaching beds. The onsite watershed available for dilution (19.3 acres) was estimated using the post-mounding water table map generated during the travel time analysis. The estimated dilution area (see figure 12) encompasses the region between the proposed drain system and the property boundary.

As shown by table 5, substituting the above values in this equation results in a nitrate nitrogen concentration leaving the area on concern of 1.3 mg/l, of which 0.3 mg/l is the assumed nitrogen content of the precipitation, so the conservatively-projected nitrogen impact would be 1.0 mg/l.

Table 5 - Nitrate-Nitrogen Dilution

$$N = \frac{[Q_s \times N_s] + [Q_p \times N_p]}{[Q_s + Q_p]}$$

N = nitrate nitrogen leaving the property, as N, in mg/l;
Qs = average sewager flow in gpd;
Ns = nitrogen content of sewager leaving the leaching system;
Qp = average daily infiltration of precipitation entering the flowpath, in gpd;
Np = nitrogen content of subsurban precipitation

Recharge = average annual natural recharge								26.28	inches
Approximate Recharge area								19.30	acre
Average total nitrogen concentration for treated effluent								2.2	mg/l
Qs =	33,000	gpd							
Ns =	2.2	mg/l							
Qp =	37,708	gpd							
Np =	0.5	mg/l							
N =	1.29	mg/l							
N =	0.3	mg/l							
N = Projected Net impact		*1.0*	*mg/l*						

As expected, because of pre-treatment the conservatively-projected nitrogen impacted groundwater is significantly less than the New York drinking water limit of 10 mg/l. This discharge will flow toward a combination of residential properties and undeveloped land, where substantial further nitrate dilution will occur, probably further enhanced by denitrification in the warm months of the year. Note, to be conservative the 40 reduction resulting from biologic digestion process was not incorporated into the analysis.

Based on the conservative methodology discussed above, the average total nitrogen concentration for the treated effluent would have to be greater than 35 mg/l to exceed the drinking water standard.

CONCLUSION

The results of the above described analysis indicate that the soils beneath the existing PSDAs would accept the design flow of 33,000 gpd provided fill and curtain drains (in accordance with regulatory criteria) are incorporated into Keane Coppelman Engineer, P.C. final design.

In anticipation of possible negative results, KCE should test additional PSDAs that would be available if determined to be needed in the future.

LEGGETTE, BRASHEARS & GRAHAM, INC.

Kenneth Taylor, CPG
Senior Associate/Hydrogeologist

Reviewed by:

R. G. Slayback, CPG
Senior Consultant

KT:etn
Enclosures
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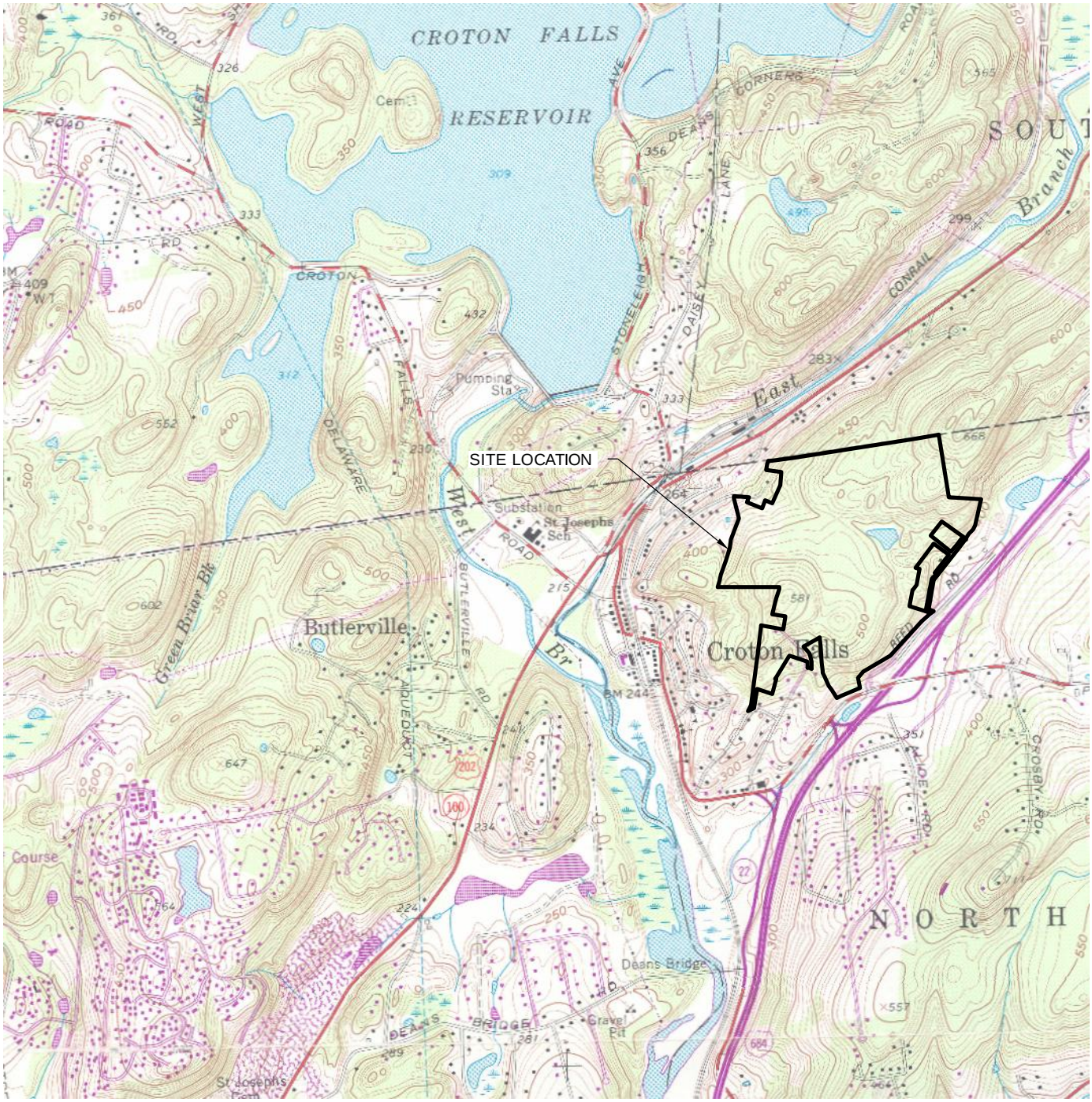
FIGURES



SOURCE: USGS TOPOGRAPHIC QUADRANGLE CROTON FALLS, NEW YORK (PHOTOREVISED 1981).

QUADRANGLE LOCATION

SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

SITE LOCATION MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
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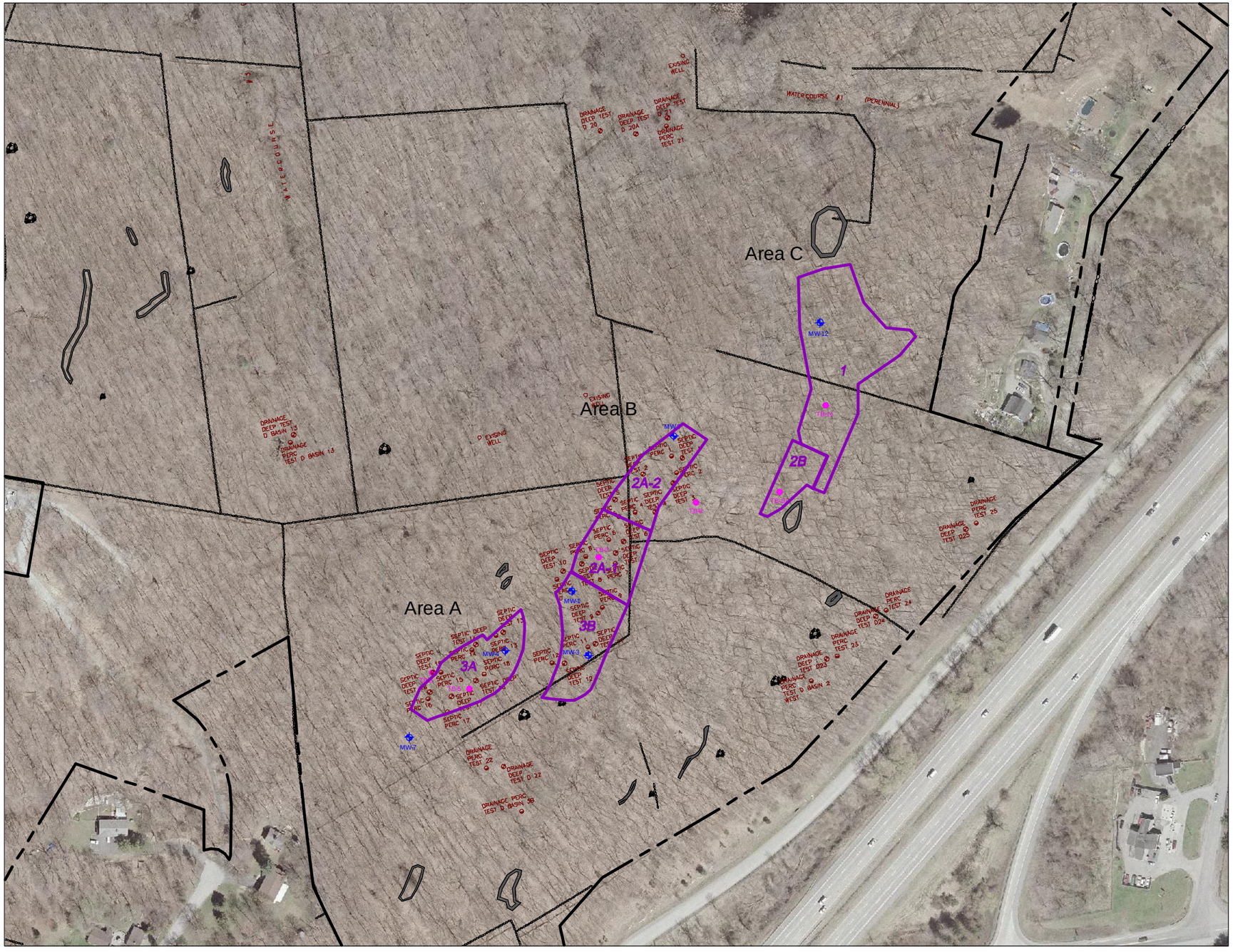
DRAWN:	MRV	CHECKED:	KT	DATE:	02/15/12	FIGURE:	1



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SCALE IN FEET

N

LEGEND

- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-11 — LBG TEST BORING
- PERCOLATION TEST
- DEEP TEST PIT
- EXISTING WELL

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

PSDA AREAS AND WELL LOCATIONS

DATE	REVISED

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DRAWN:	MRV	CHECKED:	KT	DATE:	02/15/12	FIGURE:	2

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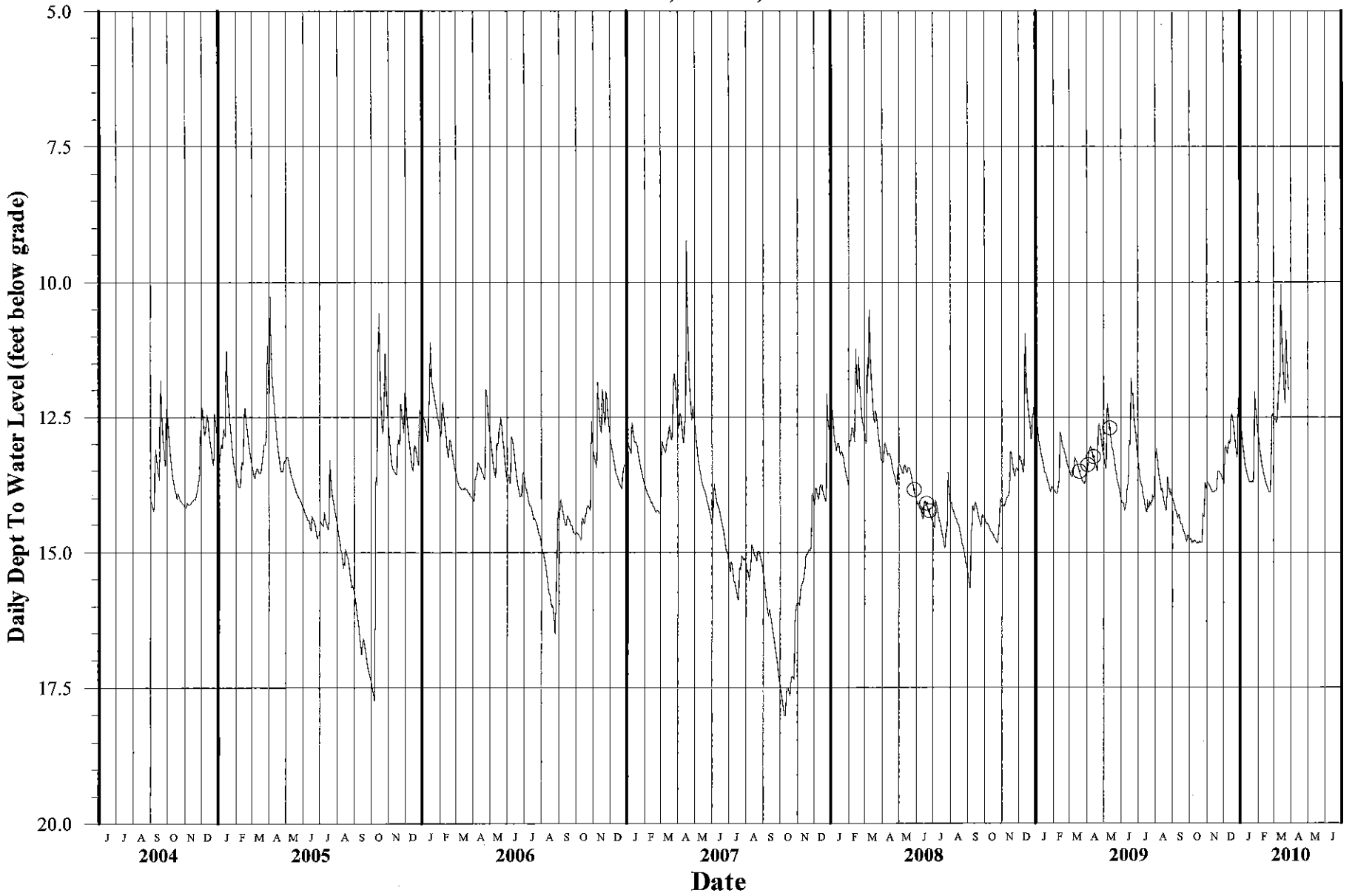
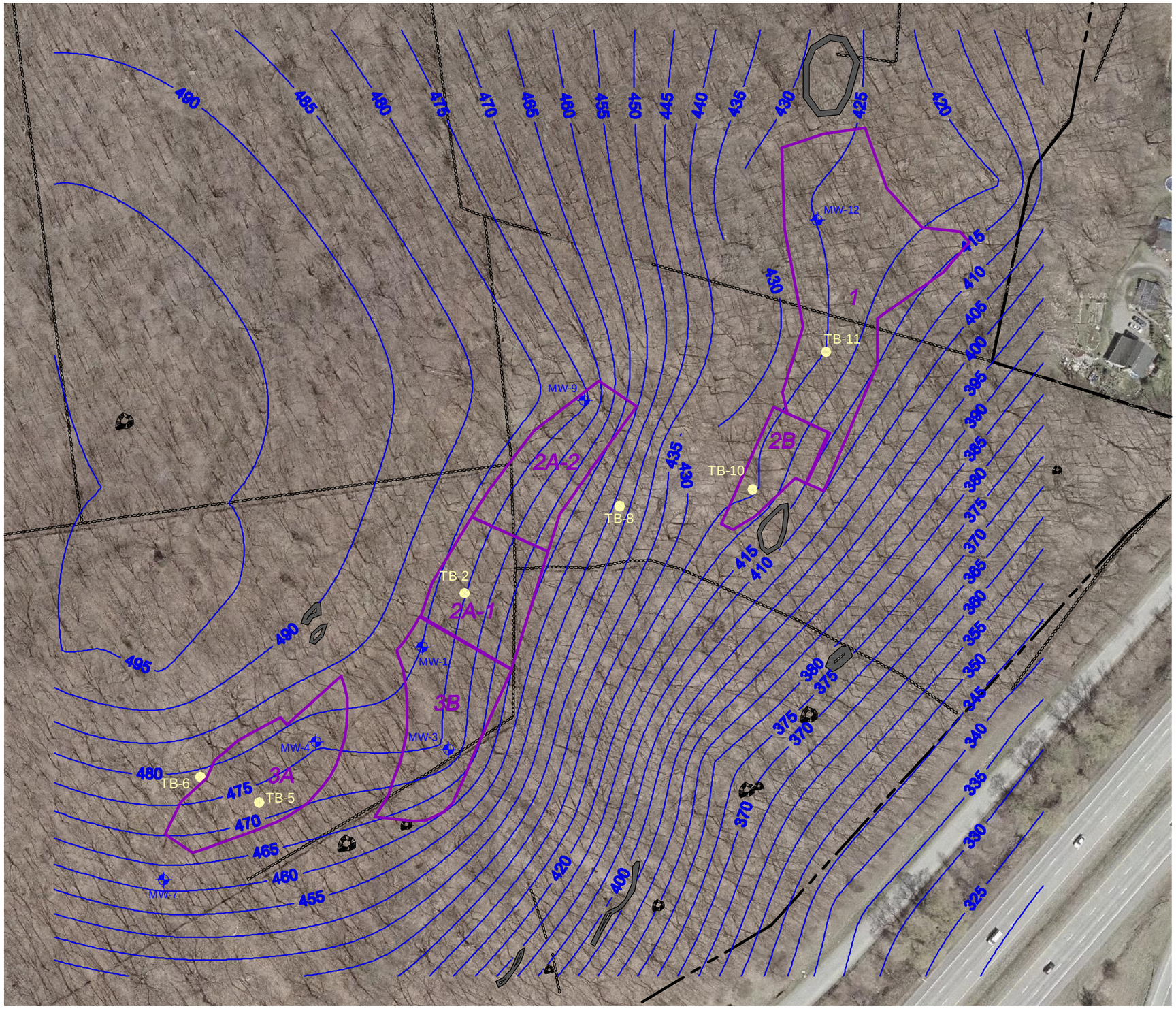
WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

Hydrograph of USGS Well, Site Number 41214907345501
P-1217, Carmel, New York



LEGGETTE, BRASHEARS & GRAHAM, INC.

Figure 3



LEGEND

360 — GROUNDWATER ELEVATION (FEET)

3A — SUBSURFACE DISPOSAL AREA

STONE WALL

PROPERTY BOUNDARY

BEDROCK OUTCROP

MW-12 — LBG MONITOR WELL

TB-8 — LBG TEST BORING

0 120

SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

SEASONAL HIGH GROUNDWATER ELEVATION CONTOUR MAP

DATE	REVISED

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DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	4

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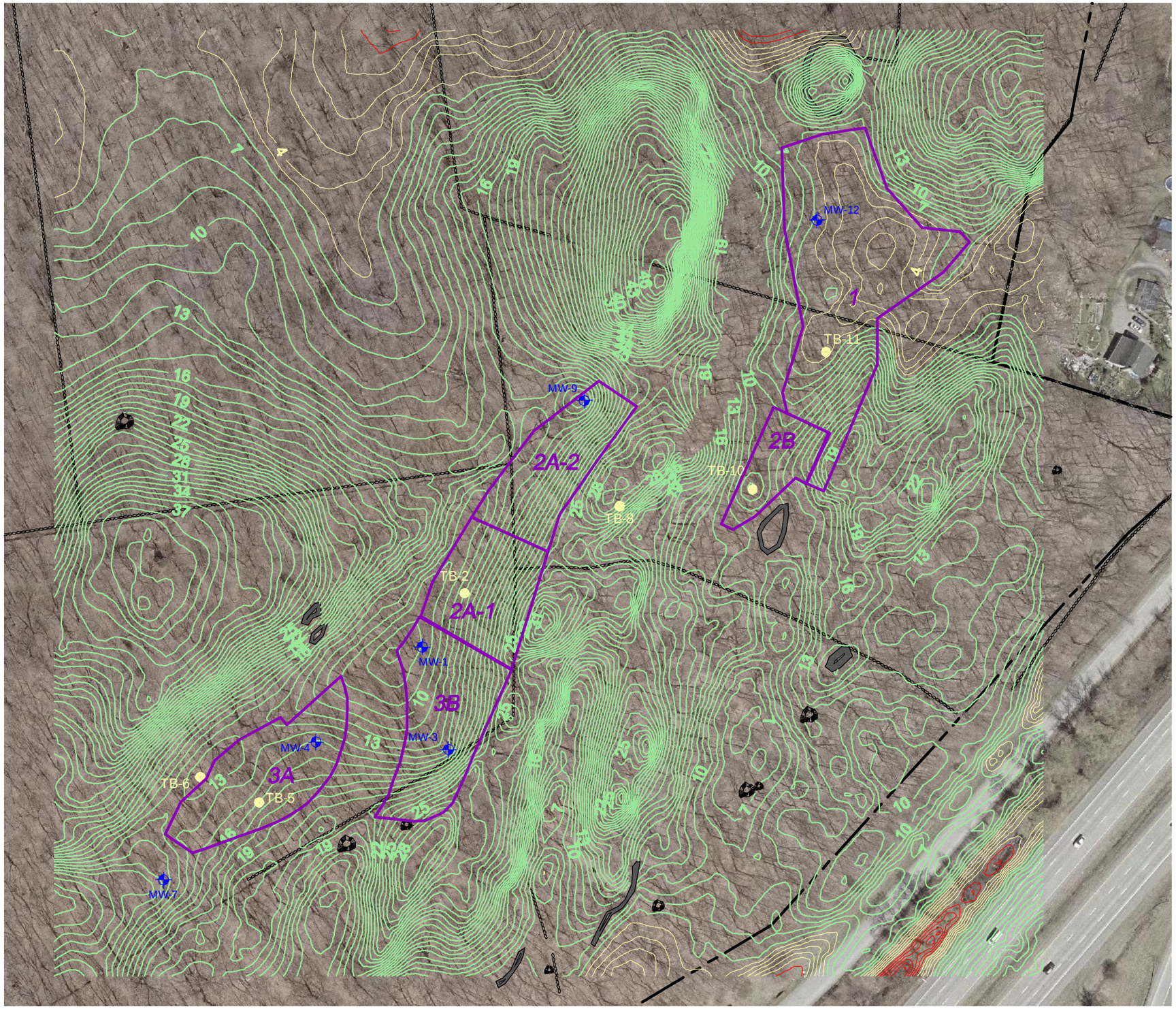


N

LEGEND

- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-8 — LBG TEST BORING

DEPTH TO WATER (feet below grade)

- <=0
- 0-5
- >=5

0 120
SCALE IN FEET

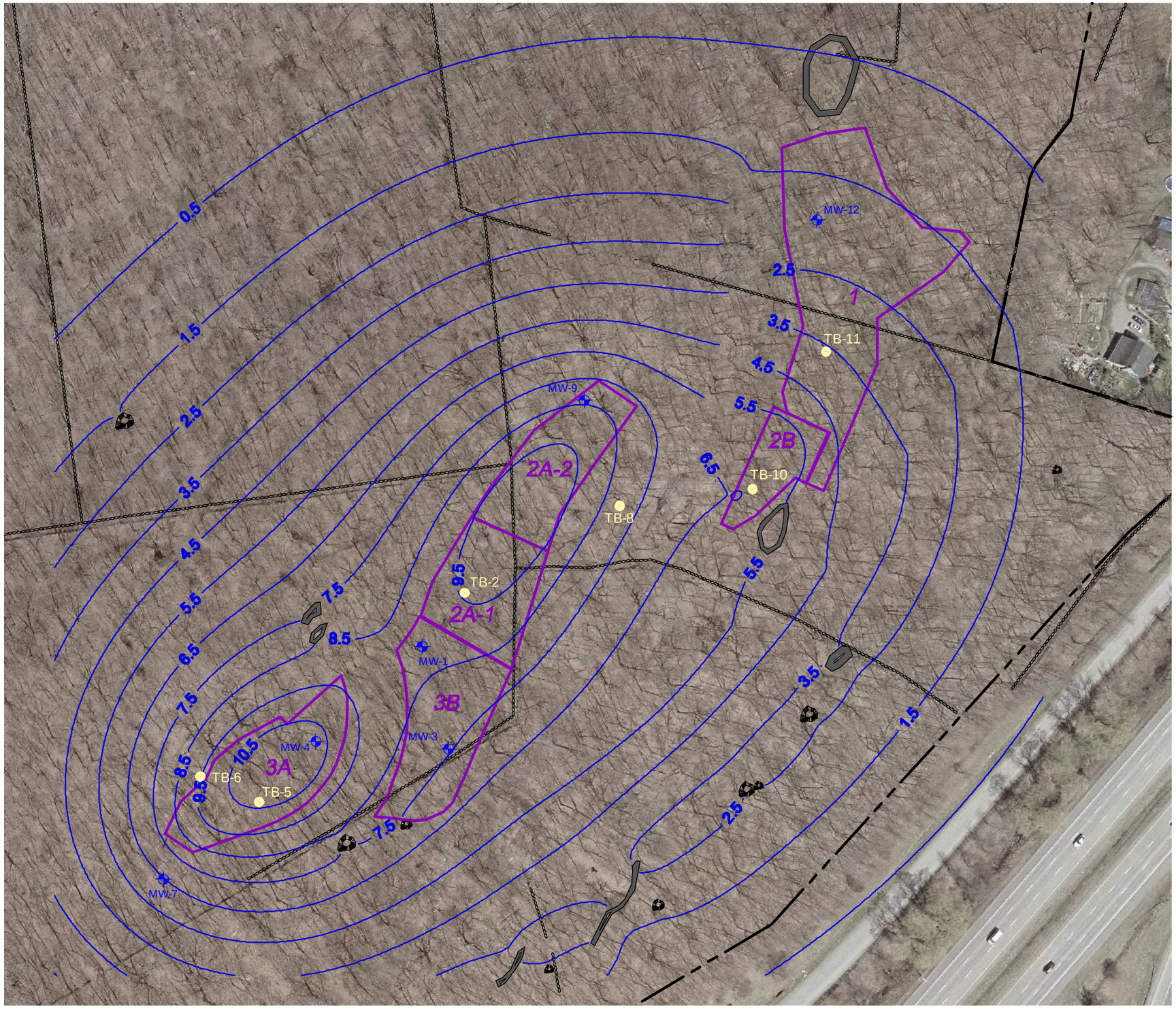
WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

INITIAL PRE MOUNDING SEASONAL HIGH DEPTH TO GROUNDWATER CONTOUR MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	5



PSDA Location	Area Used in Simulation (ft^2)	Discharge (gpd)
1	43,258	758
2A-1	15,147	5,750
2A-2	15,950	9,500
2B	7,742	4,000
3A	19,939	15,500
3B	20,199	500

LEGEND

- 4.5 — GROUNDWATER ELEVATION (FEET)
- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-8 — LBG TEST BORING

0 120
SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

INITIAL 365 DAY POST MOUNDING HEIGHT CONTOUR MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	05/07/10	FIGURE:	6

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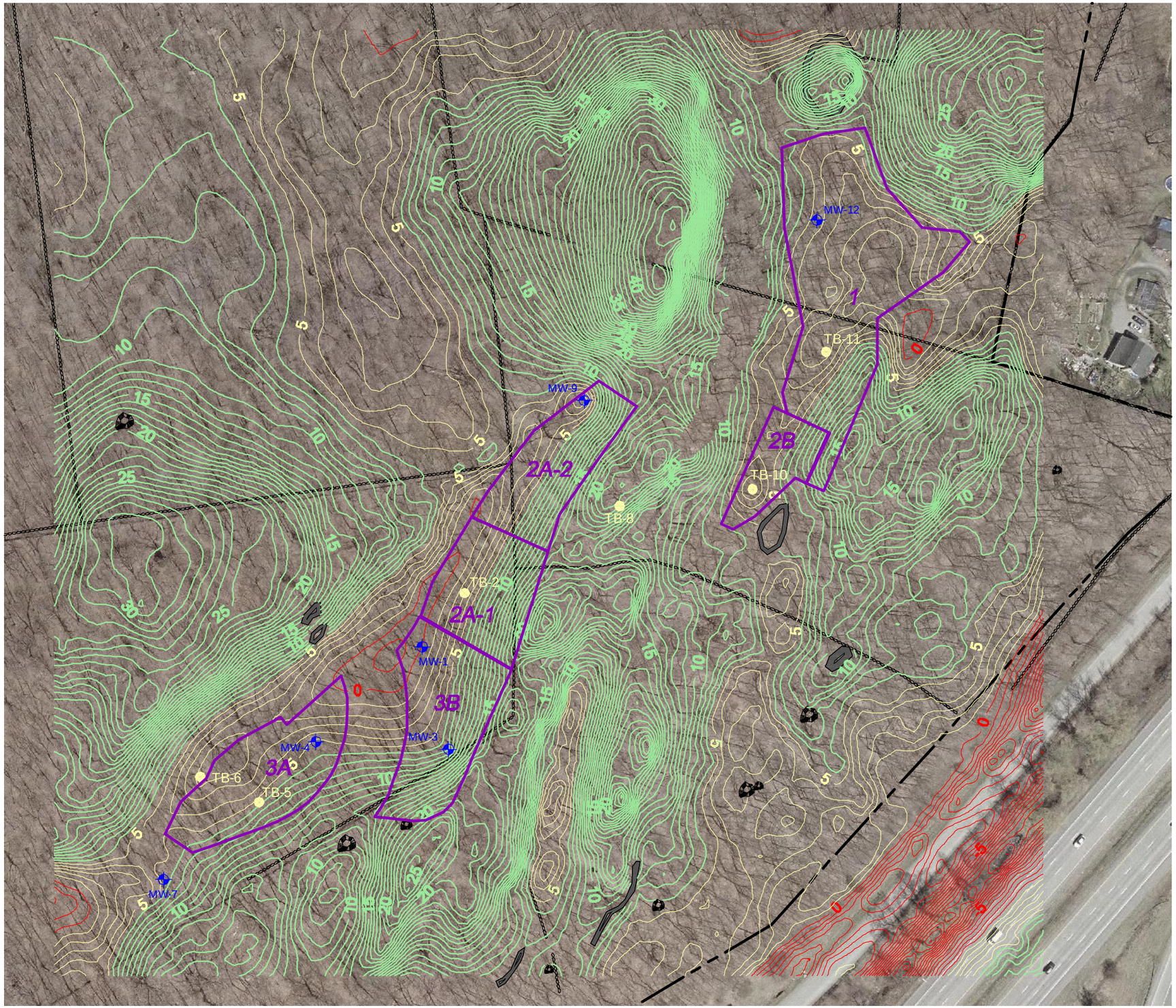

PSDA Location	Area Used in Simulation (ft^2)	Discharge (gpd)
1	43,258	758
2A-1	15,147	5,750
2A-2	15,950	9,500
2B	7,742	4,000
3A	19,939	15,500
3B	20,199	500

LEGEND

- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-8 — LBG TEST BORING

DEPTH TO WATER (feet below grade)

- <=0
- 0-5
- >=5

0 120
SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

INITIAL 365 DAY POST MOUNDING DEPTH TO GROUNDWATER CONTOUR MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	7

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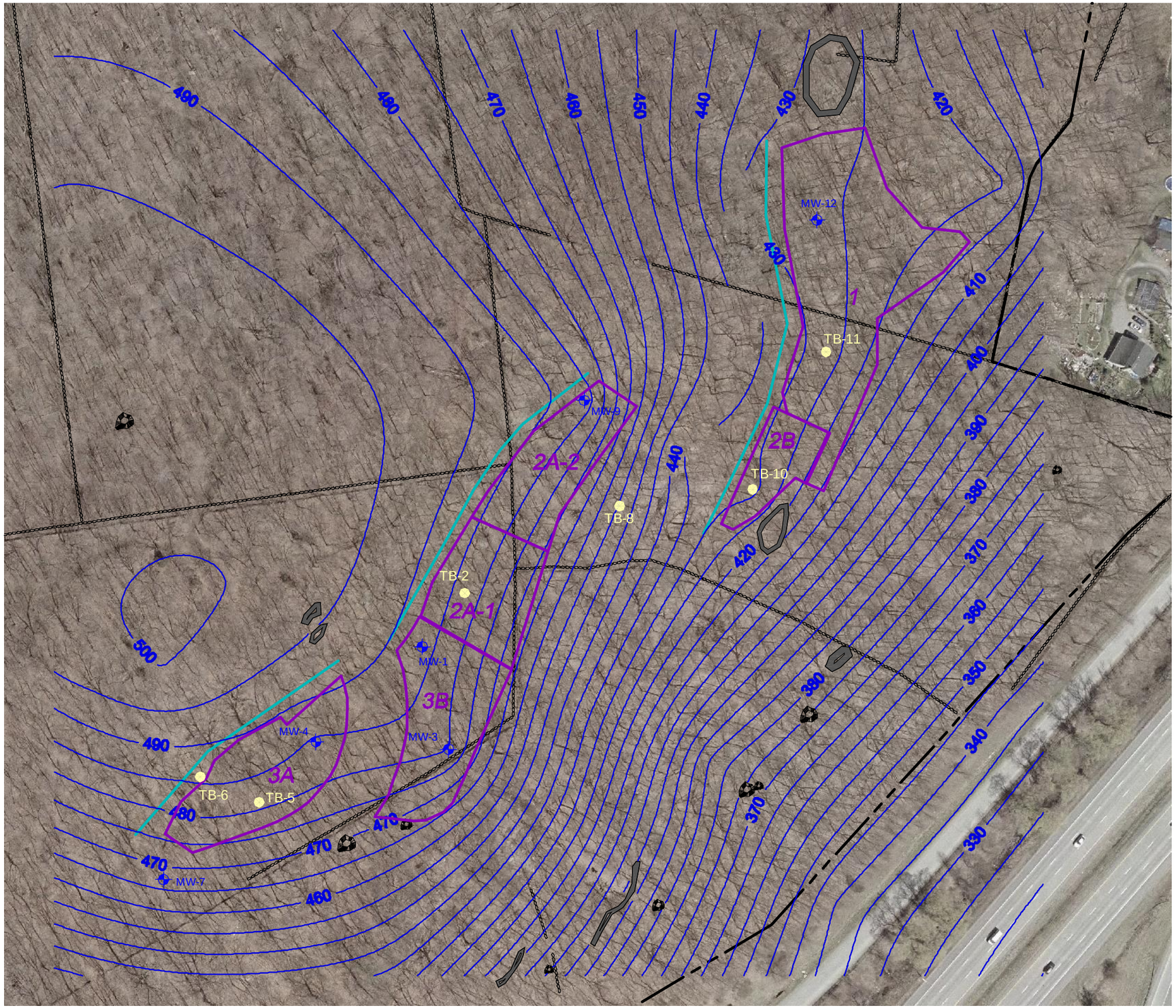

LEGEND

390	GROUNDWATER ELEVATION (FEET)
3A	SUBSURFACE DISPOSAL AREA
	STONE WALL
	PROPERTY BOUNDARY
	BEDROCK OUTCROP
MW-12	LBG MONITOR WELL
TB-8	LBG TEST BORING
	PROPOSED DRAIN LOCATION (KEANE COPPELMAN ENGINEERS)

0 120
SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

UPDATED PRE MOUNDING SEASONAL HIGH GROUNDWATER ELEVATION CONTOUR MAP USING ENGINEERING CONTROLS

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	8

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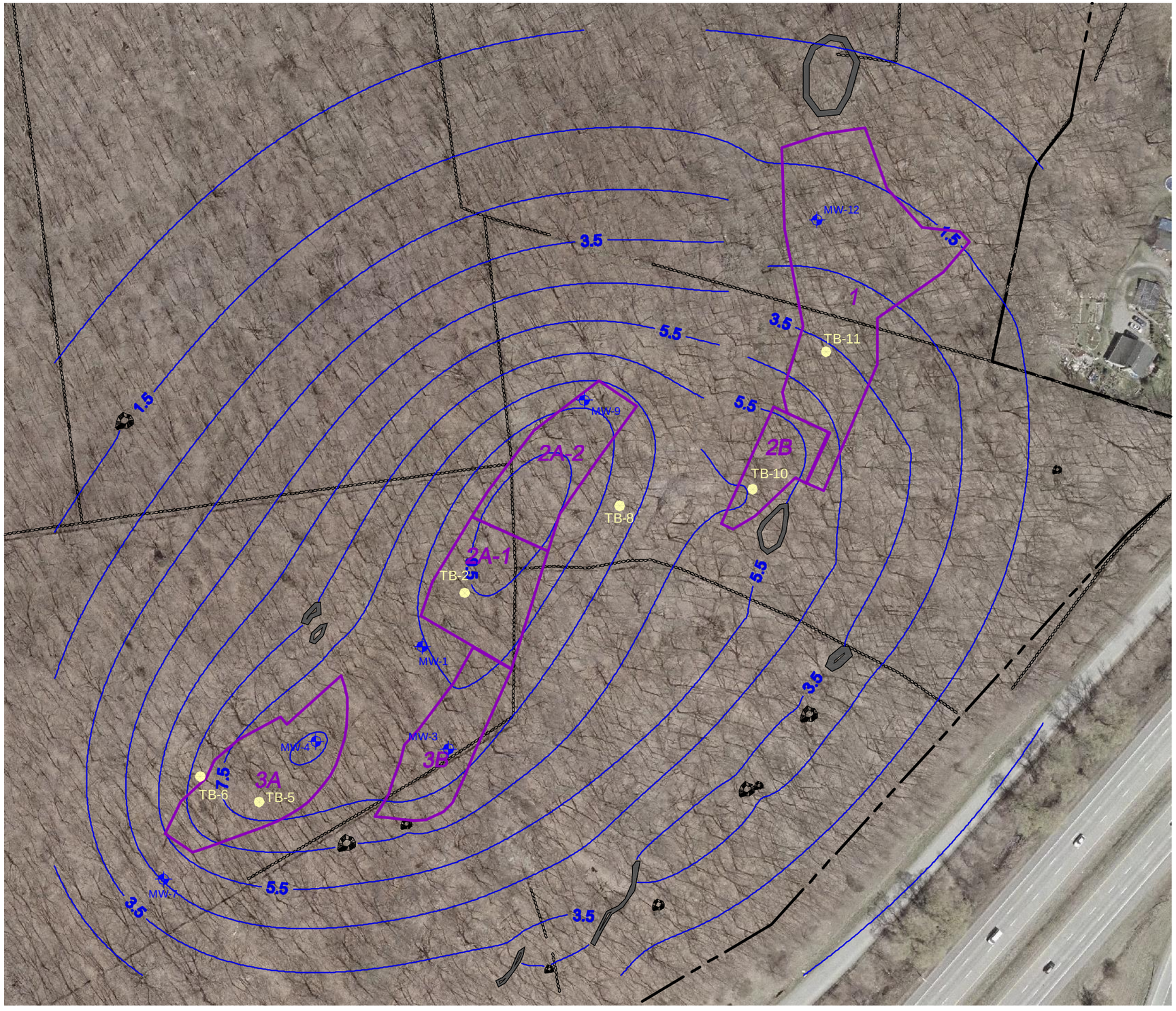


PSDA Location	Area Used in Simulation (ft^2)	Discharge (gpd)
1	43,258	758
2A-1	15,147	5,750
2A-2	15,950	9,500
2B	7,742	4,000
3A	19,939	9,000
3B	13,753	4,000

LEGEND

- 4.5 — GROUNDWATER ELEVATION (FEET)
- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-8 — LBG TEST BORING

0 120
SCALE IN FEET

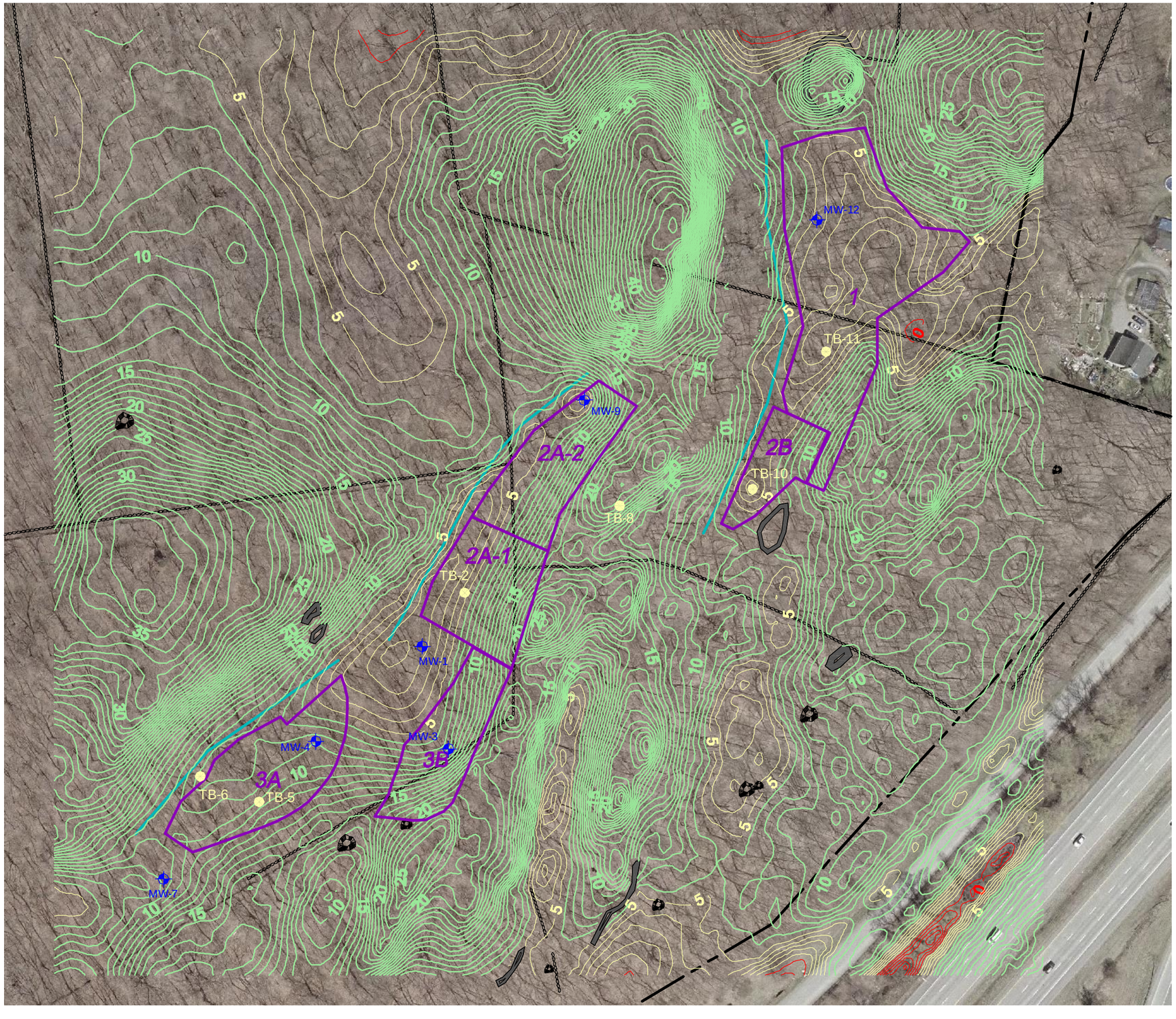
WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

FINAL 365 DAY POST MOUNDING HEIGHT CONTOUR MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	9



PSDA Location	Area Used in Simulation (ft^2)	Discharge (gpd)
1	43,258	758
2A-1	15,147	5,750
2A-2	15,950	9,500
2B	7,742	4,000
3A	19,939	9,000
3B	13,753	4,000

LEGEND

- 3A — SUBSURFACE DISPOSAL AREA
- STONE WALL
- PROPERTY BOUNDARY
- BEDROCK OUTCROP
- MW-12 — LBG MONITOR WELL
- TB-8 — LBG TEST BORING
- PROPOSED DRAIN LOCATION (KEANE COPPELMAN ENGINEERS)

DEPTH TO WATER (feet below grade)

- <=0
- 0-5
- >=5

0 120
SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

FINAL 365 DAY POST MOUNDING DEPTH TO GROUNDWATER CONTOUR MAP USING ENGINEERING CONTROLS

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
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Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	10

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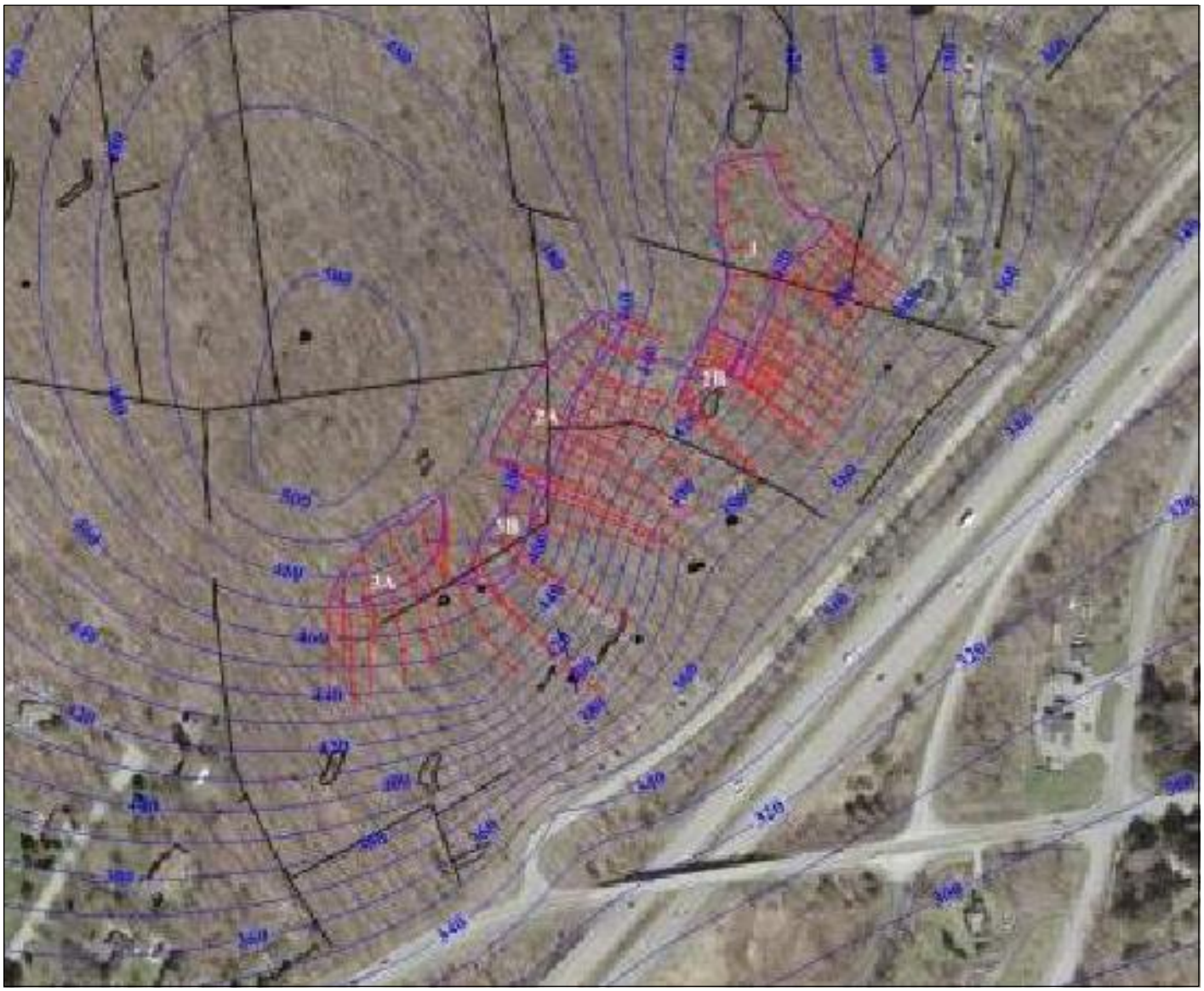


LEGEND

405 — GROUNDWATER ELEVATION (FEET)

3A — SUBSURFACE DISPOSAL AREA

STONE WALL

PROPERTY BOUNDARY

BEDROCK OUTCROP

MW-12 — LBG MONITOR WELL

PARTICLE TRACE

0 150

SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

POST MOUNDING GROUNDWATER ELEVATION CONTOUR MAP AND PARTICLE TRACES

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	11

LEGEND

3A — SUBSURFACE DISPOSAL AREA

STONE WALL

PROPERTY BOUNDARY

BEDROCK OUTCROP

MW-12 — LBG MONITOR WELL

0 150

SCALE IN FEET

WOODLANDS AT NORTH SALEM
MOUNDING ANALYSIS
NORTH SALEM, NEW YORK

ESTIMATED NITRATE DILUTION AREA

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	KT	DATE:	02/16/12	FIGURE:	12

APPENDIX I

KCE
TEST PIT LOGS

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH	HOLE # 1	HOLE # 2	HOLE # 3	HOLE # 4
G.L.				
0'-6"	ORGANIC	ORGANIC	ORGANIC	ORGANIC
1'-0"	FOREST LOAM	FOREST LOAM	FOREST LOAM	FOREST LOAM
1'-6"	I	I	I	I
2'-0"	I	I	I	SANDY LOAM
2'-6"	SANDY LOAM	MODERATE	I	I
3'-0"	I	COMPACT FINE TO	FINE TO MEDIUM	I
3'-6"	I	MEDIUM SANDS	SANDS W/ SILTS	I
4'-0"	I	I	TIGHT COMPACTION	I
4'-6"	I	I	LARGE COBBLES	I
5'-0"	I	I	I	COARSE FINE TO
5'-6"	TIGHT COMPACT	I	I	MEDIUM SANDS
6'-0"	FINE TO MEDIUM	I	I	I
6'-6"	SANDS W/ SMALL	SILTS & COMPACTION	I	I
7'-0"	COBBLES	INCREASING W/	I	I
7'-6"	I	DEPTH	I	I
8'-0"	I	I	I	I
8'-6"		I	I	I
9'-0"		I	I	I
9'-6"		I		I
10'-0"		I		I
10'-6"				
11'-0"				

INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED AS NOTED

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED AS NOTED

TESTS MADE BY: KEANE COPPELMAN ENGINEERS DATE: Jul-97

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH	HOLE # 5	HOLE # 6	HOLE # 7	HOLE # 8
G.L.				
0'-6"	ORGANIC	ORGANIC	ORGANIC	ORGANIC
1'-0"	FOREST LOAM	FOREST LOAM	FOREST LOAM	BROWN LOAM
1'-6"	I	I	I	I
2'-0"	SANDY LOAM	I	I	I
2'-6"	I	GRAY FINE TO	GRAY FINE TO	MODERATE
3'-0"	I	MEDIUM SANDS	MEDIUM SANDS	COMPACT FINE TO
3'-6"	I	STRATIFIED	STRATIFIED	MEDIUM SANDS
4'-0"	MODERATE COMPACT	COMPACTION	COMPACTION	I
4'-6"	FINE TO MEDIUM	I	I	I
5'-0"	SANDS W/ SILTS	I	I	I
5'-6"	I	I	I	I
6'-0"	I	I	I	I
6'-6"	I	I	I	I
7'-0"	I	I	I	I
7'-6"	I	I	I	I
8'-0"	I	I	I	I
8'-6"	I	I	I	I
9'-0"	I	I	I	I
9'-6"	I	I	I	I
10'-0"	I	I	I	I
10'-6"	I	I	I	I
11'-0"	I	I	I	I

INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED — AS NOTED

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED — AS NOTED

TESTS MADE BY: KEANE COPPELMAN ENGINEERS DATE: Jul-97

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH	HOLE # 9	HOLE # 10	HOLE # 11	HOLE # 12
G.L.				
0'-6"	ORGANIC	ORGANIC	ORGANIC	ORGANIC
1'-0"	FOREST LOAM	BROWN LOAM	LOAM	LOAM
1'-6"	I	I	LARGE COBBLES	LARGE COBBLES
2'-0"	I	I	I	I
2'-6"	GRAY FINE TO	MODERATE	MODERATE	MODERATE
3'-0"	MEDIUM SANDS	COMPACT FINE TO	COMPACT FINE TO	COMPACT FINE TO
3'-6"	STRATIFIED	MEDIUM SANDS	MEDIUM SANDS	MEDIUM SANDS
4'-0"	COMPACTION	I	I	I
4'-6"	I	I	I	I
5'-0"	I	LARGE COBBLES	I	SILT INCREASING
5'-6"	I	@ 5'-0"	I	W/ DEPTH
6'-0"	I	I	I	I
6'-6"	I	I	I	I
7'-0"	I	I	I	I
7'-6"	I	I	I	I
8'-0"	I	I	I	I
8'-6"	I	I	I	I
9'-0"	I	I	I	I
9'-6"	I	I		
10'-0"	I	I		
10'-6"	I	I		
11'-0"	I	I		

INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED — AS NOTED

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED — AS NOTED

TESTS MADE BY: KEANE COPPELMAN ENGINEERS DATE: Jul-97

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH	HOLE # 17	HOLE # 18	HOLE #	HOLE #
G.L.	ORGANIC	ORGANIC		
0'-6"	|	|		
1'-0"	LOAM	LOAM		
1'-6"	|	|		
2'-0"	MODERATE TO TIGHT	TIGHT GRAY		
2'-6"	GRAY SANDS	SANDS		
3'-0"	|	|		
3'-6"	|	|		
4'-0"	|	|		
4'-6"	|	|		
5'-0"	|	|		
5'-6"	|	|		
6'-0"	COBBLES INCREASING	|		
6'-6"	|	|		
7'-0"	|	|		
7'-6"	|	|		
8'-0"	|	|		
8'-6"	|	|		
9'-0"	|	|		
9'-6"				
10'-0"				
10'-6"				
11'-0"				

INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED AS NOTED

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED AS NOTED

TESTS MADE BY: KEANE COPPELMAN ENGINEERS DATE: Jul-97

Name _____ Signature _____

Address _____ SEAL

_____

Westchester County Health Department

Soil Rate Approved _____ Sq.Ft./Gal. Checked By _____

Date _____

APPENDIX II

LBG MONITOR WELL/BORING GEOLOGIC LOGS

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG MW-1 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 10-15 ft
DATE COMPLETED: 6/16/08	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** 9-15 ft **CASING SIZE & TYPE:** 2" PVC
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** 0-10 ft
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite
OBSERVER: Caitlin Colwell and Michael Ross	**SETTING:** 8-9 ft
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** 14.22 ft
STICK-UP: 3.3 ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41°20'58" N ; 73°39'05" W	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	1 – 2 – 1 – 3	0.85	- - -	0-0.55 ORGANIC; dark brown, loose. 0.55-0.85 SAND; very fine, brown, loose, dry.
5	7	SS	69 – 46 – 28 – 23	1.15	- - -	TILL; very fine sand-silt, trace pebbles, brown, compact, dry.
10	12	SS	29 – 30 – 23 – 29	0.90	- - -	TILL; very fine sand-silt, little pebbles, brown, compact, dry.
15	17	SS	50/0"			Refusal at 15ft

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG TB-2 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/16/08	**SAND PACK SIZE & TYPE:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** NA **CASING SIZE & TYPE:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** NA
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA
OBSERVER: Caitlin Colwell and Michael Ross	**SETTING:** NA
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 20' 58N 073° 39' 05W 580 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 2 – 3 – 3	0.70	---	ORGANIC; dark brown, loose.
5	7	SS	27 – 28 – 23 – 25	1.60	---	TILL; silt-fine sand, trace pebbles, brown.
10	12	SS	27 – 46 – 30 – 25	1.20	---	10-10.40 TILL; fine-medium sand, trace pebbles, brown. 10.40-10.75 DISINTEGRATED ROCK 10.75-11.20 TILL; fine-medium sand, trace pebbles, brown.
						Refusal at 12ft
						No water encountered.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG MW-3 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 12-17 ft
DATE COMPLETED: 6/16/08	**SAND PACK SIZE & TYPE:** **SETTING:** 11-17 ft
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**CASING SIZE & TYPE:** 2" PVC **SETTING:** 0-12 ft
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite **SETTING:** 10-11 ft
OBSERVER: Caitlin Colwell	
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** ~15ft
STICK-UP: 3.5 ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41° 20' 56N 073° 39' 05W 528ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 3 – 2 – 2	0.95	- - -	0-0.50 ORGANIC; dark brown, loose. 0.50-0.95 SILT; brown, loose, dry.
5	7	SS	35 – 36 – 30 – 24	1.15	- - -	5.0-5.4 DISINTEGRATED ROCK 5.4-6.15 TILL; fine-medium sand, brown with little black, trace pebbles, compact.
10	12	SS	9 – 8 – 7 – 6	1.1	- - -	TILL; fine sand, brown, trace pebbles, compact.
15	17	SS	23 – 30 – 25 – 21	None*	- - -	TILL; fine-medium sand-silt, trace pebbles, brown, wet.
						Refusal at 17ft
						*Spoon could not be opened, top fitting mis-threaded on spoon.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG MW-4
	PAGE: 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 17-27 ft
DATE COMPLETED: 6/17/08	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** 16-27 ft **CASING SIZE & TYPE:** 2" PVC
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** 0-17 ft
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite
OBSERVER: Michael Ross	**SETTING:** 15-16 ft
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** ~25ft
STICK-UP: 3.50 ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41° 20' 51N; 073° 39' 07W; 598 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	1 – 2 – 2 – 2	1.25	---	0-0.6 ORGANIC; dark brown, loose. 0.6-1.25 SAND-SILT; very fine, light brown, loose.
5	7	SS	10 – 14 – 24 – 35	1.10	---	5-5.95 SAND; very fine, disintegrated rock, brown, loose. 5.95-6.1 SAND; very fine, black, disintegrated rock, compact.
10	12	SS	10 – 23 – 28 – 20	1.00	---	SANDY TILL; very fine-fine, light brown; little rock fragments, moderately compact.
15	17	SS/C	100/2"	0.10	---	Sandy; disintegrated rock, very fine, black, moderately compact.
20	22	C	100/1"	0.0	---	SAND-SILT; very fine, grey, probably disintegrated rock.
25	27	SS	119/6"	0.3	---	SAND; very fine, black-brown, disintegrated rock, loose – outside of spoon looked wet.
						Refusal at 27ft – Steaming cuttings at bottom.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG TB-5 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/17/08	**SAND PACK SIZE & TYPE:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** NA **CASING SIZE & TYPE:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** NA
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA
OBSERVER: Michael Ross	**SETTING:** NA
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 20' 55N 073° 39' 08W 526 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 2 – 2 – 2	1.1	- - -	0-0.6 ORGANIC 0.6-1.1 SILT-SAND; very fine, brown, loose.
5	7	SS	18 – 16 – 16 – 27	1.3	- - -	SANDY TILL; very fine sand, brown; some broken rocks; some clay in upper portion.
10	12	SS	17 – 14 – 16 – 21	1.3	- - -	SANDY TILL; very fine sand, brown; maybe moist, some silt and clay.
15	17	SS	10 – 100/0"	0.8		SILT AND SAND; very fine, brown-black; disintegrated rock; trace clay.
						Refusal at 17.5ft
						No well installed.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG TB-6
	PAGE: 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/17/08	**SAND PACK SIZE & TYPE:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** NA **CASING SIZE & TYPE:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** NA
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA
OBSERVER: Michael Ross	**SETTING:** NA
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 20' 55N 073° 39' 09W 561 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 7 – 6 – 9	1.1	---	0-0.7 ORGANIC 0.7-1.1 DISINTEGRATED ROCK; black, very fine sand size.
5	7	SS	22 – 10 – 19 – 20	1.6	---	SAND; very fine, brown-dark brown; some silt, compact.
10	12	SS	100/2"	0.1	---	SAND; very fine, brown; little silt, little gravel.
						Refusal at 12.5 ft
						No well installed, dry and in similar plane to MW-4.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG MW-7 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 12-17 ft
DATE COMPLETED: 6/17/08	**SAND PACK SIZE & TYPE:** **SETTING:** 11-17 ft
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**CASING SIZE & TYPE:** 2" PVC **SETTING:** 0-12 ft
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite **SETTING:** 10-11 ft
OBSERVER: Michael Ross	
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** None detected during drilling.
STICK-UP: 3.0 ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41° 20' 55N; 073° 39' 09W; 544 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 2 – 2 – 3	0.4	- - -	ORGANIC
5	7	SS	12 – 17 – 14 – 16	1.7	- - -	SANDY TILL; very fine, brown; silt, compact.
10	12	SS	12 – 18 – 19 – 17	1.4	- - -	SAND; very fine, brown-black; some silt, some gravel, trace rock chunks.
15	17	SS	23 – 33 – 46 – 100/3"	1.55	- - -	15-15.2 TILL; silt, brown, compact. 15.2-16.55 DISINTEGRATED ROCK; schist, breaks down to very fine sand, brown-black, compact.
					- - -	Refusal at 17ft.
					- - -	

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG TB-8
	PAGE: 1 **OF** 1 **PAGES**

SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/18/08	**SAND PACK SIZE & TYPE:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** NA **CASING SIZE & TYPE:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** NA
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA
OBSERVER: Caitlin Colwell	**SETTING:** NA
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 20' 59N; 073° 39' 03W 506 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 2 – 2 – 3	0.9	- - -	ORGANIC; dark brown, loose.
5	7	SS	18 – 19 – 36 – 100/2"	1.5	- - -	5-6.3 SILT, very fine sand, brown; trace pebbles, very compact. 6.3-6.5 DISINTEGRATED ROCK; with rock chips.
10	12	SS	21 – 20 – 22 – 31	1.4	- - -	SAND; very fine-medium, brown-black; trace pebbles, compact, moist.
						Refusal at 13.5ft
						No well installed.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG MW-9
	PAGE: 1 OF 1 PAGES
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 10.5-15.5 ft
DATE COMPLETED: 6/18/08	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** 9.5-15.5 ft **CASING SIZE & TYPE:** 2" PVC
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** 0-10.5 ft
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite
OBSERVER: Caitlin Colwell	**SETTING:** 8.5-9.5 ft
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP: 2.5ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41°21'00" N ; 73°39'03" W	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 1 – 3 – 4	0.8	- - -	ORGANIC; dark brown, loose.
5	7	SS	50/0"	- - -	- - -	No Sample
10	12	SS	74 – 100/5"	0.8	- - -	SAND; very fine-medium, black, very compact.
15	17	SS	50/0"	- - -		No Sample
						Refusal at 15.5ft

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC **WELL NO:** LBG TB-10 **PAGE:** 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/19/08	**SAND PACK SIZE & TYPE:** NA **SETTING:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**CASING SIZE & TYPE:** NA **SETTING:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA **SETTING:** NA
OBSERVER: Caitlin Colwell	
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 20' 59N; 073° 39' 01W 564 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 1 – 2 – 3	0.8	---	ORGANIC; brown-dark brown, loose
5	7	SS	21 – 32 – 44 – 100/3"	1.5	---	5-5.4 SILT; brown, some pebbles, compact, moist. 5.4-5.8 DISTINTEGRATED ROCK 5.8-6.2 SILT; brown; some pebbles, compact, moist.
						Refusal at 7ft
						No well installed

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG TB-11
	PAGE: 1 **OF** 1 **PAGES**
SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** NA **SLOT NO.:** NA **SETTING:** NA
DATE COMPLETED: 6/19/08	**SAND PACK SIZE & TYPE:** NA
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** NA **CASING SIZE & TYPE:** NA
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** NA
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** NA
OBSERVER: Caitlin Colwell	**SETTING:** NA
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:** NA
STICK-UP: NA	**DEVELOPMENT METHOD:** NA
SURFACE COMPLETION: NA	**DURATION:** NA **YIELD:** NA
REMARKS:	
GPS COORDINATES: 41° 21' 01N; 073° 38' 59W 492 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	2 – 3 – 6 – 3	0.9	- - -	ORGANIC; brown-dark brown, loose.
5	7	SS	44 – 100/1"	0.7	- - -	SILT; fine-medium sand, brown; some disintegrated rock fragments, compact.
						Refusal at 5.5ft
						No well installed.

GEOLOGIC LOG LEGGETTE, BRASHEARS & GRAHAM, INC. SHELTON, CONNECTICUT	**OWNER:** A. Miceli & Associates, LLC
	WELL NO: LBG MW-12
	PAGE: 1 **OF** 1 **PAGES**

SITE LOCATION: Woodlands at North Salem North Salem, New York	**SCREEN SIZE & TYPE:** 2" PVC **SLOT NO.:** 0.010 **SETTING:** 8-13 ft
DATE COMPLETED: 6/18/08	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Soil Testing, Inc. Oxford, Connecticut	**SETTING:** 7-13 ft **CASING SIZE & TYPE:** 2" PVC
DRILLING METHOD: Track Mounted Hollow Stem Auger (HSA)	**SETTING:** 0-8 ft
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite
OBSERVER: Caitlin Colwell	**SETTING:** 6-7 ft
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** Native
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP: 2.3ft	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Stick-Up	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: 41° 21' 02; 073° 38' 59; 574 ft	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million	

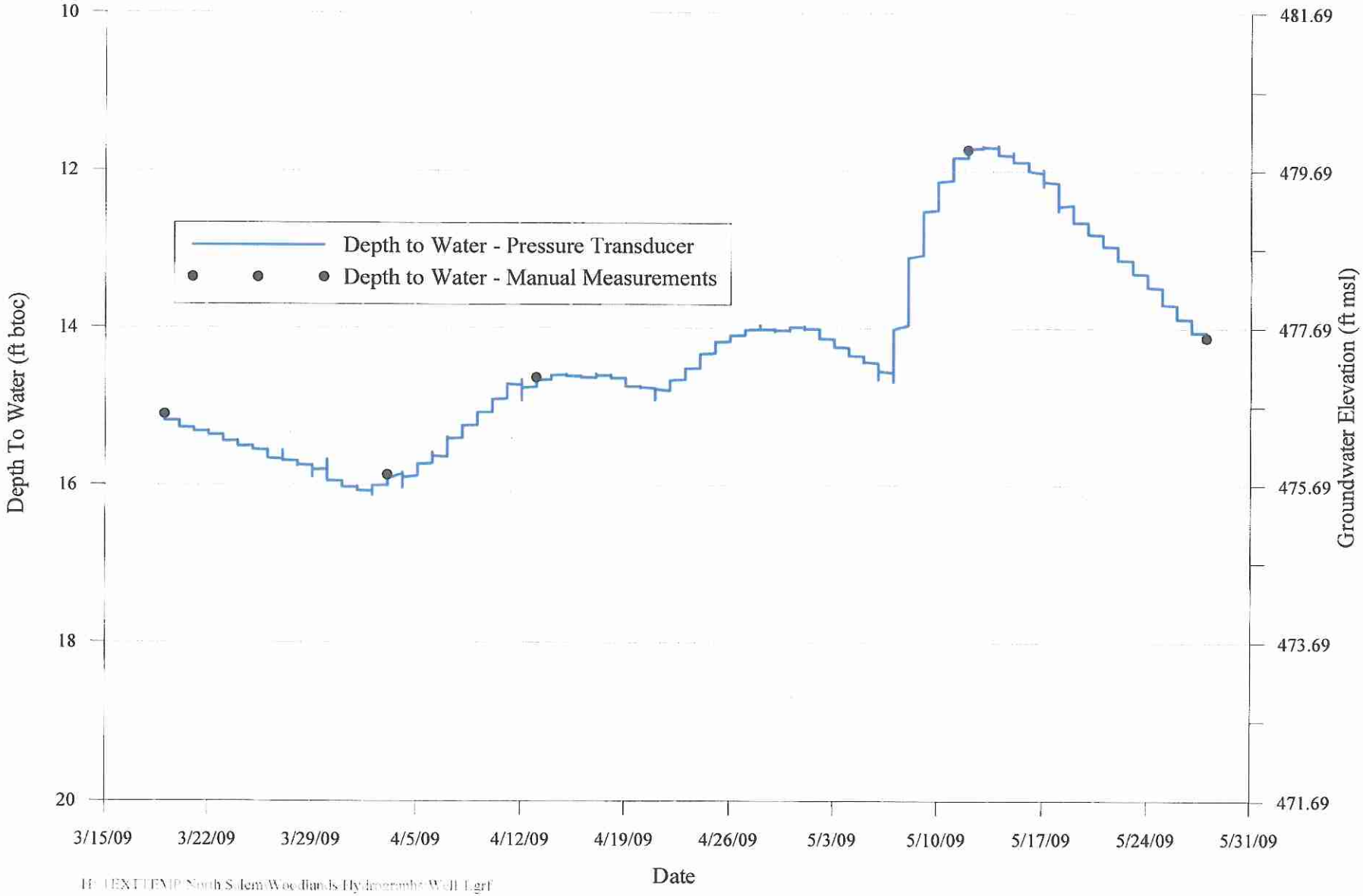
DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	2	SS	1 – 1 – 2 – 2	0.4	- - -	ORGANIC; dark brown, loose.
5	7	SS	17 – 15 – 16 – 18	1.3	- - -	SILT; brown; some fine-medium sand; some pebbles, compact, moist.
10	12	SS	9 – 36 – 62 – 14	0.75	- - -	SILT; brown-black; some fine-medium sand; some pebbles; compact, wet.
						Refusal at 13ft.

APPENDIX III

LBG HYDROGRAPHS &
USGS P-1217 CARMEL, NEW YORK
2006-2008 HYDROGRAPH
TABLE A1

WOODLANDS
NORTH SALEM, NEW YORK

Hydrograph of Water-Level Maesurements from MW-1



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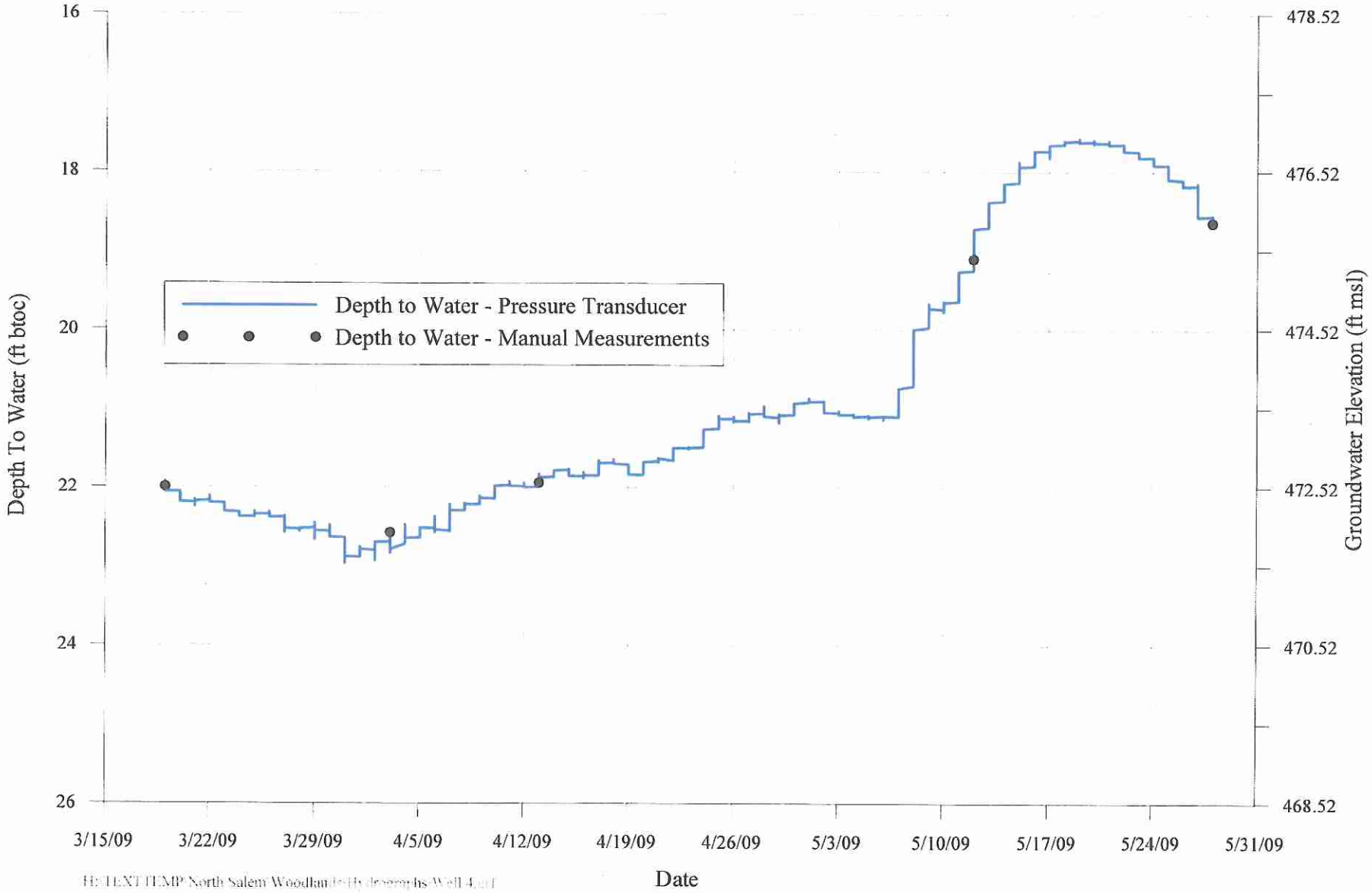
WOODLANDS
NORTH SALEM, NEW YORK

Hydrograph of Water-Level Measurements Collected from MW-4



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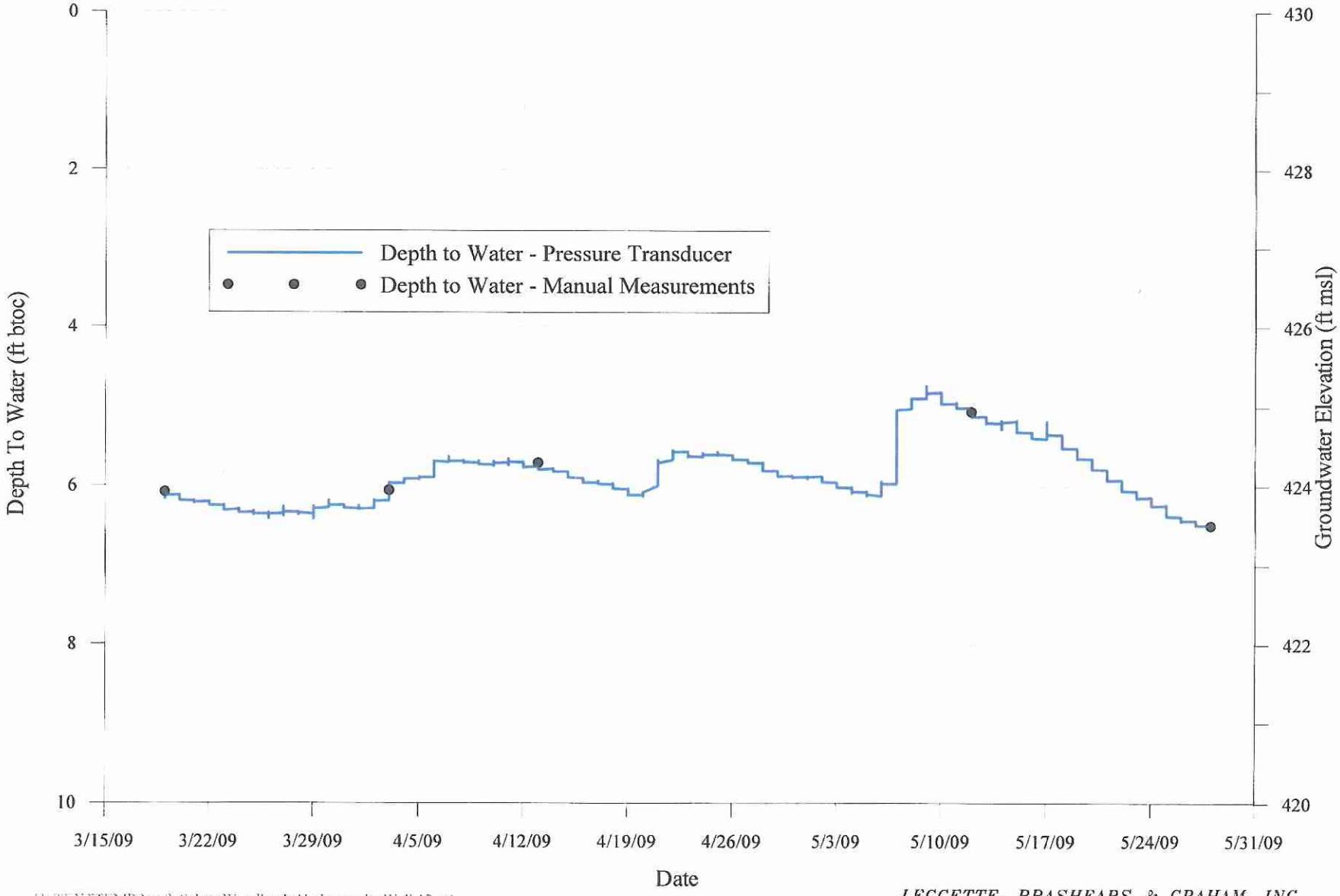
LEGGETTE, BRASHEARS & GRAHAM, INC.

WOODLANDS
NORTH SALEM, NEW YORK

Hydrograph of Water-Level Measurements Collected from MW-12



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LECCETTE, BRASHEARS & GRAHAM, INC.

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
9/2/2004	14.07	34.60%
9/3/2004	14.09	33.30%
9/4/2004	14.14	31.10%
9/5/2004	14.19	29.10%
9/6/2004	14.21	28.50%
9/7/2004	14.24	27.40%
9/8/2004	14.07	34.60%
9/9/2004	13.34	64.60%
9/10/2004	13.10	73.00%
9/11/2004	13.21	69.30%
9/12/2004	13.31	66.00%
9/13/2004	13.42	61.60%
9/14/2004	13.52	56.30%
9/15/2004	13.57	53.90%
9/16/2004	13.61	52.30%
9/17/2004	13.66	50.20%
9/18/2004	12.33	93.10%
9/19/2004	11.82	97.10%
9/20/2004	12.20	94.30%
9/21/2004	12.47	90.40%
9/22/2004	12.69	85.20%
9/23/2004	12.88	80.60%
9/24/2004	13.02	76.00%
9/25/2004	13.13	72.20%
9/26/2004	13.27	67.10%
9/27/2004	13.40	62.30%
9/28/2004	13.39	62.90%
9/29/2004	12.44	91.20%
9/30/2004	12.33	93.10%
10/1/2004	12.48	90.10%
10/2/2004	12.62	86.60%
10/3/2004	12.77	83.00%
10/4/2004	12.86	81.00%
10/5/2004	13.01	76.30%
10/6/2004	13.14	71.80%
10/7/2004	13.27	67.10%
10/8/2004	13.38	63.30%
10/9/2004	13.48	58.60%
10/10/2004	13.56	54.40%
10/11/2004	13.64	51.10%
10/12/2004	13.70	49.00%
10/13/2004	13.77	45.90%
10/14/2004	13.83	43.30%
10/15/2004	13.87	41.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
10/16/2004	13.89	40.80%
10/17/2004	13.96	38.40%
10/18/2004	14.01	36.80%
10/19/2004	13.93	39.30%
10/20/2004	13.91	39.90%
10/21/2004	13.95	38.70%
10/22/2004	13.99	37.20%
10/23/2004	14.02	36.20%
10/24/2004	14.04	35.60%
10/25/2004	14.06	35.00%
10/26/2004	14.07	34.60%
10/27/2004	14.09	33.30%
10/28/2004	14.12	32.20%
10/29/2004	14.12	32.20%
10/30/2004	14.12	32.20%
10/31/2004	14.14	31.10%
11/1/2004	14.19	29.10%
11/2/2004	14.18	29.50%
11/3/2004	14.19	29.10%
11/4/2004	14.16	30.10%
11/5/2004	14.09	33.30%
11/6/2004	14.10	32.80%
11/7/2004	14.11	32.40%
11/8/2004	14.13	31.50%
11/9/2004	14.14	31.10%
11/10/2004	14.13	31.50%
11/11/2004	14.12	32.20%
11/12/2004	14.11	32.40%
11/13/2004	14.08	34.00%
11/14/2004	14.08	34.00%
11/15/2004	14.06	35.00%
11/16/2004	14.04	35.60%
11/17/2004	14.03	36.00%
11/18/2004	14.02	36.20%
11/19/2004	14.02	36.20%
11/20/2004	14.03	36.00%
11/21/2004	13.97	37.90%
11/22/2004	13.92	39.50%
11/23/2004	13.89	40.80%
11/24/2004	13.84	42.90%
11/25/2004	13.76	46.30%
11/26/2004	13.69	49.20%
11/27/2004	13.66	50.20%
11/28/2004	13.32	65.30%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
11/29/2004	12.76	83.40%
11/30/2004	12.81	82.10%
12/1/2004	12.61	86.90%
12/2/2004	12.32	93.20%
12/3/2004	12.41	91.60%
12/4/2004	12.55	88.60%
12/5/2004	12.68	85.50%
12/6/2004	12.79	82.70%
12/7/2004	12.83	81.60%
12/8/2004	12.73	84.10%
12/9/2004	12.70	85.00%
12/10/2004	12.61	86.90%
12/11/2004	12.46	90.60%
12/12/2004	12.51	89.50%
12/13/2004	12.60	87.20%
12/14/2004	12.73	84.10%
12/15/2004	12.83	81.60%
12/16/2004	12.92	79.50%
12/17/2004	13.00	76.70%
12/18/2004	13.09	73.40%
12/19/2004	13.16	71.10%
12/20/2004	13.26	67.50%
12/21/2004	13.32	65.30%
12/22/2004	13.38	63.30%
12/23/2004	13.25	68.00%
12/24/2004	12.45	90.90%
12/25/2004	12.49	89.90%
12/26/2004	12.58	87.70%
12/27/2004	12.70	85.00%
12/28/2004	12.80	82.30%
12/29/2004	12.87	80.80%
12/30/2004	12.98	77.60%
12/31/2004	13.05	74.90%
1/1/2005	13.13	72.20%
1/2/2005	13.22	68.90%
1/3/2005	13.26	67.50%
1/4/2005	13.14	71.80%
1/5/2005	13.05	74.90%
1/6/2005	13.01	76.30%
1/7/2005	13.06	74.60%
1/8/2005	13.00	76.70%
1/9/2005	12.76	83.40%
1/10/2005	12.73	84.10%
1/11/2005	12.79	82.70%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	**Depth to Water (feet below grade)**	**Percent of time greater than or equal to measurment**
1/12/2005	12.82	81.90%
1/13/2005	12.85	81.30%
1/14/2005	11.69	97.80%
1/15/2005	11.28	98.90%
1/16/2005	11.66	97.90%
1/17/2005	11.94	96.50%
1/18/2005	12.18	94.50%
1/19/2005	12.30	93.40%
1/20/2005	12.45	90.90%
1/21/2005	12.60	87.20%
1/22/2005	12.70	85.00%
1/23/2005	12.84	81.50%
1/24/2005	12.98	77.60%
1/25/2005	13.12	72.40%
1/26/2005	13.21	69.30%
1/27/2005	13.33	65.00%
1/28/2005	13.38	63.30%
1/29/2005	13.42	61.60%
1/30/2005	13.48	58.60%
1/31/2005	13.56	54.40%
2/1/2005	13.60	52.60%
2/2/2005	13.65	50.70%
2/3/2005	13.68	49.70%
2/4/2005	13.72	47.60%
2/5/2005	13.76	46.30%
2/6/2005	13.79	45.00%
2/7/2005	13.79	45.00%
2/8/2005	13.79	45.00%
2/9/2005	13.77	45.90%
2/10/2005	13.58	53.40%
2/11/2005	13.37	63.70%
2/12/2005	13.34	64.60%
2/13/2005	13.38	63.30%
2/14/2005	13.38	63.30%
2/15/2005	12.70	85.00%
2/16/2005	12.44	91.20%
2/17/2005	12.34	92.90%
2/18/2005	12.43	91.40%
2/19/2005	12.56	88.30%
2/20/2005	12.67	85.60%
2/21/2005	12.73	84.10%
2/22/2005	12.85	81.30%
2/23/2005	12.95	78.60%
2/24/2005	13.03	75.50%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
2/25/2005	13.11	72.70%
2/26/2005	13.18	70.30%
2/27/2005	13.26	67.50%
2/28/2005	13.31	66.00%
3/1/2005	13.37	63.70%
3/2/2005	13.43	61.00%
3/3/2005	13.50	57.80%
3/4/2005	13.55	54.80%
3/5/2005	13.58	53.40%
3/6/2005	13.62	51.90%
3/7/2005	13.63	51.40%
3/8/2005	13.54	55.40%
3/9/2005	13.51	57.30%
3/10/2005	13.48	58.60%
3/11/2005	13.46	59.50%
3/12/2005	13.47	59.20%
3/13/2005	13.51	57.30%
3/14/2005	13.53	56.00%
3/15/2005	13.54	55.40%
3/16/2005	13.55	54.80%
3/17/2005	13.53	56.00%
3/18/2005	13.50	57.80%
3/19/2005	13.42	61.60%
3/20/2005	13.34	64.60%
3/21/2005	13.25	68.00%
3/22/2005	13.14	71.80%
3/23/2005	13.02	76.00%
3/24/2005	13.01	76.30%
3/25/2005	13.02	76.00%
3/26/2005	12.98	77.60%
3/27/2005	12.87	80.80%
3/28/2005	12.40	91.80%
3/29/2005	11.17	99.30%
3/30/2005	11.55	98.30%
3/31/2005	11.85	97.00%
4/1/2005	12.06	95.60%
4/2/2005	11.86	96.90%
4/3/2005	10.27	99.90%
4/4/2005	10.89	99.70%
4/5/2005	11.34	98.80%
4/6/2005	11.62	98.20%
4/7/2005	11.81	97.30%
4/8/2005	11.96	96.30%
4/9/2005	12.08	95.30%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
4/10/2005	12.20	94.30%
4/11/2005	12.35	92.70%
4/12/2005	12.47	90.40%
4/13/2005	12.60	87.20%
4/14/2005	12.74	83.70%
4/15/2005	12.88	80.60%
4/16/2005	12.99	77.00%
4/17/2005	13.08	73.90%
4/18/2005	13.17	70.60%
4/19/2005	13.25	68.00%
4/20/2005	13.32	65.30%
4/21/2005	13.42	61.60%
4/22/2005	13.47	59.20%
4/23/2005	13.51	57.30%
4/24/2005	13.50	57.80%
4/25/2005	13.50	57.80%
4/26/2005	13.51	57.30%
4/27/2005	13.45	60.10%
4/28/2005	13.35	64.30%
4/29/2005	13.32	65.30%
4/30/2005	13.31	66.00%
5/1/2005	13.29	66.50%
5/2/2005	13.28	66.90%
5/3/2005	13.25	68.00%
5/4/2005	13.25	68.00%
5/5/2005	13.27	67.10%
5/6/2005	13.31	66.00%
5/7/2005	13.37	63.70%
5/8/2005	13.43	61.00%
5/9/2005	13.47	59.20%
5/10/2005	13.54	55.40%
5/11/2005	13.59	53.00%
5/12/2005	13.62	51.90%
5/13/2005	13.65	50.70%
5/14/2005	13.68	49.70%
5/15/2005	13.72	47.60%
5/16/2005	13.76	46.30%
5/17/2005	13.79	45.00%
5/18/2005	13.82	43.90%
5/19/2005	13.86	41.90%
5/20/2005	13.89	40.80%
5/21/2005	13.92	39.50%
5/22/2005	13.94	39.10%
5/23/2005	13.96	38.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
5/24/2005	13.99	37.20%
5/25/2005	13.99	37.20%
5/26/2005	14.01	36.80%
5/27/2005	14.04	35.60%
5/28/2005	14.07	34.60%
5/29/2005	14.08	34.00%
5/30/2005	14.12	32.20%
5/31/2005	14.15	30.70%
6/1/2005	14.18	29.50%
6/2/2005	14.20	28.70%
6/3/2005	14.22	28.10%
6/4/2005	14.27	26.40%
6/5/2005	14.31	25.60%
6/6/2005	14.33	25.00%
6/7/2005	14.32	25.30%
6/8/2005	14.37	24.00%
6/9/2005	14.41	22.70%
6/10/2005	14.42	22.30%
6/11/2005	14.41	22.70%
6/12/2005	14.43	22.00%
6/13/2005	14.48	20.80%
6/14/2005	14.56	18.60%
6/15/2005	14.60	18.20%
6/16/2005	14.54	19.10%
6/17/2005	14.35	24.60%
6/18/2005	14.38	23.70%
6/19/2005	14.41	22.70%
6/20/2005	14.42	22.30%
6/21/2005	14.45	21.50%
6/22/2005	14.50	20.10%
6/23/2005	14.53	19.30%
6/24/2005	14.61	17.90%
6/25/2005	14.67	16.70%
6/26/2005	14.73	15.50%
6/27/2005	14.75	15.30%
6/28/2005	14.70	16.00%
6/29/2005	14.68	16.60%
6/30/2005	14.69	16.30%
7/1/2005	14.62	17.70%
7/2/2005	14.44	21.70%
7/3/2005	14.46	21.20%
7/4/2005	14.49	20.40%
7/5/2005	14.51	19.80%
7/6/2005	14.51	19.80%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	**Depth to Water (feet below grade)**	**Percent of time greater than or equal to measurment**
7/7/2005	14.53	19.30%
7/8/2005	14.43	22.00%
7/9/2005	14.28	26.20%
7/10/2005	14.34	24.80%
7/11/2005	14.41	22.70%
7/12/2005	14.46	21.20%
7/13/2005	14.49	20.40%
7/14/2005	14.51	19.80%
7/15/2005	14.55	18.90%
7/16/2005	14.58	18.40%
7/17/2005	14.54	19.10%
7/18/2005	14.22	28.10%
7/19/2005	13.30	66.30%
7/20/2005	13.52	56.30%
7/21/2005	13.70	49.00%
7/22/2005	13.82	43.90%
7/23/2005	13.91	39.90%
7/24/2005	14.00	36.90%
7/25/2005	14.04	35.60%
7/26/2005	14.12	32.20%
7/27/2005	14.20	28.70%
7/28/2005	14.25	27.00%
7/29/2005	14.29	26.00%
7/30/2005	14.36	24.20%
7/31/2005	14.41	22.70%
8/1/2005	14.47	21.00%
8/2/2005	14.54	19.10%
8/3/2005	14.63	17.50%
8/4/2005	14.72	15.80%
8/5/2005	14.77	14.80%
8/6/2005	14.84	13.30%
8/7/2005	14.92	12.60%
8/8/2005	14.97	12.20%
8/9/2005	15.01	11.60%
8/10/2005	15.08	10.50%
8/11/2005	15.21	9.30%
8/12/2005	15.27	8.70%
8/13/2005	15.19	9.30%
8/14/2005	15.23	9.00%
8/15/2005	15.01	11.60%
8/16/2005	14.95	12.50%
8/17/2005	14.97	12.20%
8/18/2005	15.04	11.00%
8/19/2005	15.07	10.70%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
8/20/2005	15.08	10.50%
8/21/2005	15.13	9.90%
8/22/2005	15.21	9.30%
8/23/2005	15.30	8.40%
8/24/2005	15.40	7.70%
8/25/2005	15.47	7.30%
8/26/2005	15.57	6.80%
8/27/2005	15.65	6.30%
8/28/2005	15.66	6.30%
8/29/2005	15.62	6.50%
8/30/2005	15.67	6.10%
8/31/2005	15.68	6.00%
9/1/2005	15.74	5.80%
9/2/2005	15.82	5.50%
9/3/2005	15.90	5.20%
9/4/2005	15.98	4.70%
9/5/2005	16.06	4.40%
9/6/2005	16.15	4.10%
9/7/2005	16.23	3.90%
9/8/2005	16.30	3.70%
9/9/2005	16.39	3.60%
9/10/2005	16.50	3.40%
9/11/2005	16.62	3.20%
9/12/2005	16.70	2.90%
9/13/2005	16.80	2.70%
9/14/2005	16.88	2.50%
9/15/2005	16.77	2.80%
9/16/2005	16.67	3.00%
9/17/2005	16.60	3.20%
9/18/2005	16.62	3.20%
9/19/2005	16.68	3.00%
9/20/2005	16.74	2.80%
9/21/2005	16.81	2.60%
9/22/2005	16.88	2.50%
9/23/2005	16.97	2.30%
9/24/2005	17.04	2.20%
9/25/2005	17.11	2.10%
9/26/2005	17.17	2.00%
9/27/2005	17.22	2.00%
9/28/2005	17.25	1.90%
9/29/2005	17.29	1.80%
9/30/2005	17.33	1.60%
10/1/2005	17.39	1.30%
10/2/2005	17.43	1.30%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
10/3/2005	17.50	1.20%
10/4/2005	17.55	0.90%
10/5/2005	17.61	0.70%
10/6/2005	17.67	0.50%
10/7/2005	17.73	0.40%
10/8/2005	16.96	2.40%
10/9/2005	13.71	48.20%
10/10/2005	13.62	51.90%
10/11/2005	13.76	46.30%
10/12/2005	12.92	79.50%
10/13/2005	11.30	98.90%
10/14/2005	11.18	99.20%
10/15/2005	10.58	99.80%
10/16/2005	11.27	99.00%
10/17/2005	11.75	97.50%
10/18/2005	12.07	95.40%
10/19/2005	12.31	93.30%
10/20/2005	12.52	89.30%
10/21/2005	12.68	85.50%
10/22/2005	12.80	82.30%
10/23/2005	12.60	87.20%
10/24/2005	12.52	89.30%
10/25/2005	11.71	97.60%
10/26/2005	11.32	98.80%
10/27/2005	11.69	97.80%
10/28/2005	11.97	96.30%
10/29/2005	12.16	94.70%
10/30/2005	12.34	92.90%
10/31/2005	12.51	89.50%
11/1/2005	12.65	86.20%
11/2/2005	12.81	82.10%
11/3/2005	12.95	78.60%
11/4/2005	13.07	74.10%
11/5/2005	13.19	69.90%
11/6/2005	13.28	66.90%
11/7/2005	13.37	63.70%
11/8/2005	13.43	61.00%
11/9/2005	13.47	59.20%
11/10/2005	13.47	59.20%
11/11/2005	13.51	57.30%
11/12/2005	13.53	56.00%
11/13/2005	13.53	56.00%
11/14/2005	13.56	54.40%
11/15/2005	13.57	53.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
11/16/2005	13.56	54.40%
11/17/2005	13.09	73.40%
11/18/2005	12.92	79.50%
11/19/2005	12.93	79.00%
11/20/2005	12.98	77.60%
11/21/2005	13.01	76.30%
11/22/2005	12.75	83.60%
11/23/2005	12.25	93.80%
11/24/2005	12.30	93.40%
11/25/2005	12.47	90.40%
11/26/2005	12.56	88.30%
11/27/2005	12.64	86.30%
11/28/2005	12.71	84.50%
11/29/2005	12.78	82.90%
11/30/2005	12.14	94.90%
12/1/2005	12.01	96.00%
12/2/2005	12.17	94.60%
12/3/2005	12.36	92.50%
12/4/2005	12.50	89.50%
12/5/2005	12.62	86.60%
12/6/2005	12.72	84.30%
12/7/2005	12.85	81.30%
12/8/2005	12.97	77.90%
12/9/2005	13.02	76.00%
12/10/2005	13.13	72.20%
12/11/2005	13.22	68.90%
12/12/2005	13.33	65.00%
12/13/2005	13.43	61.00%
12/14/2005	13.46	59.50%
12/15/2005	13.49	58.10%
12/16/2005	13.31	66.00%
12/17/2005	13.08	73.90%
12/18/2005	13.03	75.50%
12/19/2005	13.05	74.90%
12/20/2005	13.10	73.00%
12/21/2005	13.18	70.30%
12/22/2005	13.24	68.50%
12/23/2005	13.29	66.50%
12/24/2005	13.37	63.70%
12/25/2005	13.39	62.90%
12/26/2005	12.70	85.00%
12/27/2005	12.38	92.20%
12/28/2005	12.43	91.40%
12/29/2005	12.42	91.50%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurement
12/30/2005	12.18	94.50%
12/31/2005	12.21	94.20%
1/1/2006	12.36	92.50%
1/2/2006	12.48	90.10%
1/3/2006	12.53	89.10%
1/4/2006	12.54	88.90%
1/5/2006	12.58	87.70%
1/6/2006	12.65	86.20%
1/7/2006	12.72	84.30%
1/8/2006	12.79	82.70%
1/9/2006	12.86	81.00%
1/10/2006	12.94	78.70%
1/11/2006	12.92	79.50%
1/12/2006	12.39	92.00%
1/13/2006	12.16	94.70%
1/14/2006	11.62	98.20%
1/15/2006	11.12	99.30%
1/16/2006	11.51	98.50%
1/17/2006	11.82	97.10%
1/18/2006		#N/A
1/19/2006		#N/A
1/20/2006		#N/A
1/21/2006		#N/A
1/22/2006		#N/A
1/23/2006		#N/A
1/24/2006		#N/A
1/25/2006		#N/A
1/26/2006		#N/A
1/27/2006		#N/A
1/28/2006		#N/A
1/29/2006		#N/A
1/30/2006		#N/A
1/31/2006		#N/A
2/1/2006		#N/A
2/2/2006		#N/A
2/3/2006	12.84	81.50%
2/4/2006	12.66	85.90%
2/5/2006	12.33	93.10%
2/6/2006	12.24	93.90%
2/7/2006	12.34	92.90%
2/8/2006	12.46	90.60%
2/9/2006	12.57	87.90%
2/10/2006	12.69	85.20%
2/11/2006	12.79	82.70%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
2/12/2006	12.86	81.00%
2/13/2006	13.00	76.70%
2/14/2006	13.11	72.70%
2/15/2006	13.20	69.70%
2/16/2006	13.24	68.50%
2/17/2006	13.14	71.80%
2/18/2006	12.93	79.00%
2/19/2006	12.92	79.50%
2/20/2006	12.96	78.30%
2/21/2006	13.03	75.50%
2/22/2006	13.11	72.70%
2/23/2006	13.17	70.60%
2/24/2006	13.26	67.50%
2/25/2006	13.31	66.00%
2/26/2006	13.39	62.90%
2/27/2006	13.44	60.50%
2/28/2006	13.48	58.60%
3/1/2006	13.53	56.00%
3/2/2006	13.56	54.40%
3/3/2006	13.62	51.90%
3/4/2006	13.66	50.20%
3/5/2006	13.70	49.00%
3/6/2006	13.73	47.30%
3/7/2006	13.77	45.90%
3/8/2006	13.79	45.00%
3/9/2006	13.80	44.40%
3/10/2006	13.80	44.40%
3/11/2006	13.84	42.90%
3/12/2006	13.84	42.90%
3/13/2006	13.83	43.30%
3/14/2006	13.82	43.90%
3/15/2006	13.83	43.30%
3/16/2006	13.83	43.30%
3/17/2006	13.81	44.20%
3/18/2006	13.81	44.20%
3/19/2006	13.82	43.90%
3/20/2006	13.84	42.90%
3/21/2006	13.84	42.90%
3/22/2006	13.86	41.90%
3/23/2006	13.89	40.80%
3/24/2006	13.90	40.30%
3/25/2006	13.91	39.90%
3/26/2006	13.93	39.30%
3/27/2006	13.96	38.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
3/28/2006	13.97	37.90%
3/29/2006	13.98	37.60%
3/30/2006	14.00	36.90%
3/31/2006	14.01	36.80%
4/1/2006	14.01	36.80%
4/2/2006	14.05	35.30%
4/3/2006	14.05	35.30%
4/4/2006	13.80	44.40%
4/5/2006	13.65	50.70%
4/6/2006	13.61	52.30%
4/7/2006	13.59	53.00%
4/8/2006	13.55	54.80%
4/9/2006	13.41	61.70%
4/10/2006	13.35	64.30%
4/11/2006	13.37	63.70%
4/12/2006	13.40	62.30%
4/13/2006	13.42	61.60%
4/14/2006	13.44	60.50%
4/15/2006	13.45	60.10%
4/16/2006	13.51	57.30%
4/17/2006	13.53	56.00%
4/18/2006	13.55	54.80%
4/19/2006	13.57	53.90%
4/20/2006	13.61	52.30%
4/21/2006	13.65	50.70%
4/22/2006	13.64	51.10%
4/23/2006	12.86	81.00%
4/24/2006	11.98	96.20%
4/25/2006	12.06	95.60%
4/26/2006	12.22	94.00%
4/27/2006	12.36	92.50%
4/28/2006	12.52	89.30%
4/29/2006	12.63	86.40%
4/30/2006	12.74	83.70%
5/1/2006	12.84	81.50%
5/2/2006	12.91	79.60%
5/3/2006	13.02	76.00%
5/4/2006	13.11	72.70%
5/5/2006	13.20	69.70%
5/6/2006	13.30	66.30%
5/7/2006	13.39	62.90%
5/8/2006	13.46	59.50%
5/9/2006	13.52	56.30%
5/10/2006	13.57	53.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
5/11/2006	13.61	52.30%
5/12/2006	13.39	62.90%
5/13/2006	13.02	76.00%
5/14/2006	12.99	77.00%
5/15/2006	13.02	76.00%
5/16/2006	12.94	78.70%
5/17/2006	12.72	84.30%
5/18/2006	12.73	84.10%
5/19/2006	12.66	85.90%
5/20/2006	12.51	89.50%
5/21/2006	12.56	88.30%
5/22/2006	12.69	85.20%
5/23/2006	12.79	82.70%
5/24/2006	12.93	79.00%
5/25/2006	13.01	76.30%
5/26/2006	13.11	72.70%
5/27/2006	13.22	68.90%
5/28/2006	13.36	64.00%
5/29/2006	13.47	59.20%
5/30/2006	13.58	53.40%
5/31/2006	13.64	51.10%
6/1/2006	13.68	49.70%
6/2/2006	13.67	50.00%
6/3/2006	13.63	51.40%
6/4/2006	13.58	53.40%
6/5/2006	13.65	50.70%
6/6/2006	13.71	48.20%
6/7/2006	13.50	57.80%
6/8/2006	12.87	80.80%
6/9/2006	12.87	80.80%
6/10/2006	12.90	79.90%
6/11/2006	12.97	77.90%
6/12/2006	13.06	74.60%
6/13/2006	13.16	71.10%
6/14/2006	13.24	68.50%
6/15/2006	13.35	64.30%
6/16/2006	13.48	58.60%
6/17/2006	13.57	53.90%
6/18/2006	13.65	50.70%
6/19/2006	13.73	47.30%
6/20/2006	13.78	45.50%
6/21/2006	13.83	43.30%
6/22/2006	13.89	40.80%
6/23/2006	13.97	37.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
6/24/2006	13.97	37.90%
6/25/2006	13.95	38.70%
6/26/2006	13.92	39.50%
6/27/2006	13.96	38.40%
6/28/2006	13.68	49.70%
6/29/2006	13.53	56.00%
6/30/2006	13.52	56.30%
7/1/2006	13.60	52.60%
7/2/2006	13.67	50.00%
7/3/2006	13.75	46.50%
7/4/2006	13.81	44.20%
7/5/2006	13.84	42.90%
7/6/2006	13.88	41.20%
7/7/2006	13.95	38.70%
7/8/2006	14.00	36.90%
7/9/2006	14.06	35.00%
7/10/2006	14.11	32.40%
7/11/2006	14.15	30.70%
7/12/2006	14.15	30.70%
7/13/2006	14.14	31.10%
7/14/2006	14.19	29.10%
7/15/2006	14.23	27.70%
7/16/2006	14.29	26.00%
7/17/2006	14.35	24.60%
7/18/2006	14.40	23.10%
7/19/2006	14.37	24.00%
7/20/2006	14.40	23.10%
7/21/2006	14.43	22.00%
7/22/2006	14.44	21.70%
7/23/2006	14.47	21.00%
7/24/2006	14.52	19.40%
7/25/2006	14.57	18.50%
7/26/2006	14.62	17.70%
7/27/2006	14.68	16.60%
7/28/2006	14.69	16.30%
7/29/2006	14.69	16.30%
7/30/2006	14.75	15.30%
7/31/2006	14.82	13.80%
8/1/2006	14.88	12.80%
8/2/2006	14.95	12.50%
8/3/2006	15.02	11.20%
8/4/2006	14.99	11.70%
8/5/2006	15.03	11.20%
8/6/2006	15.12	10.00%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
8/7/2006	15.16	9.60%
8/8/2006	15.22	9.10%
8/9/2006	15.32	8.30%
8/10/2006	15.40	7.70%
8/11/2006	15.47	7.30%
8/12/2006	15.58	6.70%
8/13/2006	15.66	6.30%
8/14/2006	15.75	5.70%
8/15/2006	15.75	5.70%
8/16/2006	15.79	5.60%
8/17/2006	15.87	5.30%
8/18/2006	15.94	5.00%
8/19/2006	16.00	4.70%
8/20/2006	15.97	4.80%
8/21/2006	16.02	4.50%
8/22/2006	16.10	4.20%
8/23/2006	16.18	4.00%
8/24/2006	16.43	3.50%
8/25/2006	16.48	3.40%
8/26/2006	16.05	4.50%
8/27/2006	15.65	6.30%
8/28/2006	15.01	11.60%
8/29/2006	14.76	15.00%
8/30/2006	14.25	27.00%
8/31/2006	14.28	26.20%
9/1/2006	14.36	24.20%
9/2/2006	14.39	23.40%
9/3/2006	14.15	30.70%
9/4/2006	14.03	36.00%
9/5/2006	14.08	34.00%
9/6/2006	14.13	31.50%
9/7/2006	14.20	28.70%
9/8/2006	14.26	26.60%
9/9/2006	14.32	25.30%
9/10/2006	14.39	23.40%
9/11/2006	14.44	21.70%
9/12/2006	14.48	20.80%
9/13/2006	14.51	19.80%
9/14/2006	14.50	20.10%
9/15/2006	14.41	22.70%
9/16/2006	14.33	25.00%
9/17/2006	14.34	24.80%
9/18/2006	14.38	23.70%
9/19/2006	14.40	23.10%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
9/20/2006	14.42	22.30%
9/21/2006	14.48	20.80%
9/22/2006	14.51	19.80%
9/23/2006	14.50	20.10%
9/24/2006	14.51	19.80%
9/25/2006	14.57	18.50%
9/26/2006	14.61	17.90%
9/27/2006	14.64	17.30%
9/28/2006	14.65	17.10%
9/29/2006	14.65	17.10%
9/30/2006	14.68	16.60%
10/1/2006	14.65	17.10%
10/2/2006	14.63	17.50%
10/3/2006	14.65	17.10%
10/4/2006	14.66	16.80%
10/5/2006	14.67	16.70%
10/6/2006	14.68	16.60%
10/7/2006	14.70	16.00%
10/8/2006	14.72	15.80%
10/9/2006	14.74	15.40%
10/10/2006	14.77	14.80%
10/11/2006	14.75	15.30%
10/12/2006	14.38	23.70%
10/13/2006	14.39	23.40%
10/14/2006	14.40	23.10%
10/15/2006	14.45	21.50%
10/16/2006	14.48	20.80%
10/17/2006	14.46	21.20%
10/18/2006	14.32	25.30%
10/19/2006	14.30	25.70%
10/20/2006	14.25	27.00%
10/21/2006	14.17	29.70%
10/22/2006	14.15	30.70%
10/23/2006	14.14	31.10%
10/24/2006	14.16	30.10%
10/25/2006	14.18	29.50%
10/26/2006	14.21	28.50%
10/27/2006	14.22	28.10%
10/28/2006	13.12	72.40%
10/29/2006	12.58	87.70%
10/30/2006	12.84	81.50%
10/31/2006	13.00	76.70%
11/1/2006	13.13	72.20%
11/2/2006	13.20	69.70%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
11/3/2006	13.25	68.00%
11/4/2006	13.29	66.50%
11/5/2006	13.33	65.00%
11/6/2006	13.37	63.70%
11/7/2006	13.42	61.60%
11/8/2006	13.08	73.90%
11/9/2006	11.85	97.00%
11/10/2006	12.10	95.10%
11/11/2006	12.29	93.50%
11/12/2006	12.46	90.60%
11/13/2006	12.59	87.50%
11/14/2006	12.68	85.50%
11/15/2006	12.76	83.40%
11/16/2006	12.78	82.90%
11/17/2006	12.00	96.10%
11/18/2006	12.03	95.90%
11/19/2006	12.20	94.30%
11/20/2006	12.38	92.20%
11/21/2006	12.53	89.10%
11/22/2006	12.64	86.30%
11/23/2006	12.52	89.30%
11/24/2006	12.04	95.70%
11/25/2006	12.11	95.00%
11/26/2006	12.25	93.80%
11/27/2006	12.40	91.80%
11/28/2006	12.54	88.90%
11/29/2006	12.65	86.20%
11/30/2006	12.75	83.60%
12/1/2006	12.85	81.30%
12/2/2006	12.96	78.30%
12/3/2006	13.03	75.50%
12/4/2006	13.08	73.90%
12/5/2006	13.14	71.80%
12/6/2006	13.20	69.70%
12/7/2006	13.24	68.50%
12/8/2006	13.32	65.30%
12/9/2006	13.38	63.30%
12/10/2006	13.44	60.50%
12/11/2006	13.51	57.30%
12/12/2006	13.56	54.40%
12/13/2006	13.57	53.90%
12/14/2006	13.60	52.60%
12/15/2006	13.63	51.40%
12/16/2006	13.68	49.70%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
12/17/2006	13.71	48.20%
12/18/2006	13.73	47.30%
12/19/2006	13.76	46.30%
12/20/2006	13.78	45.50%
12/21/2006	13.80	44.40%
12/22/2006	13.82	43.90%
12/23/2006	13.64	51.10%
12/24/2006	13.51	57.30%
12/25/2006	13.48	58.60%
12/26/2006	13.39	62.90%
12/27/2006	13.39	62.90%
12/28/2006	13.40	62.30%
12/29/2006	13.42	61.60%
12/30/2006	13.43	61.00%
12/31/2006	13.47	59.20%
1/1/2007	13.31	66.00%
1/2/2007	13.06	74.60%
1/3/2007	13.02	76.00%
1/4/2007	13.05	74.90%
1/5/2007	13.09	73.40%
1/6/2007	13.11	72.70%
1/7/2007	13.16	71.10%
1/8/2007	12.88	80.60%
1/9/2007	12.61	86.90%
1/10/2007	12.66	85.90%
1/11/2007	12.76	83.40%
1/12/2007	12.82	81.90%
1/13/2007	12.89	80.20%
1/14/2007	12.97	77.90%
1/15/2007	12.97	77.90%
1/16/2007	12.96	78.30%
1/17/2007	13.01	76.30%
1/18/2007	13.03	75.50%
1/19/2007	13.05	74.90%
1/20/2007	13.15	71.30%
1/21/2007	13.24	68.50%
1/22/2007	13.27	67.10%
1/23/2007	13.34	64.60%
1/24/2007	13.41	61.70%
1/25/2007	13.46	59.50%
1/26/2007	13.51	57.30%
1/27/2007	13.54	55.40%
1/28/2007	13.58	53.40%
1/29/2007	13.64	51.10%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
1/30/2007	13.68	49.70%
1/31/2007	13.72	47.60%
2/1/2007	13.76	46.30%
2/2/2007	13.78	45.50%
2/3/2007	13.83	43.30%
2/4/2007	13.86	41.90%
2/5/2007	13.90	40.30%
2/6/2007	13.92	39.50%
2/7/2007	13.94	39.10%
2/8/2007	13.96	38.40%
2/9/2007	13.98	37.60%
2/10/2007	14.01	36.80%
2/11/2007	14.05	35.30%
2/12/2007	14.08	34.00%
2/13/2007	14.10	32.80%
2/14/2007	14.07	34.60%
2/15/2007	14.13	31.50%
2/16/2007	14.15	30.70%
2/17/2007	14.17	29.70%
2/18/2007	14.19	29.10%
2/19/2007	14.23	27.70%
2/20/2007	14.24	27.40%
2/21/2007	14.26	26.60%
2/22/2007	14.24	27.40%
2/23/2007	14.23	27.70%
2/24/2007	14.24	27.40%
2/25/2007	14.25	27.00%
2/26/2007	14.25	27.00%
2/27/2007	14.28	26.20%
2/28/2007	14.28	26.20%
3/1/2007	14.27	26.40%
3/2/2007	13.69	49.20%
3/3/2007	13.05	74.90%
3/4/2007	12.96	78.30%
3/5/2007	13.00	76.70%
3/6/2007	13.06	74.60%
3/7/2007	13.07	74.10%
3/8/2007	13.09	73.40%
3/9/2007	13.14	71.80%
3/10/2007	13.16	71.10%
3/11/2007	13.09	73.40%
3/12/2007	12.98	77.60%
3/13/2007	12.92	79.50%
3/14/2007	12.89	80.20%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
3/15/2007	12.85	81.30%
3/16/2007	12.73	84.10%
3/17/2007	12.67	85.60%
3/18/2007	12.74	83.70%
3/19/2007	12.82	81.90%
3/20/2007	12.89	80.20%
3/21/2007	12.92	79.50%
3/22/2007	12.88	80.60%
3/23/2007	12.35	92.70%
3/24/2007	12.01	96.00%
3/25/2007	11.71	97.60%
3/26/2007	11.69	97.80%
3/27/2007	11.81	97.30%
3/28/2007	11.94	96.50%
3/29/2007	12.08	95.30%
3/30/2007	12.21	94.20%
3/31/2007	12.35	92.70%
4/1/2007	12.47	90.40%
4/2/2007	12.55	88.60%
4/3/2007	12.65	86.20%
4/4/2007	12.64	86.30%
4/5/2007	12.43	91.40%
4/6/2007	12.45	90.90%
4/7/2007	12.54	88.90%
4/8/2007	12.66	85.90%
4/9/2007	12.77	83.00%
4/10/2007	12.88	80.60%
4/11/2007	12.97	77.90%
4/12/2007	12.89	80.20%
4/13/2007	12.58	87.70%
4/14/2007	12.59	87.50%
4/15/2007	11.93	96.50%
4/16/2007	9.23	100.00%
4/17/2007	10.02	100.00%
4/18/2007	10.60	99.80%
4/19/2007	11.01	99.50%
4/20/2007	11.36	98.70%
4/21/2007	11.64	98.10%
4/22/2007	11.87	96.80%
4/23/2007	12.06	95.60%
4/24/2007	12.25	93.80%
4/25/2007	12.42	91.50%
4/26/2007	12.55	88.60%
4/27/2007	12.46	90.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
4/28/2007	12.32	93.20%
4/29/2007	12.38	92.20%
4/30/2007	12.49	89.90%
5/1/2007	12.61	86.90%
5/2/2007	12.72	84.30%
5/3/2007	12.85	81.30%
5/4/2007	12.96	78.30%
5/5/2007	13.06	74.60%
5/6/2007	13.17	70.60%
5/7/2007	13.26	67.50%
5/8/2007	13.33	65.00%
5/9/2007	13.40	62.30%
5/10/2007	13.48	58.60%
5/11/2007	13.51	57.30%
5/12/2007	13.58	53.40%
5/13/2007	13.66	50.20%
5/14/2007	13.71	48.20%
5/15/2007	13.74	46.80%
5/16/2007	13.78	45.50%
5/17/2007	13.81	44.20%
5/18/2007	13.84	42.90%
5/19/2007	13.85	42.30%
5/20/2007	13.89	40.80%
5/21/2007	13.94	39.10%
5/22/2007	13.99	37.20%
5/23/2007	14.03	36.00%
5/24/2007	14.08	34.00%
5/25/2007	14.12	32.20%
5/26/2007	14.17	29.70%
5/27/2007	14.21	28.50%
5/28/2007	14.25	27.00%
5/29/2007	14.31	25.60%
5/30/2007	14.35	24.60%
5/31/2007	14.43	22.00%
6/1/2007	14.43	22.00%
6/2/2007	14.40	23.10%
6/3/2007	14.24	27.40%
6/4/2007	13.98	37.60%
6/5/2007	13.74	46.80%
6/6/2007	13.83	43.30%
6/7/2007	13.91	39.90%
6/8/2007	13.98	37.60%
6/9/2007	14.05	35.30%
6/10/2007	14.09	33.30%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurement
6/11/2007	14.12	32.20%
6/12/2007	14.16	30.10%
6/13/2007	14.18	29.50%
6/14/2007	14.22	28.10%
6/15/2007	14.26	26.60%
6/16/2007	14.31	25.60%
6/17/2007	14.39	23.40%
6/18/2007	14.43	22.00%
6/19/2007	14.49	20.40%
6/20/2007	14.54	19.10%
6/21/2007	14.58	18.40%
6/22/2007	14.62	17.70%
6/23/2007	14.72	15.80%
6/24/2007	14.79	14.40%
6/25/2007	14.85	13.00%
6/26/2007	14.93	12.50%
6/27/2007	14.97	12.20%
6/28/2007	14.98	11.80%
6/29/2007	15.01	11.60%
6/30/2007	15.07	10.70%
7/1/2007	15.16	9.60%
7/2/2007	15.23	9.00%
7/3/2007	15.31	8.30%
7/4/2007	15.35	8.00%
7/5/2007	15.18	9.50%
7/6/2007	15.18	9.50%
7/7/2007	15.24	8.90%
7/8/2007	15.33	8.10%
7/9/2007	15.44	7.50%
7/10/2007	15.52	7.00%
7/11/2007	15.56	6.80%
7/12/2007	15.55	6.90%
7/13/2007	15.62	6.50%
7/14/2007	15.66	6.30%
7/15/2007	15.72	5.90%
7/16/2007	15.77	5.60%
7/17/2007	15.86	5.40%
7/18/2007	15.87	5.30%
7/19/2007	15.73	5.90%
7/20/2007	15.32	8.30%
7/21/2007	15.28	8.60%
7/22/2007	15.32	8.30%
7/23/2007	15.24	8.90%
7/24/2007	15.06	10.80%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurement
7/25/2007	15.07	10.70%
7/26/2007	15.10	10.20%
7/27/2007	15.13	9.90%
7/28/2007	15.12	10.00%
7/29/2007	15.15	9.70%
7/30/2007	15.11	10.10%
7/31/2007	15.15	9.70%
8/1/2007	15.22	9.10%
8/2/2007	15.29	8.50%
8/3/2007	15.38	7.80%
8/4/2007	15.33	8.10%
8/5/2007	15.39	7.70%
8/6/2007	15.45	7.50%
8/7/2007	15.50	7.20%
8/8/2007	15.37	7.90%
8/9/2007	15.29	8.50%
8/10/2007	15.11	10.10%
8/11/2007	14.87	12.90%
8/12/2007	14.89	12.80%
8/13/2007	14.92	12.60%
8/14/2007	14.97	12.20%
8/15/2007	15.01	11.60%
8/16/2007	15.05	10.90%
8/17/2007	15.05	10.90%
8/18/2007	15.06	10.80%
8/19/2007	15.10	10.20%
8/20/2007	15.14	9.80%
8/21/2007	15.08	10.50%
8/22/2007	14.98	11.80%
8/23/2007	14.97	12.20%
8/24/2007	14.98	11.80%
8/25/2007	15.01	11.60%
8/26/2007	15.05	10.90%
8/27/2007	15.09	10.30%
8/28/2007	15.14	9.80%
8/29/2007	15.18	9.50%
8/30/2007	15.24	8.90%
8/31/2007	15.30	8.40%
9/1/2007	15.38	7.80%
9/2/2007	15.45	7.50%
9/3/2007	15.54	7.00%
9/4/2007	15.62	6.50%
9/5/2007	15.74	5.80%
9/6/2007	15.85	5.50%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
9/7/2007	15.92	5.20%
9/8/2007	16.01	4.60%
9/9/2007	16.09	4.30%
9/10/2007	16.16	4.00%
9/11/2007	16.12	4.10%
9/12/2007	16.06	4.40%
9/13/2007	16.11	4.20%
9/14/2007	16.18	4.00%
9/15/2007	16.23	3.90%
9/16/2007	16.30	3.70%
9/17/2007	16.37	3.60%
9/18/2007	16.44	3.50%
9/19/2007	16.51	3.30%
9/20/2007	16.58	3.30%
9/21/2007	16.66	3.10%
9/22/2007	16.73	2.90%
9/23/2007	16.80	2.70%
9/24/2007	16.87	2.60%
9/25/2007	16.94	2.40%
9/26/2007	17.02	2.20%
9/27/2007	17.11	2.10%
9/28/2007	17.22	2.00%
9/29/2007	17.32	1.60%
9/30/2007	17.37	1.40%
10/1/2007	17.45	1.20%
10/2/2007	17.52	1.00%
10/3/2007	17.58	0.70%
10/4/2007	17.64	0.60%
10/5/2007	17.72	0.40%
10/6/2007	17.79	0.30%
10/7/2007	17.87	0.20%
10/8/2007	17.94	0.20%
10/9/2007	18.01	0.10%
10/10/2007	18.02	0.00%
10/11/2007	17.99	0.10%
10/12/2007	17.73	0.40%
10/13/2007	17.55	0.90%
10/14/2007	17.50	1.20%
10/15/2007	17.50	1.20%
10/16/2007	17.53	0.90%
10/17/2007	17.57	0.80%
10/18/2007	17.61	0.70%
10/19/2007	17.64	0.60%
10/20/2007	17.50	1.20%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
10/21/2007	17.36	1.40%
10/22/2007	17.31	1.70%
10/23/2007	17.29	1.80%
10/24/2007	17.30	1.70%
10/25/2007	17.33	1.60%
10/26/2007	17.34	1.50%
10/27/2007	16.99	2.30%
10/28/2007	16.29	3.80%
10/29/2007	16.09	4.30%
10/30/2007	16.00	4.70%
10/31/2007	15.96	4.90%
11/1/2007	15.93	5.10%
11/2/2007	15.94	5.00%
11/3/2007	15.92	5.20%
11/4/2007	15.96	4.90%
11/5/2007	15.97	4.80%
11/6/2007	15.85	5.50%
11/7/2007	15.70	6.00%
11/8/2007	15.64	6.40%
11/9/2007	15.61	6.60%
11/10/2007	15.57	6.80%
11/11/2007	15.55	6.90%
11/12/2007	15.51	7.20%
11/13/2007	15.45	7.50%
11/14/2007	15.37	7.90%
11/15/2007	15.27	8.70%
11/16/2007	15.07	10.70%
11/17/2007	15.03	11.20%
11/18/2007	15.04	11.00%
11/19/2007	15.03	11.20%
11/20/2007	15.00	11.60%
11/21/2007	14.97	12.20%
11/22/2007	14.95	12.50%
11/23/2007	14.97	12.20%
11/24/2007	14.97	12.20%
11/25/2007	14.96	12.30%
11/26/2007	14.74	15.40%
11/27/2007	14.06	35.00%
11/28/2007	13.91	39.90%
11/29/2007	13.95	38.70%
11/30/2007	14.03	36.00%
12/1/2007	14.10	32.80%
12/2/2007	14.12	32.20%
12/3/2007	13.98	37.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
12/4/2007	13.81	44.20%
12/5/2007	13.81	44.20%
12/6/2007	13.89	40.80%
12/7/2007	13.93	39.30%
12/8/2007	13.98	37.60%
12/9/2007	14.02	36.20%
12/10/2007	13.96	38.40%
12/11/2007	13.86	41.90%
12/12/2007	13.77	45.90%
12/13/2007	13.75	46.50%
12/14/2007	13.78	45.50%
12/15/2007	13.83	43.30%
12/16/2007	13.78	45.50%
12/17/2007	13.88	41.20%
12/18/2007	13.94	39.10%
12/19/2007	13.95	38.70%
12/20/2007	13.98	37.60%
12/21/2007	14.03	36.00%
12/22/2007	14.05	35.30%
12/23/2007	13.77	45.90%
12/24/2007	12.07	95.40%
12/25/2007	12.34	92.90%
12/26/2007	12.56	88.30%
12/27/2007	12.68	85.50%
12/28/2007	12.72	84.30%
12/29/2007	12.57	87.90%
12/30/2007	12.39	92.00%
12/31/2007	12.43	91.40%
1/1/2008	12.36	92.50%
1/2/2008	12.29	93.50%
1/3/2008	12.44	91.20%
1/4/2008	12.57	87.90%
1/5/2008	12.69	85.20%
1/6/2008	12.82	81.90%
1/7/2008	12.92	79.50%
1/8/2008	12.99	77.00%
1/9/2008	13.03	75.50%
1/10/2008	13.12	72.40%
1/11/2008	13.09	73.40%
1/12/2008	13.00	76.70%
1/13/2008	12.98	77.60%
1/14/2008	12.98	77.60%
1/15/2008	13.04	75.10%
1/16/2008	13.13	72.20%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
1/17/2008	13.19	69.90%
1/18/2008	13.18	70.30%
1/19/2008	13.14	71.80%
1/20/2008	13.15	71.30%
1/21/2008	13.21	69.30%
1/22/2008	13.20	69.70%
1/23/2008	13.28	66.90%
1/24/2008	13.35	64.30%
1/25/2008	13.43	61.00%
1/26/2008	13.48	58.60%
1/27/2008	13.53	56.00%
1/28/2008	13.59	53.00%
1/29/2008	13.62	51.90%
1/30/2008	13.64	51.10%
1/31/2008	13.73	47.30%
2/1/2008	13.67	50.00%
2/2/2008	13.06	74.60%
2/3/2008	12.93	79.00%
2/4/2008	12.95	78.60%
2/5/2008	12.92	79.50%
2/6/2008	12.79	82.70%
2/7/2008	12.70	85.00%
2/8/2008	12.70	85.00%
2/9/2008	12.75	83.60%
2/10/2008	12.79	82.70%
2/11/2008	12.89	80.20%
2/12/2008	12.95	78.60%
2/13/2008	12.15	94.80%
2/14/2008	11.24	99.10%
2/15/2008	11.59	98.30%
2/16/2008	11.86	96.90%
2/17/2008	12.04	95.70%
2/18/2008	11.68	97.80%
2/19/2008	11.38	98.70%
2/20/2008	11.64	98.10%
2/21/2008	11.90	96.60%
2/22/2008	12.07	95.40%
2/23/2008	12.25	93.80%
2/24/2008	12.41	91.60%
2/25/2008	12.52	89.30%
2/26/2008	12.61	86.90%
2/27/2008	12.62	86.60%
2/28/2008	12.70	85.00%
2/29/2008	12.76	83.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
3/1/2008	12.79	82.70%
3/2/2008	12.91	79.60%
3/3/2008	12.98	77.60%
3/4/2008	12.93	79.00%
3/5/2008	11.77	97.40%
3/6/2008	11.52	98.50%
3/7/2008	11.74	97.50%
3/8/2008	11.18	99.20%
3/9/2008	10.52	99.90%
3/10/2008	11.06	99.40%
3/11/2008	11.38	98.70%
3/12/2008	11.63	98.10%
3/13/2008	11.87	96.80%
3/14/2008	12.03	95.90%
3/15/2008	12.19	94.40%
3/16/2008	12.35	92.70%
3/17/2008	12.49	89.90%
3/18/2008	12.59	87.50%
3/19/2008	12.60	87.20%
3/20/2008	12.39	92.00%
3/21/2008	12.40	91.80%
3/22/2008	12.48	90.10%
3/23/2008	12.60	87.20%
3/24/2008	12.71	84.50%
3/25/2008	12.81	82.10%
3/26/2008	12.90	79.90%
3/27/2008	13.00	76.70%
3/28/2008	13.07	74.10%
3/29/2008	13.19	69.90%
3/30/2008	13.27	67.10%
3/31/2008	13.31	66.00%
4/1/2008	13.31	66.00%
4/2/2008	13.35	64.30%
4/3/2008	13.35	64.30%
4/4/2008	13.23	68.70%
4/5/2008	13.03	75.50%
4/6/2008	12.99	77.00%
4/7/2008	13.01	76.30%
4/8/2008	13.06	74.60%
4/9/2008	13.10	73.00%
4/10/2008	13.16	71.10%
4/11/2008	13.21	69.30%
4/12/2008	13.18	70.30%
4/13/2008	13.17	70.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurement
4/14/2008	13.18	70.30%
4/15/2008	13.21	69.30%
4/16/2008	13.25	68.00%
4/17/2008	13.29	66.50%
4/18/2008	13.34	64.60%
4/19/2008	13.40	62.30%
4/20/2008	13.46	59.50%
4/21/2008	13.50	57.80%
4/22/2008	13.55	54.80%
4/23/2008	13.58	53.40%
4/24/2008	13.63	51.40%
4/25/2008	13.67	50.00%
4/26/2008	13.71	48.20%
4/27/2008	13.75	46.50%
4/28/2008	13.71	48.20%
4/29/2008	13.51	57.30%
4/30/2008	13.42	61.60%
5/1/2008	13.39	62.90%
5/2/2008	13.38	63.30%
5/3/2008	13.40	62.30%
5/4/2008	13.42	61.60%
5/5/2008	13.45	60.10%
5/6/2008	13.47	59.20%
5/7/2008	13.51	57.30%
5/8/2008	13.55	54.80%
5/9/2008	13.54	55.40%
5/10/2008	13.44	60.50%
5/11/2008	13.40	62.30%
5/12/2008	13.39	62.90%
5/13/2008	13.44	60.50%
5/14/2008	13.50	57.80%
5/15/2008	13.52	56.30%
5/16/2008	13.53	56.00%
5/17/2008	13.46	59.50%
5/18/2008	13.43	61.00%
5/19/2008	13.44	60.50%
5/20/2008	13.45	60.10%
5/21/2008	13.47	59.20%
5/22/2008	13.52	56.30%
5/23/2008	13.57	53.90%
5/24/2008	13.63	51.40%
5/25/2008	13.68	49.70%
5/26/2008	13.73	47.30%
5/27/2008	13.78	45.50%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
5/28/2008	13.84	42.90%
5/29/2008	13.90	40.30%
5/30/2008	13.94	39.10%
5/31/2008	13.97	37.90%
6/1/2008	14.01	36.80%
6/2/2008	14.07	34.60%
6/3/2008	14.11	32.40%
6/4/2008	14.10	32.80%
6/5/2008	14.14	31.10%
6/6/2008	14.15	30.70%
6/7/2008	14.18	29.50%
6/8/2008	14.20	28.70%
6/9/2008	14.19	29.10%
6/10/2008	14.24	27.40%
6/11/2008	14.29	26.00%
6/12/2008	14.35	24.60%
6/13/2008	14.39	23.40%
6/14/2008	14.36	24.20%
6/15/2008	14.07	34.60%
6/16/2008	14.09	33.30%
6/17/2008	14.06	35.00%
6/18/2008	14.09	33.30%
6/19/2008	14.10	32.80%
6/20/2008	14.15	30.70%
6/21/2008	14.17	29.70%
6/22/2008	14.21	28.50%
6/23/2008	14.20	28.70%
6/24/2008	14.24	27.40%
6/25/2008	14.29	26.00%
6/26/2008	14.31	25.60%
6/27/2008	14.34	24.80%
6/28/2008	14.37	24.00%
6/29/2008	14.41	22.70%
6/30/2008	14.42	22.30%
7/1/2008	14.46	21.20%
7/2/2008	14.51	19.80%
7/3/2008	14.55	18.90%
7/4/2008	14.55	18.90%
7/5/2008	14.16	30.10%
7/6/2008	14.06	35.00%
7/7/2008	14.12	32.20%
7/8/2008	14.16	30.10%
7/9/2008	14.22	28.10%
7/10/2008	14.29	26.00%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
7/11/2008	14.35	24.60%
7/12/2008	14.40	23.10%
7/13/2008	14.45	21.50%
7/14/2008	14.47	21.00%
7/15/2008	14.52	19.40%
7/16/2008	14.58	18.40%
7/17/2008	14.64	17.30%
7/18/2008	14.69	16.30%
7/19/2008	14.75	15.30%
7/20/2008	14.81	14.00%
7/21/2008	14.86	13.00%
7/22/2008	14.91	12.60%
7/23/2008	14.89	12.80%
7/24/2008	14.61	17.90%
7/25/2008	14.59	18.20%
7/26/2008	14.62	17.70%
7/27/2008	14.37	24.00%
7/28/2008	13.53	56.00%
7/29/2008	13.74	46.80%
7/30/2008	13.89	40.80%
7/31/2008	13.98	37.60%
8/1/2008	14.08	34.00%
8/2/2008	14.08	34.00%
8/3/2008	14.08	34.00%
8/4/2008	14.15	30.70%
8/5/2008	14.21	28.50%
8/6/2008	14.22	28.10%
8/7/2008	14.26	26.60%
8/8/2008	14.30	25.70%
8/9/2008	14.33	25.00%
8/10/2008	14.37	24.00%
8/11/2008	14.38	23.70%
8/12/2008	14.39	23.40%
8/13/2008	14.44	21.70%
8/14/2008	14.47	21.00%
8/15/2008	14.49	20.40%
8/16/2008	14.50	20.10%
8/17/2008	14.55	18.90%
8/18/2008	14.61	17.90%
8/19/2008	14.65	17.10%
8/20/2008	14.72	15.80%
8/21/2008	14.77	14.80%
8/22/2008	14.84	13.30%
8/23/2008	14.87	12.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
8/24/2008	14.90	12.70%
8/25/2008	14.95	12.50%
8/26/2008	15.01	11.60%
8/27/2008	15.08	10.50%
8/28/2008	15.15	9.70%
8/29/2008	15.21	9.30%
8/30/2008	15.21	9.30%
8/31/2008	15.27	8.70%
9/1/2008	15.35	8.00%
9/2/2008	15.43	7.60%
9/3/2008	15.51	7.20%
9/4/2008	15.59	6.60%
9/5/2008	15.66	6.30%
9/6/2008	15.51	7.20%
9/7/2008	14.60	18.20%
9/8/2008	14.60	18.20%
9/9/2008	14.44	21.70%
9/10/2008	14.15	30.70%
9/11/2008	14.21	28.50%
9/12/2008	14.24	27.40%
9/13/2008	14.18	29.50%
9/14/2008	14.10	32.80%
9/15/2008	14.08	34.00%
9/16/2008	14.13	31.50%
9/17/2008	14.16	30.10%
9/18/2008	14.22	28.10%
9/19/2008	14.28	26.20%
9/20/2008	14.32	25.30%
9/21/2008	14.38	23.70%
9/22/2008	14.42	22.30%
9/23/2008	14.46	21.20%
9/24/2008	14.50	20.10%
9/25/2008	14.53	19.30%
9/26/2008	14.40	23.10%
9/27/2008	14.31	25.60%
9/28/2008	14.33	25.00%
9/29/2008	14.35	24.60%
9/30/2008	14.36	24.20%
10/1/2008	14.37	24.00%
10/2/2008	14.41	22.70%
10/3/2008	14.45	21.50%
10/4/2008	14.48	20.80%
10/5/2008	14.48	20.80%
10/6/2008	14.48	20.80%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
10/7/2008	14.50	20.10%
10/8/2008	14.51	19.80%
10/9/2008	14.53	19.30%
10/10/2008	14.57	18.50%
10/11/2008	14.60	18.20%
10/12/2008	14.63	17.50%
10/13/2008	14.63	17.50%
10/14/2008	14.64	17.30%
10/15/2008	14.66	16.80%
10/16/2008	14.67	16.70%
10/17/2008	14.70	16.00%
10/18/2008	14.73	15.50%
10/19/2008	14.75	15.30%
10/20/2008	14.76	15.00%
10/21/2008	14.76	15.00%
10/22/2008	14.80	14.30%
10/23/2008	14.83	13.60%
10/24/2008	14.83	13.60%
10/25/2008	14.79	14.40%
10/26/2008	14.56	18.60%
10/27/2008	14.55	18.90%
10/28/2008	14.32	25.30%
10/29/2008	14.03	36.00%
10/30/2008	14.06	35.00%
10/31/2008	14.07	34.60%
11/1/2008	14.09	33.30%
11/2/2008	14.12	32.20%
11/3/2008	14.13	31.50%
11/4/2008	14.15	30.70%
11/5/2008	14.15	30.70%
11/6/2008	14.13	31.50%
11/7/2008	14.08	34.00%
11/8/2008	14.05	35.30%
11/9/2008	14.01	36.80%
11/10/2008	13.98	37.60%
11/11/2008	13.97	37.90%
11/12/2008	13.96	38.40%
11/13/2008	13.94	39.10%
11/14/2008	13.85	42.30%
11/15/2008	13.63	51.40%
11/16/2008	13.16	71.10%
11/17/2008	13.14	71.80%
11/18/2008	13.22	68.90%
11/19/2008	13.30	66.30%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurement
11/20/2008	13.36	64.00%
11/21/2008	13.44	60.50%
11/22/2008	13.51	57.30%
11/23/2008	13.56	54.40%
11/24/2008	13.59	53.00%
11/25/2008	13.53	56.00%
11/26/2008	13.47	59.20%
11/27/2008	13.45	60.10%
11/28/2008	13.45	60.10%
11/29/2008	13.49	58.10%
11/30/2008	13.49	58.10%
12/1/2008	13.33	65.00%
12/2/2008	13.22	68.90%
12/3/2008	13.23	68.70%
12/4/2008	13.25	68.00%
12/5/2008	13.31	66.00%
12/6/2008	13.36	64.00%
12/7/2008	13.40	62.30%
12/8/2008	13.49	58.10%
12/9/2008	13.52	56.30%
12/10/2008	13.48	58.60%
12/11/2008	13.20	69.70%
12/12/2008	10.95	99.60%
12/13/2008	11.20	99.10%
12/14/2008	11.64	98.10%
12/15/2008	11.90	96.60%
12/16/2008	12.13	94.90%
12/17/2008	12.25	93.80%
12/18/2008	12.37	92.30%
12/19/2008	12.44	91.20%
12/20/2008	12.55	88.60%
12/21/2008	12.62	86.60%
12/22/2008	12.76	83.40%
12/23/2008	12.89	80.20%
12/24/2008	12.90	79.90%
12/25/2008	12.54	88.90%
12/26/2008	12.44	91.20%
12/27/2008	12.48	90.10%
12/28/2008	12.37	92.30%
12/29/2008	12.08	95.30%
12/30/2008	12.15	94.80%
12/31/2008	12.28	93.60%
1/1/2009	12.45	90.90%
1/2/2009	12.54	88.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
1/3/2009	12.66	85.90%
1/4/2009	12.78	82.90%
1/5/2009	12.88	80.60%
1/6/2009	12.98	77.60%
1/7/2009	13.02	76.00%
1/8/2009	13.08	73.90%
1/9/2009	13.16	71.10%
1/10/2009	13.20	69.70%
1/11/2009	13.23	68.70%
1/12/2009	13.30	66.30%
1/13/2009	13.33	65.00%
1/14/2009	13.40	62.30%
1/15/2009	13.45	60.10%
1/16/2009	13.51	57.30%
1/17/2009	13.54	55.40%
1/18/2009	13.54	55.40%
1/19/2009	13.57	53.90%
1/20/2009	13.62	51.90%
1/21/2009	13.67	50.00%
1/22/2009	13.71	48.20%
1/23/2009	13.74	46.80%
1/24/2009	13.78	45.50%
1/25/2009	13.82	43.90%
1/26/2009	13.85	42.30%
1/27/2009	13.87	41.40%
1/28/2009	13.82	43.90%
1/29/2009	13.78	45.50%
1/30/2009	13.79	45.00%
1/31/2009	13.82	43.90%
2/1/2009	13.84	42.90%
2/2/2009	13.86	41.90%
2/3/2009	13.85	42.30%
2/4/2009	13.88	41.20%
2/5/2009	13.90	40.30%
2/6/2009	13.91	39.90%
2/7/2009	13.90	40.30%
2/8/2009	13.88	41.20%
2/9/2009	13.79	45.00%
2/10/2009	13.72	47.60%
2/11/2009	13.60	52.60%
2/12/2009	13.08	73.90%
2/13/2009	12.79	82.70%
2/14/2009	12.82	81.90%
2/15/2009	12.91	79.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
2/16/2009	12.98	77.60%
2/17/2009	13.04	75.10%
2/18/2009	13.08	73.90%
2/19/2009	13.09	73.40%
2/20/2009	13.13	72.20%
2/21/2009	13.18	70.30%
2/22/2009	13.19	69.90%
2/23/2009	13.25	68.00%
2/24/2009	13.31	66.00%
2/25/2009	13.36	64.00%
2/26/2009	13.40	62.30%
2/27/2009	13.42	61.60%
2/28/2009	13.45	60.10%
3/1/2009	13.49	58.10%
3/2/2009	13.51	57.30%
3/3/2009	13.55	54.80%
3/4/2009	13.58	53.40%
3/5/2009	13.60	52.60%
3/6/2009	13.60	52.60%
3/7/2009	13.59	53.00%
3/8/2009	13.55	54.80%
3/9/2009	13.45	60.10%
3/10/2009	13.32	65.30%
3/11/2009	13.26	67.50%
3/12/2009	13.30	66.30%
3/13/2009	13.31	66.00%
3/14/2009	13.33	65.00%
3/15/2009	13.37	63.70%
3/16/2009	13.41	61.70%
3/17/2009	13.44	60.50%
3/18/2009	13.47	59.20%
3/19/2009	13.51	57.30%
3/20/2009	13.55	54.80%
3/21/2009	13.59	53.00%
3/22/2009	13.61	52.30%
3/23/2009	13.64	51.10%
3/24/2009	13.68	49.70%
3/25/2009	13.70	49.00%
3/26/2009	13.70	49.00%
3/27/2009	13.70	49.00%
3/28/2009	13.73	47.30%
3/29/2009	13.70	49.00%
3/30/2009	13.61	52.30%
3/31/2009	13.56	54.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
4/1/2009	13.51	57.30%
4/2/2009	13.49	58.10%
4/3/2009	13.39	62.90%
4/4/2009	13.20	69.70%
4/5/2009	13.16	71.10%
4/6/2009	13.13	72.20%
4/7/2009	13.08	73.90%
4/8/2009	13.05	74.90%
4/9/2009	13.08	73.90%
4/10/2009	13.12	72.40%
4/11/2009	13.16	71.10%
4/12/2009	13.21	69.30%
4/13/2009	13.24	68.50%
4/14/2009	13.28	66.90%
4/15/2009	13.31	66.00%
4/16/2009	13.36	64.00%
4/17/2009	13.39	62.90%
4/18/2009	13.42	61.60%
4/19/2009	13.48	58.60%
4/20/2009	13.50	57.80%
4/21/2009	12.93	79.00%
4/22/2009	12.68	85.50%
4/23/2009	12.63	86.40%
4/24/2009	12.68	85.50%
4/25/2009	12.73	84.10%
4/26/2009	12.81	82.10%
4/27/2009	12.90	79.90%
4/28/2009	12.97	77.90%
4/29/2009	13.08	73.90%
4/30/2009	13.14	71.80%
5/1/2009	13.19	69.90%
5/2/2009	13.26	67.50%
5/3/2009	13.34	64.60%
5/4/2009	13.40	62.30%
5/5/2009	13.45	60.10%
5/6/2009	13.43	61.00%
5/7/2009	12.55	88.60%
5/8/2009	12.25	93.80%
5/9/2009	12.33	93.10%
5/10/2009	12.47	90.40%
5/11/2009	12.59	87.50%
5/12/2009	12.70	85.00%
5/13/2009	12.80	82.30%
5/14/2009	12.88	80.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
5/15/2009	12.97	77.90%
5/16/2009	13.06	74.60%
5/17/2009	13.09	73.40%
5/18/2009	13.16	71.10%
5/19/2009	13.22	68.90%
5/20/2009	13.28	66.90%
5/21/2009	13.36	64.00%
5/22/2009	13.43	61.00%
5/23/2009	13.51	57.30%
5/24/2009	13.56	54.40%
5/25/2009	13.65	50.70%
5/26/2009	13.71	48.20%
5/27/2009	13.74	46.80%
5/28/2009	13.78	45.50%
5/29/2009	13.82	43.90%
5/30/2009	13.88	41.20%
5/31/2009	13.95	38.70%
6/1/2009	14.01	36.80%
6/2/2009	14.05	35.30%
6/3/2009	14.09	33.30%
6/4/2009	14.09	33.30%
6/5/2009	14.10	32.80%
6/6/2009	14.13	31.50%
6/7/2009	14.19	29.10%
6/8/2009	14.23	27.70%
6/9/2009	14.14	31.10%
6/10/2009	14.09	33.30%
6/11/2009	14.10	32.80%
6/12/2009	13.79	45.00%
6/13/2009	13.76	46.30%
6/14/2009	13.71	48.20%
6/15/2009	13.28	66.90%
6/16/2009	12.94	78.70%
6/17/2009	13.02	76.00%
6/18/2009	12.70	85.00%
6/19/2009	11.78	97.30%
6/20/2009	11.98	96.20%
6/21/2009	12.09	95.10%
6/22/2009	12.06	95.60%
6/23/2009	12.21	94.20%
6/24/2009	12.40	91.80%
6/25/2009	12.56	88.30%
6/26/2009	12.68	85.50%
6/27/2009	12.76	83.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
6/28/2009	12.88	80.60%
6/29/2009	13.00	76.70%
6/30/2009	13.14	71.80%
7/1/2009	13.24	68.50%
7/2/2009	13.34	64.60%
7/3/2009	13.43	61.00%
7/4/2009	13.54	55.40%
7/5/2009	13.62	51.90%
7/6/2009	13.70	49.00%
7/7/2009	13.74	46.80%
7/8/2009	13.76	46.30%
7/9/2009	13.85	42.30%
7/10/2009	13.91	39.90%
7/11/2009	13.96	38.40%
7/12/2009	14.01	36.80%
7/13/2009	14.07	34.60%
7/14/2009	14.15	30.70%
7/15/2009	14.21	28.50%
7/16/2009	14.25	27.00%
7/17/2009	14.26	26.60%
7/18/2009	14.03	36.00%
7/19/2009	14.12	32.20%
7/20/2009	14.19	29.10%
7/21/2009	14.17	29.70%
7/22/2009	14.07	34.60%
7/23/2009	14.10	32.80%
7/24/2009	14.13	31.50%
7/25/2009	14.07	34.60%
7/26/2009	14.08	34.00%
7/27/2009	13.95	38.70%
7/28/2009	13.97	37.90%
7/29/2009	13.99	37.20%
7/30/2009	14.01	36.80%
7/31/2009	13.73	47.30%
8/1/2009	13.21	69.30%
8/2/2009	13.25	68.00%
8/3/2009	13.11	72.70%
8/4/2009	13.18	70.30%
8/5/2009	13.29	66.50%
8/6/2009	13.40	62.30%
8/7/2009	13.50	57.80%
8/8/2009	13.60	52.60%
8/9/2009	13.65	50.70%
8/10/2009	13.71	48.20%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
8/11/2009	13.79	45.00%
8/12/2009	13.86	41.90%
8/13/2009	13.82	43.90%
8/14/2009	13.86	41.90%
8/15/2009	13.94	39.10%
8/16/2009	14.01	36.80%
8/17/2009	14.07	34.60%
8/18/2009	14.12	32.20%
8/19/2009	14.18	29.50%
8/20/2009	14.23	27.70%
8/21/2009	14.21	28.50%
8/22/2009	13.93	39.30%
8/23/2009	13.62	51.90%
8/24/2009	13.70	49.00%
8/25/2009	13.77	45.90%
8/26/2009	13.84	42.90%
8/27/2009	13.90	40.30%
8/28/2009	13.93	39.30%
8/29/2009	13.85	42.30%
8/30/2009	13.90	40.30%
8/31/2009	13.96	38.40%
9/1/2009	14.01	36.80%
9/2/2009	14.04	35.60%
9/3/2009	14.07	34.60%
9/4/2009	14.12	32.20%
9/5/2009	14.16	30.10%
9/6/2009	14.22	28.10%
9/7/2009	14.25	27.00%
9/8/2009	14.27	26.40%
9/9/2009	14.32	25.30%
9/10/2009	14.38	23.70%
9/11/2009	14.35	24.60%
9/12/2009	14.32	25.30%
9/13/2009	14.35	24.60%
9/14/2009	14.40	23.10%
9/15/2009	14.45	21.50%
9/16/2009	14.49	20.40%
9/17/2009	14.49	20.40%
9/18/2009	14.50	20.10%
9/19/2009	14.55	18.90%
9/20/2009	14.60	18.20%
9/21/2009	14.63	17.50%
9/22/2009	14.65	17.10%
9/23/2009	14.68	16.60%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
9/24/2009	14.72	15.80%
9/25/2009	14.77	14.80%
9/26/2009	14.80	14.30%
9/27/2009	14.71	15.80%
9/28/2009	14.69	16.30%
9/29/2009	14.70	16.00%
9/30/2009	14.74	15.40%
10/1/2009	14.76	15.00%
10/2/2009	14.77	14.80%
10/3/2009	14.75	15.30%
10/4/2009	14.77	14.80%
10/5/2009	14.80	14.30%
10/6/2009	14.83	13.60%
10/7/2009	14.80	14.30%
10/8/2009	14.82	13.80%
10/9/2009	14.80	14.30%
10/10/2009	14.78	14.50%
10/11/2009	14.79	14.40%
10/12/2009	14.81	14.00%
10/13/2009	14.82	13.80%
10/14/2009	14.84	13.30%
10/15/2009	14.84	13.30%
10/16/2009	14.82	13.80%
10/17/2009	14.84	13.30%
10/18/2009	14.83	13.60%
10/19/2009	14.80	14.30%
10/20/2009	14.81	14.00%
10/21/2009	14.82	13.80%
10/22/2009	14.83	13.60%
10/23/2009	14.84	13.30%
10/24/2009	14.69	16.30%
10/25/2009	14.30	25.70%
10/26/2009	14.34	24.80%
10/27/2009	14.35	24.60%
10/28/2009	14.08	34.00%
10/29/2009	13.72	47.60%
10/30/2009	13.79	45.00%
10/31/2009	13.82	43.90%
11/1/2009	13.75	46.50%
11/2/2009	13.70	49.00%
11/3/2009	13.70	49.00%
11/4/2009	13.73	47.30%
11/5/2009	13.74	46.80%
11/6/2009	13.77	45.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
11/7/2009	13.79	45.00%
11/8/2009	13.82	43.90%
11/9/2009	13.84	42.90%
11/10/2009	13.85	42.30%
11/11/2009	13.88	41.20%
11/12/2009	13.89	40.80%
11/13/2009	13.90	40.30%
11/14/2009	13.89	40.80%
11/15/2009	13.87	41.40%
11/16/2009	13.86	41.90%
11/17/2009	13.86	41.90%
11/18/2009	13.85	42.30%
11/19/2009	13.83	43.30%
11/20/2009	13.67	50.00%
11/21/2009	13.51	57.30%
11/22/2009	13.50	57.80%
11/23/2009	13.51	57.30%
11/24/2009	13.53	56.00%
11/25/2009	13.54	55.40%
11/26/2009	13.56	54.40%
11/27/2009	13.57	53.90%
11/28/2009	13.61	52.30%
11/29/2009	13.65	50.70%
11/30/2009	13.66	50.20%
12/1/2009	13.70	49.00%
12/2/2009	13.72	47.60%
12/3/2009	13.28	66.90%
12/4/2009	13.04	75.10%
12/5/2009	13.04	75.10%
12/6/2009	13.09	73.40%
12/7/2009	13.13	72.20%
12/8/2009	13.17	70.60%
12/9/2009	13.10	73.00%
12/10/2009	12.98	77.60%
12/11/2009	12.95	78.60%
12/12/2009	12.99	77.00%
12/13/2009	12.96	78.30%
12/14/2009	12.58	87.70%
12/15/2009	12.49	89.90%
12/16/2009	12.45	90.90%
12/17/2009	12.49	89.90%
12/18/2009	12.58	87.70%
12/19/2009	12.65	86.20%
12/20/2009	12.76	83.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
12/21/2009	12.86	81.00%
12/22/2009	12.96	78.30%
12/23/2009	13.06	74.60%
12/24/2009	13.16	71.10%
12/25/2009	13.24	68.50%
12/26/2009	13.24	68.50%
12/27/2009	12.38	92.20%
12/28/2009	12.15	94.80%
12/29/2009	12.31	93.30%
12/30/2009	12.45	90.90%
12/31/2009	12.55	88.60%
1/1/2010	12.65	86.20%
1/2/2010	12.75	83.60%
1/3/2010	12.85	81.30%
1/4/2010	12.96	78.30%
1/5/2010	13.06	74.60%
1/6/2010	13.15	71.30%
1/7/2010	13.24	68.50%
1/8/2010	13.31	66.00%
1/9/2010	13.39	62.90%
1/10/2010	13.45	60.10%
1/11/2010	13.49	58.10%
1/12/2010	13.54	55.40%
1/13/2010	13.59	53.00%
1/14/2010	13.62	51.90%
1/15/2010	13.65	50.70%
1/16/2010	13.69	49.20%
1/17/2010	13.71	48.20%
1/18/2010	13.71	48.20%
1/19/2010	13.70	49.00%
1/20/2010	13.69	49.20%
1/21/2010	13.70	49.00%
1/22/2010	13.68	49.70%
1/23/2010	13.70	49.00%
1/24/2010	13.69	49.20%
1/25/2010	13.03	75.50%
1/26/2010	12.03	95.90%
1/27/2010	12.21	94.20%
1/28/2010	12.35	92.70%
1/29/2010	12.49	89.90%
1/30/2010	12.60	87.20%
1/31/2010	12.71	84.50%
2/1/2010	12.81	82.10%
2/2/2010	12.90	79.90%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
2/3/2010	12.99	77.00%
2/4/2010	13.10	73.00%
2/5/2010	13.17	70.60%
2/6/2010	13.24	68.50%
2/7/2010	13.32	65.30%
2/8/2010	13.39	62.90%
2/9/2010	13.45	60.10%
2/10/2010	13.47	59.20%
2/11/2010	13.54	55.40%
2/12/2010	13.59	53.00%
2/13/2010	13.62	51.90%
2/14/2010	13.67	50.00%
2/15/2010	13.71	48.20%
2/16/2010	13.73	47.30%
2/17/2010	13.77	45.90%
2/18/2010	13.80	44.40%
2/19/2010	13.84	42.90%
2/20/2010	13.86	41.90%
2/21/2010	13.88	41.20%
2/22/2010	13.89	40.80%
2/23/2010	13.88	41.20%
2/24/2010	13.63	51.40%
2/25/2010		#N/A
2/26/2010	12.48	90.10%
2/27/2010	12.45	90.90%
2/28/2010	12.49	89.90%
3/1/2010	12.55	88.60%
3/2/2010	12.56	88.30%
3/3/2010	12.53	89.10%
3/4/2010	12.54	88.90%
3/5/2010	12.56	88.30%
3/6/2010	12.59	87.50%
3/7/2010	12.57	87.90%
3/8/2010	12.43	91.40%
3/9/2010	12.18	94.50%
3/10/2010	11.98	96.20%
3/11/2010	11.87	96.80%
3/12/2010	11.81	97.30%
3/13/2010	11.54	98.40%
3/14/2010	10.05	100.00%
3/15/2010	10.64	99.70%
3/16/2010	10.98	99.50%
3/17/2010	11.27	99.00%
3/18/2010	11.53	98.40%

Table A1

USGS Well P-1217		
Carmel, New York		
Site Number 41214907345501		
Date	Depth to Water (feet below grade)	Percent of time greater than or equal to measurment
3/19/2010	11.76	97.40%
3/20/2010	11.95	96.40%
3/21/2010	12.12	95.00%
3/22/2010	12.24	93.90%
3/23/2010	10.91	99.60%
3/24/2010	11.10	99.40%
3/25/2010	11.44	98.60%
3/26/2010	11.66	97.90%
3/27/2010	11.85	97.00%
3/28/2010	12.00	96.10%

APPENDIX IV

HYDRAULIC CONDUCTIVITY CALCULATIONS

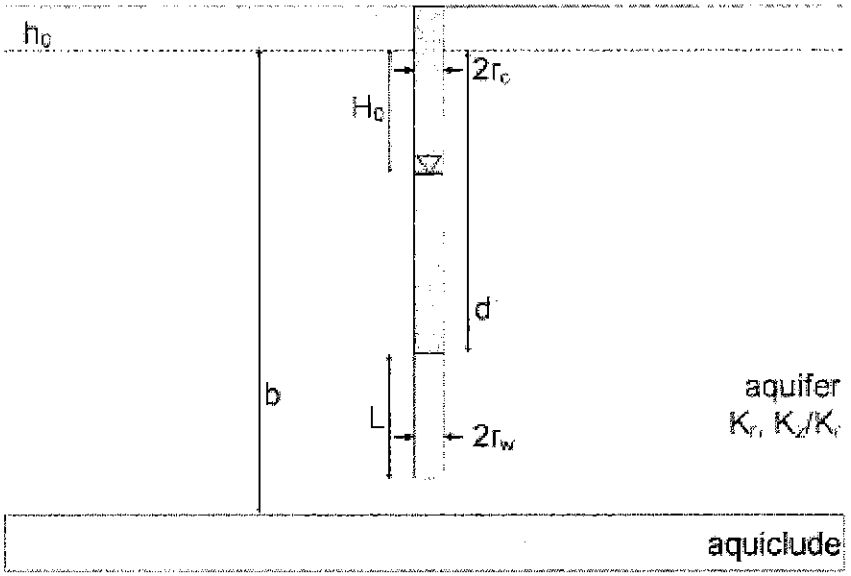
Hvorslev (1951) Solution for a Slug Test in an Unconfined Aquifer

(Match > Solution)

For slug tests in an unconfined aquifer, the preferred quasi-steady-state method is the Bouwer-Rice (1976) solution; however, Bouwer (1989) observed that the water-table boundary in an unconfined aquifer has little effect on slug test response unless the top of the well screen is positioned close to the boundary. Thus, in many cases, we may apply the Hvorslev (1951) solution for confined aquifers to approximate unconfined conditions when the well screen is below the water table.

In cases of noninstantaneous test initiation, apply the translation method of Pandit and Miner (1986) prior to analyzing the data.

- **Illustration**



- **Equations**

  Refer to the equations for the Hvorslev (1951) solution for a confined aquifer.

  For the unconfined variant of the Hvorslev solution, AQTESOLV applies the correction for filter pack porosity for wells screened across the water table. For the confined Hvorslev solution, the filter pack correction is unnecessary.

- **Assumptions**

  - aquifer has infinite areal extent
  - aquifer is homogeneous and of uniform thickness
  - test well is fully or partially penetrating
  - aquifer is confined
  - flow to well is quasi-steady-state (storage is negligible)

- volume of water, V, is injected into or discharged from the well instantaneously

- **Data Requirements**
  - test well measurements (time and displacement)
  - initial displacement
  - casing radius and well radius
  - depth to top of well screen and screen length
  - saturated thickness
  - hydraulic conductivity anisotropy ratio (for partially penetrating wells)

- **Estimated Parameters**
  - K (hydraulic conductivity)
  - y0 (intercept of line on y axis)

- **Curve Matching Tips**
  - Follow guidelines developed by Butler (1998) for analyzing slug tests.
  - Choose Match>Visual to perform visual curve matching using the procedure for straight-line solutions.
  - For this solution, visual curve matching is often more effective than automatic matching because you are interested in matching the straight line to a specific range of data that meet the assumptions of the solution. To achieve the same effect with automatic curve matching, it would require the judicious application of weights to ignore observations outside the desired range.
  - Choose View>Options and select the **Recommended Head Range** option in the **Plots** tab to superimpose on the plot the head range recommended by Butler (1998) to obtain the most reliable matching results for solutions (assuming a steady-state representation of flow for a slug test).

- **References**

1. Bouwer, H., 1989. The Bouwer and Rice slug test--an update, Ground Water, vol. 27, no. 3, pp. 304-309.
2. Hvorslev, M.J., 1951. Time Lag and Soil Permeability in Ground-Water Observations, Bull. No. 36, Waterways Exper. Sta. Corps of Engrs, U.S. Army, Vicksburg, Mississippi, pp. 1-50.

Bouwer-Rice (1976) Solution for a Slug Test in an Unconfined Aquifer

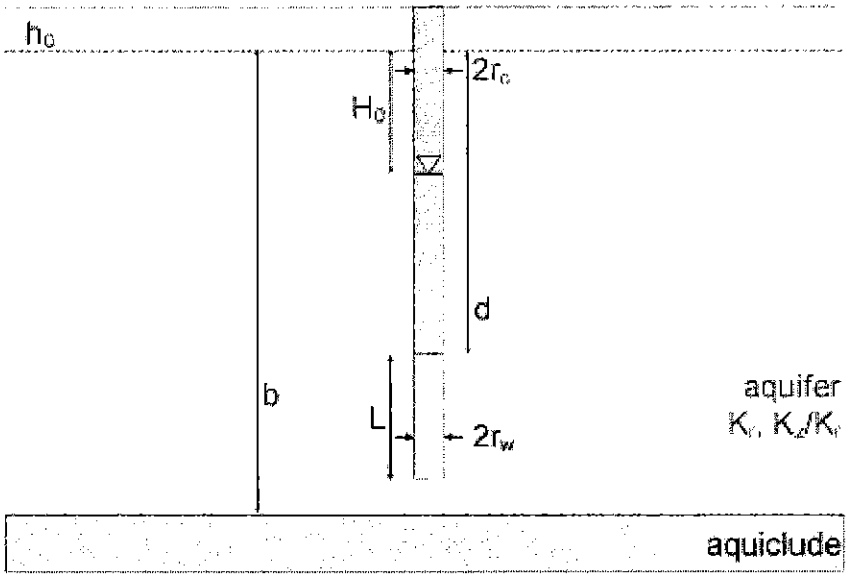
(Match > Solution)

Bouwer and Rice (1976) developed a semi-analytical method for the analysis of an overdamped slug test in a fully or partially penetrating well in an unconfined aquifer. The Bouwer-Rice method employs a quasi-steady-state model that ignores elastic storage in the aquifer.

In cases of noninstantaneous test initiation, apply the translation method of Pandit and Miner (1986) prior to analyzing the data.

If the test well is screened across the water table, you may apply an optional correction for the effective porosity of the filter pack. When the test well is fully submerged (i.e., screened below the water table) or the aquifer is confined, the correction is unnecessary.

- **Illustration**



- **Equations**

Bouwer and Rice (1976) developed an empirical relationship describing the water-level response in an unconfined aquifer due to the instantaneous injection or withdrawal of water from a well:

$$\ln(H_0) - \ln(h) = \frac{2KLt}{r_{ce}^2 \ln(r_e / r_{we})}$$

$$r_{we} = r_w \sqrt{K_z / K_r}$$

where

- h is displacement at time t [L]
- H_0 is initial displacement [L]

- K, K_r is radial hydraulic conductivity [L/T]
- K_z is vertical hydraulic conductivity [L/T]
- L is screen length [L]
- n_e is filter pack effective porosity [dimensionless]
- r_c is nominal casing radius [L]
- r_{ce} is effective casing radius (= r_c when well screen is fully submerged) [L]
- r_e is external radius [L]
- r_w is well radius [L]
- r_{we} is equivalent well radius [L]
- t is time [T]

The term $\ln(r_e/r_{we})$ is an empirical quantity that accounts for well geometry (Bouwer and Rice 1976).

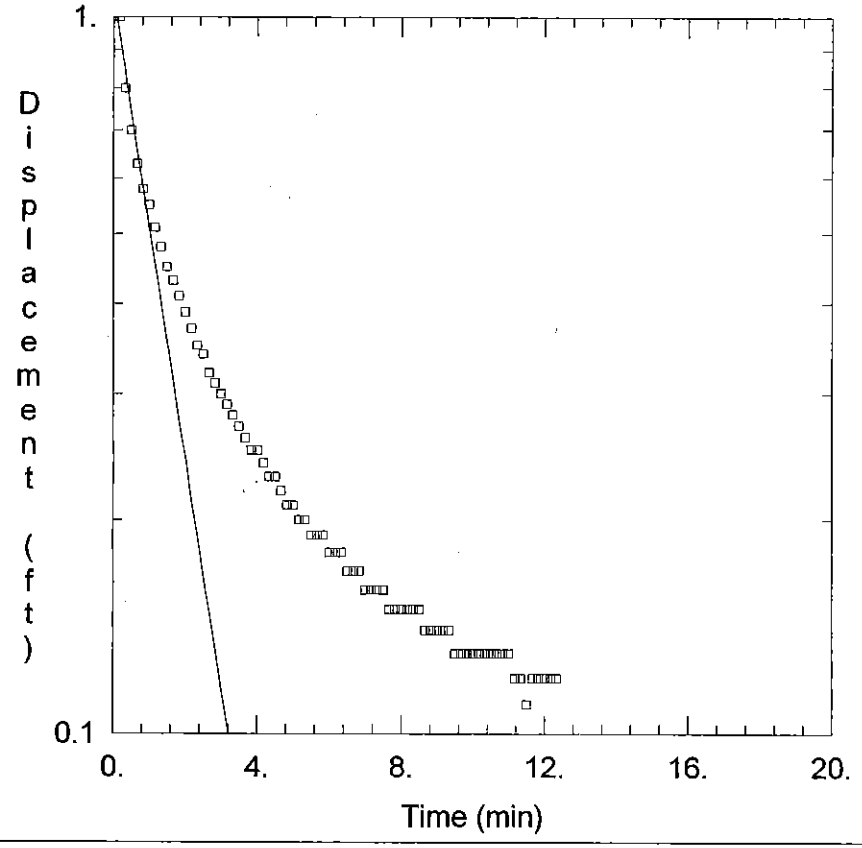
Zlotnik (1994) proposed an equivalent well radius (r_{we}) for a partially penetrating well in an anisotropic aquifer. Enter the anisotropy ratio in the aquifer data for the slug test well; the well radius is unchanged when the anisotropy ratio is set to unity (1.0).

- **Assumptions**
  - aquifer has infinite areal extent
  - aquifer is homogeneous and of uniform thickness
  - test well is fully or partially penetrating
  - aquifer is unconfined
  - flow to well is quasi-steady-state (storage is negligible)
  - volume of water, V, is injected into or discharged from the well instantaneously
- **Data Requirements**
  - test well measurements (time and displacement)
  - initial displacement
  - casing radius and well radius
  - depth to top of well screen and screen length
  - saturated thickness

- porosity of gravel pack for well screened across water table (optional)
- hydraulic conductivity anisotropy ratio (for partially penetrating wells)

- **Estimated Parameters**
  - K (hydraulic conductivity)
  - y0 (intercept of line on y axis)
- **Curve Matching Tips**
  - Follow guidelines developed by Butler (1998) for analyzing slug tests.
  - Choose Match>Visual to perform visual curve matching using the procedure for straight-line solutions.
  - For this solution, visual curve matching is often more effective than automatic matching because you are interested in matching the straight line to a specific range of data that meet the assumptions of the solution. To achieve the same effect with automatic curve matching, it would require the judicious application of weights to ignore observations outside the desired range.
  - Choose View>Options and select the **Recommended Head Range** option in the **Plots** tab to superimpose on the plot the head range recommended by Butler (1998) to obtain the most reliable matching results for solutions (assuming a steady-state representation of flow for a slug test).
- **References**

1. Bouwer, H., 1989. The Bouwer and Rice slug test--an update, Ground Water, vol. 27, no. 3, pp. 304-309.
2. Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.
3. Zlotnik, V., 1994. Interpretation of slug and packer tests in anisotropic aquifers, Ground Water, vol. 32, no. 5, pp. 761-766.



WELL TEST ANALYSIS

Data Set: M:\...\MW-12.aqt
Date: 07/03/08 Time: 14:35:51

PROJECT INFORMATION

Company: LBG
Location: North Salem
Test Date: 6/24/08

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice Silt, some fine sand

K = 4.294 ft/day
y0 = 1.072 ft

AQUIFER DATA

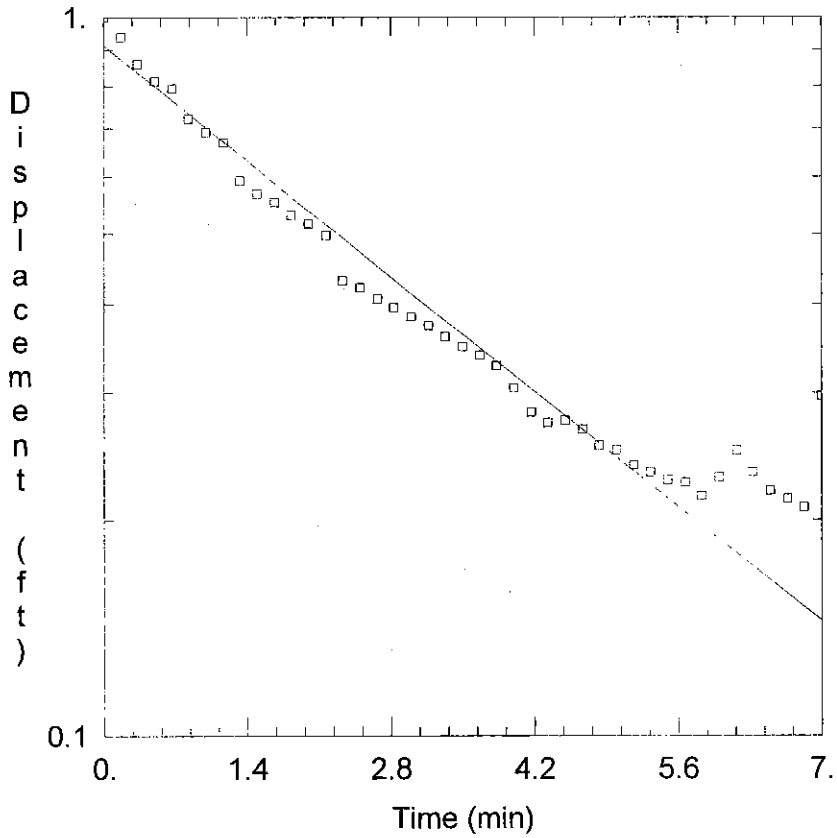
Saturated Thickness: 6.43 ft

Anisotropy Ratio (Kz/Kr): 0.001012

WELL DATA (MW-12)

Initial Displacement: 1. ft
Total Well Penetration Depth: 6.43 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.43 ft
Screen Length: 5. ft
Well Radius: 0.08333 ft



WELL TEST ANALYSIS

Data Set: M:\...\MW-1.aqt
Date: 08/28/08 Time: 16:35:00

PROJECT INFORMATION

Company: LBG
Location: North Salem
Test Well: MW-1
Test Date: 6/24/08

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 5.997 ft/day
y0 = 0.9127 ft

AQUIFER DATA

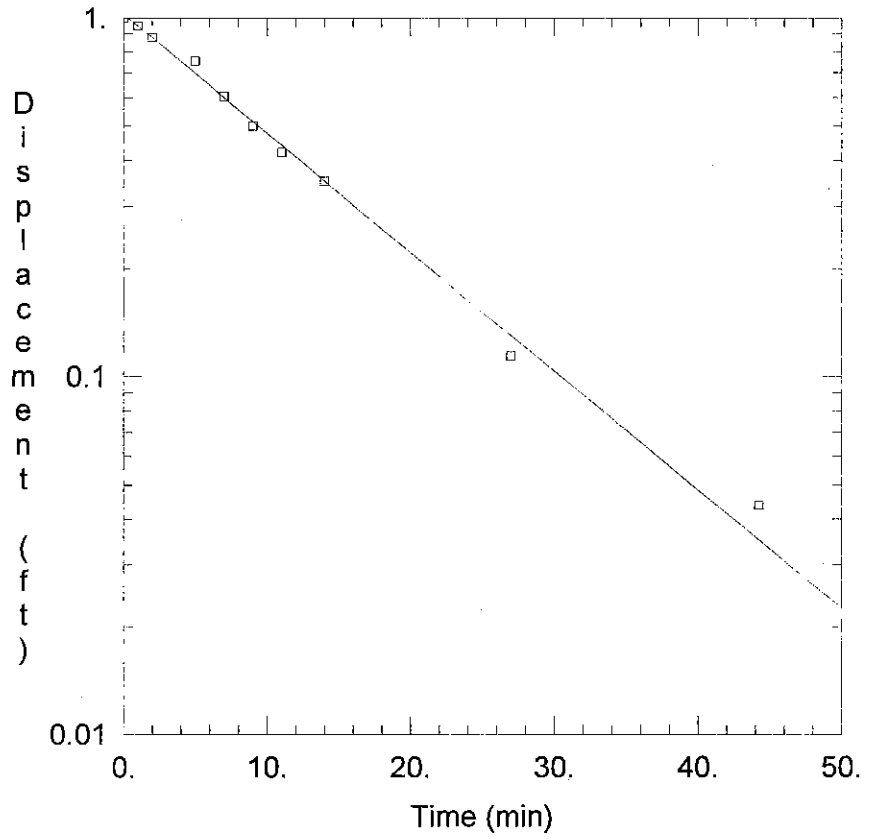
Saturated Thickness: 1. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 1. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 0. ft
Screen Length: 1. ft
Well Radius: 0.08333 ft
Gravel Pack Porosity: 0.3



WELL TEST ANALYSIS

Data Set: M:\...\MW-3.aqt
Date: 08/28/08 Time: 16:36:00

PROJECT INFORMATION

Company: LBG
Location: North Salem
Test Well: MW-3
Test Date: 6/24/08

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.9382 ft/day
y0 = 1.022 ft

AQUIFER DATA

Saturated Thickness: 1.85 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 1.85 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 1.85 ft
Screen Length: 1.85 ft
Well Radius: 0.08333 ft
Gravel Pack Porosity: 0.3

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Shelton, CT

Sample ID: TB-2
Sample Date: 6/16-6/19/08
Interval: 10-12

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
0.56	0.074
1.25	0.149
8.13	0.21
23.91	0.297
42.53	0.42
49.83	0.595
55.11	0.841
59.97	1.19
62.54	1.4
67.76	2
69.91	2.38
75.26	3.35
80.82	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
19	Gravel
81	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

K = **1.28E-02 cm/sec**

$v = 1.14 \text{ mm}^2/\text{s}$

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: MW-4
Sample Date: 6/26/08
Interval: 10-12

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
9.58	0.074
21.14	0.149
31.64	0.21
40.64	0.297
47.99	0.42
53.5	0.595
57.35	0.841
60.16	1.19
61.45	1.4
63.57	2
64.63	2.38
66.71	3.35
69.14	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
31	Gravel
69	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

K = **6.67E-04 cm/sec**

$v = 1.14 \text{ mm}^2/\text{s}$

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: TB-5
Sample Date: 6/16-6/19/2008
Interval: 10-12

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
1.74	0.074
4.22	0.149
36.94	0.21
65.54	0.297
78.25	0.42
84.14	0.595
87.7	0.841
91.12	1.19
91.18	1.4
92.9	2
93.64	2.38
94.9	3.35
96.13	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
4	Gravel
96	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

$v = 1.14 \text{ mm}^2/\text{s}$

K = **1.44E-02 cm/sec**

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: TB-6
Sample Date: 6/16-6/19/08
Interval: 5-7

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
3.86	0.074
8.1	0.149
28.6	0.21
47.98	0.297
65.35	0.42
74.62	0.595
79.16	0.841
81.93	1.19
83.15	1.4
85.27	2
86.2	2.38
87.98	3.35
89.96	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
10	Gravel
90	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

K = **1.14E-02 cm/sec**

$v = 1.14 \text{ mm}^2/\text{s}$
$C = 1$
$\varphi(n) = n^{3.287}$
$n = 0.255 \cdot (1 + 0.83^{\eta})$
$\eta = d_{60}/d_{10}$
$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: MW-7
Sample Date: 6/16-6/19 2008
Interval: 15-17

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
7.97	0.074
18.44	0.149
31.73	0.21
44.87	0.297
57.62	0.42
67.79	0.595
75.36	0.841
81.69	1.19
84.88	1.4
90.01	2
91.94	2.38
95.03	3.35
97	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
3	Gravel
97	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

$v = 1.14 \text{ mm}^2/\text{s}$

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

$K =$ **1.94E-03 cm/sec**

5.49

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: TB-8
Sample Date: 6/16-6/19/08
Interval: 5-7

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
0.61	0.074
1.7	0.149
7.59	0.21
24.03	0.297
39.73	0.42
47.64	0.595
54.13	0.841
60.57	1.19
64.35	1.4
71.7	2
74.99	2.38
81.38	3.35
86	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
14	Gravel
86	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

$v = 1.14 \text{ mm}^2/\text{s}$

$K =$ **1.35E-02 cm/sec**

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: MW-9
Sample Date: 6/16-6/19 2008
Interval: 10-12

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
5.34	0.074
8.3	0.149
31.04	0.21
45.61	0.297
59.55	0.42
69.57	0.595
74.59	0.841
77.13	1.19
78.06	1.4
79.45	2
80.28	2.38
81.94	3.35
84.13	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
16	Gravel
84	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

$v = 1.14 \text{ mm}^2/\text{s}$

$K =$ **1.04E-02 cm/sec**

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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Sample ID: TB-10
Sample Date: 6/16-6/19/08
Interval: 5-7

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
0.89	0.074
1.88	0.149
7.93	0.21
22.7	0.297
40.5	0.42
47.49	0.595
52.71	0.841
57.2	1.19
59.55	1.4
63.62	2
65.55	2.38
68.53	3.35
71.82	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
28	Gravel
72	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{\nu} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

K = **1.09E-02 cm/sec**

$\nu = 1.14 \text{ mm}^2/\text{s}$

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
ν	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.

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7/11/2008

Sample ID: TB-11
Sample Date: 6/16-6/19/08
Interval: 5-7

HYDRAULIC CONDUCTIVITY CALCULATED FROM SIEVE ANALYSIS

SIEVE ANALYSIS

Percent	Diameter
0	0.037
0.73	0.074
1.39	0.149
8.16	0.21
25.61	0.297
51.82	0.42
61.65	0.595
68.21	0.841
73.66	1.19
76.18	1.4
80.29	2
82.08	2.38
85.4	3.35
87.52	4.75
100	4.76

SIZE DISTRIBUTION

Percent	Size
0	+3"
13	Gravel
87	Sand
0	Silt
0	Clay

SLICHTER METHOD

$$K = \frac{g}{v} \cdot C \cdot \varphi(n) \cdot d_e^2 \quad where: \quad g = 9.81 \text{ m/s}^2$$

$v = 1.14 \text{ mm}^2/\text{s}$

$K =$ **2.23E-02 cm/sec**

$C = 1$

$\varphi(n) = n^{3.287}$

$n = 0.255 \cdot (1 + 0.83^{\eta})$

$\eta = d_{60}/d_{10}$

$d_e = d_{10}$

VARIABLES

K	- Hydraulic conductivity	(cm/s)
g	- Acceleration due to gravity	(m/s^2)
v	- Viscosity	(mm^2/s)
C	- Coefficient	–
$\varphi(n)$	- Function of porosity	–
n	- Porosity *	–
η	- Uniformity	–
d_e	- Effective grain diameter	(mm)
d_{10}	- Diameter at 10%	(mm)
d_{60}	- Diameter at 60%	(mm)

* May substitute measured porosity.