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REVISED FINAL METHYL TERTIARY BUTYL ETHER INVESTIGATION REPORT AREA OF CONCERN F SITE 1738 WITH TRANSMITTAL AND RESPONSE TO COMMENTS NAVAL ACTIVITY PUERTO RICO
6/28/2013
BAKER ENVIRONMENTAL, INC.

Baker

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June 28, 2013

U.S. Environmental Protection Agency - Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

Attn: Mr. Phil Flax
Chief, Resource Conservation and Special Projects Section

Re: Contract N62470-10-D-3000
IDIQ for A/E Services for Multi-Media
Environmental Compliance Engineering Support
Delivery Order (DO) JM07
U.S. Naval Activity Puerto Rico (NAPR)
EPA I.D. No. PR2170027203
Revised Final MtBE Investigation Report AOC F – Site 1738

Dear Mr. Flax:

Michael Baker Jr., Inc. (Baker), on behalf of the Navy, is pleased to provide you with one hard copy and one electronic copy provided on CD of the Revised Final MtBE Investigation Report for AOC F – Site 1738. This report is being submitted to address EPA comments dated April 2, 2013 and PREQB comments dated March 15, 2013.

If you have questions regarding this submittal, please contact Mr. David Criswell at (843) 743-2130. Additional distribution has been made as indicated below.

Sincerely,

MICHAEL BAKER JR., INC.

John W. Mentz
Activity Coordinator

Attachments

cc: Ms. Debbie Sanders, BRAC PMO SE (letter only)
Mr. David Criswell, BRAC PMO SE (1 CD)
Mr. Pedro Ruiz, NAPR (Electronic Submission)
Mr. Stacin Martin, NAVFAC Atlantic (1 CD)
Mr. Doug Pocze US EPA Region II (2 hard copies and 2 CDs)
Mr. Jose Font, US EPA Caribbean Office (1 hard copy and 1 CD)
Mr. Felix Lopez, US F&WS (1 hard copy and 1 CD)
Ms. Wilmarie Rivera, PREQB (1 hard copy and 1 CD)
Ms. Gloria Toro, PREQB (1 hard copy and 1 CD)
Ms. Connie Crossley, Booz Allen Hamilton (1 hard copy and 1 CD)

NAVY RESPONSE TO USEPA COMMENTS (DATED APRIL 2, 2013) AND PREQB COMMENTS (DATED MARCH 15, 2013) ON THE REVISED FINAL MtBE INVESTIGATION REPORT AOC F - SITE 1738 DATED JANUARY 4, 2013

The following comments were generated based on review of the *Revised Final MtBE Investigation Report AOC F - Site 1738*, dated January 4, 2013. USEPA and PREQB comments are provided in italics and the Navy response is provided in regular print.

USEPA COMMENTS

USEPA GENERAL COMMENTS

USEPA Comment 1: *The conceptual model presented for the site does not appear to be fully developed. The nature of the saturated zone is not adequately described (see Specific Comments No. 1 and No. 2) and potential preferential migration pathways have not been fully identified based on the hydraulic conductivity zones mapped for the site (see Specific Comment No. 3). The full extent of the MtBE plume may not have been fully assessed as a result of limiting the data used to develop plume depictions and improperly depicting concentration measured in groundwater (see Specific Comments No. 4, No. 5, and No. 6). The conceptual model developed for the site, including the migration of the petroleum release from the former USTs, the migration of the nonaqueous phase liquids (NAPLs) in the subsurface, the partitioning of specific contaminants from the residual source material, and the fate and transport of the plume, does not appear appropriate and/or complete (see Specific Comments No. 7, No. 8, No. 9, No. 10, No. 11, and No. 12). The conceptual model should be expanded to fully address the concerns identified in the specific comments.*

Navy Response: The concerns regarding the conceptual site model (CSM) and Navy responses can be summarized as follows:

Identification of preferential pathways

- A discussion regarding a preferential pathway in the vicinity of 1738MW01 was added to Sections 5.2.2 – Hydrogeology and 6.5.3 - Hydrogeology (Navy response to USEPA Comment 3).

Saturated zone description

- The description of saturated zones versus unsaturated zones was clarified in Sections 5.2.2 and 6.5.3 (Navy responses to USEPA Comments 1 and 2).

MtBE extent figures

- Concerns regarding the lack of MtBE contamination delineation appear to result from two issues; 1) An incorrect color concentration scale was used on Figure 6-8, and, 2) inadequate rationale description for the figures. Section 6.3 and Figures 6-7 and 6-8 have been revised to address these issues (Navy responses to USEPA Comments 4, 5, 6 and 7).

Migration of NAPL

- The text in Section 6.5.4 will be revised to provide additional information on NAPL migration, including a comment on the specific gravity. The cross sections (Figures 5-2 through 5-6) will also be revised to show the groundwater table and potentiometric surface (Navy responses to USEPA Comment 8).

Partitioning of contaminants from source material

- Changes in wording in Section 6.5.4 and depiction of the water table on cross sections (Figures 5-2 through 5-6) should aid in clarification (Navy responses to USEPA Comments 8 and 9).

Fate and transport of the plume

- It is acknowledged that biodegradation is an important natural attenuation factor. The text in Section 6.5.4 will be revised to de-emphasize sorption. Regarding MtBE plume stability, the position that the MtBE plume is not migrating was taken for the sake of the conceptual site model. There is low confidence in either conclusion; the plume is migrating, or the plume is not migrating. Continued monitoring is required, and the conclusion will be changed if the data suggests that the plume is migrating (Navy responses to USEPA Comments 10, 11 and 12).

Detailed and more complete responses can be found after each comment.

USEPA SPECIFIC COMMENTS

Section 5.2, Hydrogeology, pages 5-2 through 5-4

USEPA Comment 1: *The description of site hydrogeology indicates that "during drilling groundwater was encountered in various lithologies described above, and in relatively thin, discontinuous zones." The text further indicates "the degree of saturation appears to vary, from a trace amount of moisture on particle surfaces to flowing water, and that these zones were observed to be separated by relatively dry matrix." This language implies that a series of perched water tables were encountered during drilling. However, the more likely explanation is that a series of strata were penetrated during drilling that exhibited differing degrees of permeability, with low permeability strata yielding little water and appearing dry, while higher permeability material appeared wet or yield flowing water. Under such condition, the entire soil/rock matrix remains saturated but only the more permeable strata appear wet or yield flowing groundwater. Please reexamine the above statements and modify as appropriate the description of saturated subsurface material encounter below the local water table. The reference to water yielding zones throughout the text should be similarly modified.*

Navy Response: It is agreed that the observation of relatively dry zones and relatively wet zones is related to permeability and yield, not saturation. However, groundwater occurrence was observed within one or two stratum (Saprolite or Residuum), rather than a series of multiple strata with differing degrees of permeability. There are examples where the grain size/permeability varied within the Saprolite and the occurrence of water was coincident with these more permeable zones (e.g., 1738MW13 at 22- to 28-feet bgs). However, this is the exception since the residuum and saprolite are fairly uniform in grain size, but exhibited marked differences in yields (e.g., 1738MW07B below 20-feet bgs). The last sentence of the first paragraph of Section 5.2.2 will be revised to read, “During drilling, groundwater was encountered in the saprolite (upgradient area) and in the residuum and saprolite (downgradient area) in relatively thin, discontinuous zones.”

A new paragraph also will be added to Section 5.2.2, as follows: “Groundwater flow in the fine-grained residuum and saprolite appears to be behaving like non-porous media (e.g., bedrock). The degree of groundwater yield observed during drilling varied greatly; from a trace amount of moisture on particle surfaces, to flowing water. In a bedrock aquifer, the matrix is saturated below the groundwater table, but groundwater yield is predominantly from fractures. Likewise, the residuum and saprolite are saturated below the first encountered groundwater; however, there are a few thin water producing zones (possibly associated with weathered zones and fractures) separated by a relatively damp matrix."

USEPA Comment 2: *The text (page 5-3) states "at this site, confined conditions are likely controlled by the degree of fracture interconnectivity and the connection with the atmosphere." It is recommended that this statement be reworded to state that "degree of facture interconnectivity and the connection with the water table (unconfined aquifer) and the overlying unsaturated zone."*

Navy Response: That referenced phrase will be removed and replaced with a new paragraph that will read as follows: "The groundwater appears to be confined. Gauged water levels in all the newly installed monitoring wells (shallow and deep) are higher than when groundwater was first encountered during drilling for these wells. A similar trend is apparent for the existing monitoring wells. Groundwater within the weathered and fractured zones appears to be under a pressure greater than atmospheric pressure."

USEPA Comment 3: *The distributions of hydraulic conductivity in the shallow and deep zone are modeled in Figures 5-11 and 5-12. Figure 5-11 indicates that an area of significantly higher hydraulic conductivity exists in the vicinity of monitoring well 1738MW01 and 1738MW01B. Although not well defined, this area potential extends to the north and/or northeast from 1738MW01. The hydraulic conductivity in the deeper zone in this area is not modeled in Figure 5-12 and does not appear to have been determined. However, this area of higher permeability should be acknowledged in the text and identified as a potential preferential migration pathway for MtBE in groundwater from the source area.*

Navy Response: The hydraulic conductivity distribution pattern suggests that there is a preferential pathway between wells 1738MW13 and 1738MW01and potentially northward. Whether or not the higher hydraulic conductivity values are connected and form a corridor is not clear from the data, but it is agreed that this potential pathway exists and will be identified it in the text in Sections 5.2.2 and 6.5.3.

This area of higher hydraulic conductivity may have influenced the shape of the MtBE plume. The plume shown in Figure 6-8 is broad in the vicinity of wells 1738MW10 and 173MW16, and is across the predominant hydraulic gradient. This eastward spread of the MtBE plume could be related to this potential preferential pathway.

Section 6.3, Groundwater, page 6-5

USEPA Comment 4: *The distributions of benzene and MtBE are mapped on Figures 6-7 and 6-8, respectively. However, the date of analytical data used to construct these maps is not identified in the text or on the figures. It appears that the data displayed is from the 2012 sampling program. However, the figures do not appear to display all of the 2012 data. For example, the 5,600 ug/l of MtBE observed in the sample taken from 1738MW01B on August 18, 2012 is not displayed on Figure 6-8. The text indicates that the data displayed has been limited to those locations where three or more samples exceed the PREQB Target Levels. This constraint would appear to limit the use of the 2012 analytical data in depicting the benzene and MtBE plumes, since three samples are generally not available for all of the wells installed in 2012. The depiction of the plume based on such limited data potentially distorts the configuration of the plume revealed by the recent 2012 sampling data. Please provide figures that depict the horizontal distribution of benzene and MtBE based on all 2012 data.*

Navy Response: The distributions of contaminants shown on Figures 6-7 and 6-8 were mapped using the 2012 analytical data. The intent of these figures was to show the horizontal extent of contamination in groundwater. Therefore, these plan view figures show data from wells screened at similar elevations. Wells 1738MW02R and 1738MW03 appear to represent groundwater at the source zone. So, the planview map was created using the elevation represented by these two wells and depicts the horizontal migration from the source zone. In addition, the elevation selection of these wells is similar to the 2010 well network and the MtBE plume representation. This zone will become the intermediate aquifer zone. Additional planview maps will be added depicting two other screened intervals. This will include a shallow zone (generally including the "A" series wells) and a deep zone (generally including the "B" series wells and 1738MW05L). Section 6.3 will be revised to include this information. It should be noted that Figure 6-11 depicts the vertical distribution of MtBE along the groundwater flow path through the Site.

The discussion in Section 6.3 regarding limiting contaminant mapping to three or more samples exceed the PREQB Target Levels is true; however, it does not reflect what was evaluated versus what was presented. The third paragraph in Section 6.3 will be revised to read, "Depictions include benzene and MtBE. Toluene, ethylbenzene, xylenes, TPH GRO, and TPH DRO were mapped for evaluation, but not presented. The concentrations are mostly below PREQB Target Levels, and the distributions are within the footprint of benzene plume footprint."

USEPA Comment 5: *The concentration of MtBE in Figure 6-8 has been portrayed using differing colors to indicate differing ranges of MtBE concentrations. However, based on the legend provided in the figure, the colors do not always match the numerical values placed next to the individual well locations. For example, the MtBE concentration shown at 1738MW15 is 160 ug/l, while the color band is green which represents a range between 500 and 1000 ug/l. Similarly, the MtBE concentration shown at 1738MW11 is 6,900 ug/l, while the color band is yellow, which represents a range between 1000 and 5000 ug/l. Please correct Figure 6-8 so that the color banding corresponds to the concentration measured in the monitoring wells. Similarly, review other figures included in the report to ensure that proper color banding has been used.*

Navy Response: The wrong color scale was used on Figures 6-7 and 6-8. These figures have been revised with the correct color scale.

USEPA Comment 6: *The estimated horizontal extent of MtBE in groundwater based on the September 2010 data is provided in Figure 6-9 for the purpose of the comparison with the depiction of the MtBE plume depicted in Figure 6-8. Comparison of the MtBE plumes depicted in these two figures indicates that the plumes are significantly different in the two figures. The 1,000 ug/l plume in Figure 6-9 extends significantly more to the northeast than depicted in Figure 6-8. This difference appears to be based on a significantly reduced MtBE concentration observed in 1738MW01 than was observed in 2012, as well as the failure to depict the concentration of MtBE observed in 1738MW01B during the 2012 sampling round. To ensure that the full extent and nature of the MtBE plume is displayed, a figure depicting the MtBE plume using the maximum concentration of MTBE observed overtime in each monitoring well should be presented.*

Navy Response: Figures depicting three aquifer zones will be created; a shallow zone ("A" series wells), an intermediate zone (wells without a letter suffix), and a deep zone ("B" series wells and 1738MW05L). Figures 6-8B (refer to Navy Response to USEPA Comment 4) and Figure 6-9 represent the distribution of MtBE in the intermediate zone from 2010 and 2012. The plume renderings from 2010 and 2012 are comparable in that they both represent the intermediate aquifer zone; however, the 2012 data set has more data points. This alters the depictions. More than the decrease of MtBE at well 1738MW01, the addition of well 1738MW02R significantly changes the rendering of the MtBE plume. Based on the 2012 data, it is apparent that MtBE is migrating more northward (along a path represented by wells 1738MW03, 1738MW02R, and 1738MW05R). The MtBE detection at well 1738MW01B is depicted on Figure 6-8C along with other deeper aquifer wells.

For a clearer comparison of the 2010 and 2012 data distributions, Figure 6-9 will be revised to include a superimposed 2012 MtBE color-scale plume over the 2010 MtBE line plume using the same contour intervals.

Section 6.5.4, Groundwater, pages 6-11 through 6-13

***USEPA Comment 7**: The text in this section repeatedly indicates that gasoline has mostly dissociated into individual components. It is unclear what is meant by the term dissociate in this context. As indicated by the distribution of TPH GRO and BTEX depicted in Figures 6-1 and 6-2, the foot print of the TPH GRO and BTEX are very similar and do not appear to have become distinctively different. It is likely that BTEX and MtBE slowly partition into groundwater from the residual gasoline in this area. While the BTEX appears to be readily degraded, MtBE continues to migrate with only limited degradation. If this is the process that is implied by the term "dissociate," it is recommended that the text be modified to more clearly reflect this process. Otherwise, please explain more clearly what is meant by disassociate in this context.*

Navy Response: BTEX and MtBE have significantly partitioned from the gasoline into soil and groundwater, leaving low levels of "weathered" gasoline behind. The data indicate that the distribution of TPH GRO and BTEX appear to be very similar; however, the TPH GRO concentrations in soil and groundwater are low compared with constituents such as BTEX and MtBE. This idea will be explained in Section 6.5.4 and the term "partition" will be used rather than "disassociate".

***USEPA Comment 8**: In the discussion of migration pathways, the AOC F Report indicates that the migration of gasoline after its release from the USTs follows the principles of NAPL migration. However, the discussion of NAPL does not indicate whether the releases were likely to be light nonaqueous phase or dense nonaqueous phase liquid (LNAPL of DNAPL). It is assumed that the releases were LNAPL and followed the pathways typical of such releases. In such cases, the release likely migrated vertically to the water table where it tends to float and spread on top of the water table. If the release were of sufficient volume, the LNAPL may have mounded on the water table and depressed the water table before the mound was able to dissipate laterally. As the LNAPL lens dissipates, residual LNAPL is left behind and provides a continuing source of contaminants for release to groundwater. This is why LNAPL source areas are generally found at and just below the water table surface. However, at Site 1738 residual LNAPL has been detected at depths significantly below the water table. This potentially suggests very large releases of gasoline and/or some other mechanism for the migration of LNAPL below the water table. No explanation for the depth at which residual LNAPL has been found has been offered in the discussion. The text should be revised to more clearly explain the migration of LNAPL from the release area into the subsurface and to provide an explanation for the relative depth at which LNAPL residual continues to be found.*

Navy Response: The specific gravity of gasoline ranges from approximately 0.7 kg/L to nearly 0.8 kg/L depending on the literature source, so the NAPL at Site 1738 is light. LNAPL will migrate downward and laterally through the vadose zone by gravity and fluid pressure, often following a tortuous path controlled by the pore space pressures. This vertical migration will end when pore pressures meet or exceed NAPL fluid pressure, which is often near the water table. The "pancake" model of LNAPL floating as a homogeneous mass on the water table is not accurate. LNAPL tends to be heterogeneously distributed in the subsurface. The Interstate

Technology and Regulatory Counsel (ITRC) defines the distribution as the vertical equilibrium model (ITRC, 2012). Free-phase and residual-phase LNAPL can be present below the water table for a number of reasons. As mentioned in USEPA Comment 8, LNAPL can temporarily depress the water table. The water table will recover and can trap NAPL mass below the water table. Free-phase and residual-phase LNAPL can also be present below the water table due to a low water table at the time of the release. When the water table recovers, NAPL mass can be trapped in confined aquifers or fractures, or leave a residual-phase smear.

Note that the residual-phase NAPL is mainly above the groundwater table. The cross sections show the potentiometric water table based on gauged static water levels. Due to confining conditions, the physical occurrence of groundwater is actually deeper. For example, at well 1738MW02R the gauged static water level was 104.30 feet above MSL on 6/29/2012; however, water was first observed at about 91 feet above MSL during drilling on June 16, 2012. The residual NAPL mass is located at about 93 feet above MSL to 107 feet above MSL, which is above the first observed occurrence of water at this location.

The text in Section 6.5.4 will be revised to specify that the product release was a light NAPL and more clearly explain LNAPL migration. The cross sections (Figure 5-2 through 5-6) will be revised to show first encountered water and gauged water levels.

References cited in Navy Response to USEPA Comment 8:

Interstate Technology and Regulatory Counsel, April 2012. Light, Nonaqueous-Phase Liquids: Science, Management, and Technology, 2-Day Classroom Training manual.

USEPA Comment 9: *The discussion on the partitioning of NAPL constituents into the water phase presented in the third paragraph on page 6-12 implies that the majority of the partitioning of LNAPL constituents into subsurface water occurs in the vadose zone. While it is likely that some LNAPL constituents partitioned into the water phase in the vadose zone shortly after the release or from LNAPL currently trapped at the water table, the recently obtained soil data appear to indicate that most of the contaminant partitioning into groundwater is derived from LNAPL residual located well below the water table. The discussion of the contaminant partitioning into groundwater should be expanded to include this more likely scenario.*

Navy Response: Figures 5-2 through 5-6 will be revised to include groundwater elevation gauging of the monitoring wells and first encountered groundwater during drilling. Since groundwater appears to be confined, the groundwater elevations based on well measurements are higher than the physical occurrence. These revised figures will show that the NAPL mass is above the physical occurrence of groundwater. Thus, a majority of the partitioning is in the vadose zone.

USEPA Comment 10: *The text (last two paragraphs on page 6-12) indicates that the Navy believes that groundwater contamination is not migrating at Site 1738. While acknowledging that MtBE concentrations are increasing downgradient of the source area, the Navy references the stability of the contaminant concentrations in the source area to support this contention. However, stable concentrations in the source area only indicate that the partitioning of contaminants from the residual source material into groundwater has reached a steady state. The source continues to feed the plume, which will continue to grow until the natural attenuation processes are sufficient to stop the migration of the leading edge of the plume into downgradient areas. At this point, the downgradient data trends appear to indicate the contrary, and it does not appear possible to conclude that the MtBE plume is not continuing to expand. The conclusions should be modified accordingly.*

Navy Response: The Navy agrees that the MtBE plume appears to be expanding; however, that is based on only two observations. Additional monitoring is necessary to assess concentration trends with any confidence. This hypothesis will be tested with continued groundwater monitoring and will be revised as necessary. (See Navy Response to PREQB Comment 19.)

USEPA Comment 11: *The third bullet on page 6-13 indicates that "MtBE preferentially partitions to water compared with BTEX. Thus, MtBE may be present in groundwater at higher concentrations." While the basis for preferential partitioning of MtBE into groundwater has not been provided, the higher concentrations of MtBE relative to BTEX in the plume, particularly in the downgradient portions of the plume is likely due to greater potential for BTEX to degrade, even in anaerobic environment, than MtBE. The high concentrations of MtBE observed in the subsurface are almost certainly due to the persistence in the environment of MtBE relative to BTEX. This bullet should be expanded to more fully account for the greater concentrations of MtBE observed in the plume.*

Navy Response: "MtBE preferentially partitions to water compared with BTEX" does not refer to the rate of dissolution from gasoline, but rather the distribution of the MtBE and BTEX in the environment. This statement is based on properties of MtBE versus BTEX constituents (e.g., solubility, octanol-water partition coefficient, and distribution coefficient). It is acknowledged that degradation of BTEX constituents is a factor, and will be included in the bullet item and conceptual site model summary.

USEPA Comment 12: *The text (last paragraph on page 6-13) appears to be attributing the large extent of the MtBE plume relative to the BTEX plume to the greater retardation (adsorption) of BTEX. However, BTEX is readily degraded in the environment, even in anaerobic environments, while MtBE is not easily degraded and is generally persistent in the environment. This is evidenced by the fact that it is very unusual to observe extended plumes of BTEX (particularly benzene) because these compounds are so readily degraded. The text should be revised to provide a more complete explanation for the relative size of the BTEX and MtBE plumes observed in groundwater at Site 1738.*

Navy Response: The introductory sentences of the referenced paragraph will be revised to read, "Natural attenuation processes affect the fate and transport of contaminants such as BTEX and MtBE. These natural attenuation processes conventionally include advection, mechanical dispersion, diffusion, sorption, biodegradation, infiltration, and volatilization." Two examples of natural attenuation processes (sorption and biodegradation) will be used to explain why the MtBE plume appears larger in groundwater compared with benzene.

Section 7.1, Conclusions, page 7-1

USEPA Comment 13*: While the conclusions acknowledge that MtBE concentrations in groundwater are not well determined vertically as compared to downgradient portions of the plume, the failure to characterize groundwater quality downgradient (to the northeast) of monitoring wells 1738MW01 and 1738MW01B has not been acknowledged (see Specific Comment No. 3). The conclusions should be revised to include this data gap.*

Navy Response: The potential preferential pathway has been addressed in the Navy Response to USEPA Comment 3, and will be incorporated into the text (including the CSM). The concern regarding the exclusion of elevated MtBE data from well 1738MW01B in terms of a data gap has been addressed in Navy Response to USEPA Comment 4.

Section 7.2, Conceptual Site Model Conclusions, pages 7-1 through 7-3

***USEPA Comment 14**: The conclusions regarding the conceptual site model should be revised to fully address the numerous concerns regarding the conceptual model identified in the previous comments (see General Comment No. 1).*

Navy Response: Refer to the Navy Response to USEPA Comment 1.

Section 7.3, Recommendations, pages 7-3 through 7-4

***USEPA Comment 15**: The installation of additional deep wells in or near the source area has been recommended. Depths of 60 and 100 feet have been recommended. Since the deepest monitoring well in this area is only screened at a depth of 40 feet, the 60 and 100 foot proposed depths appear excessive and do not allow for the careful delineation of the vertical distribution of contaminant beneath the area of the release. A more discrete sampling approach should be adopted for the vertical delineation of the groundwater plume beneath and immediately downgradient of the apparent area of residual LNAPL.*

Navy Response: Various depth intervals were considered. There are no commercially available field analytical kits for MtBE. Thus, real-time decisions regarding well depths are not possible at this time. Quick-turn analysis is not a good option because of the logistical challenges in the field resulting from 1 to 2 day delay in obtaining results. Given large migration potential of MtBE, conservative well separation depths were used.

- The proposed wells near 1738MW01 and 1738MW01B are to be approximately 40 feet deeper than 1738MW01B. Well 1738MW01B is approximately 30 feet deeper than 1738MW01, and exhibits a higher MtBE concentration. So, a similar separation plus a 10-foot cushion was considered (40 feet; hence the proposed 100-foot depth).

- For the nested wells placed near wells 1738MW02R and 1738MW03, the 60 and 100 foot proposed depths would have similar separation depths as above, and also be at similar depths.

- The proposed deeper well at 1738MW05L is approximately 100 feet deep (approximately 60 feet deeper). This depth could be adjusted. Using the concentration gradient between 1738MW05R and 1738MW05L, linear extrapolation can be used to estimate a depth where a concentration at the USEPA RSL would be expected. That depth is approximately 16 feet. Adding a 10-foot cushion, the target depth of the proposed deeper well would be approximately 65 feet. The recommendations will be revised to indicate of approximately 65 feet for the deep monitoring well to be installed near 1738MW05L

***USEPA Comment 16**: Long-term groundwater monitoring has been recommended for Site 1738. While the long-term monitoring of MW1738MW07, 1738MW08, and 1738MW09 has been recommended, the remaining wells in these clusters, which were only recently installed in 2012, have not been identified for long-term monitoring. All of the monitoring wells included in the downgradient monitoring locations should be included in the long-term monitoring program.*

Navy Response: PREQB Comment 29 identified additional wells to be included in the long-term monitoring program. The list was reviewed, and will include the following:

- 1738MW02R

- 1738MW03
- 1738MW05R
- 1738MW05L
- 1738MW06
- 1738MW07 and 1738MW07A
- 1738MW08 and 1738MW08B
- 1738MW09 and 1738MW09B
- 1738MW16
- Any additionally installed deep wells

PREQB COMMENTS

PREQB GENERAL COMMENTS

PREQB Comment 1: *Slug Tests. The following concerns related to slug tests have been identified that could potentially impact the estimates of hydraulic conductivity based upon a review of AQTESOLV™ data plots provided in Appendix A:*

- *There are several instances in which the well penetration depth is greater than the saturated thickness and appears to correspond to the depth below ground surface instead of the depth that the well extends into the aquifer, which is the correct reference. See plots for MW01, MW02, and MW-12 for tests completed in 20120 and MW01B, MW02R, MW07A/B, MW08A/B, MW09A/B, MW13, and MW15 for tests completed in 2012.*

Navy Response: The penetration depths will be corrected to correspond to the depth that the well extends into the aquifer. The slug test results output (Appendix A) and Tables 5-2 and 6-7 will also be revised.

- *For several wells, the static water column is less than the screen length (e.g., wells MW03, MW05, MW12, and MWI5. In cases where the static water column is less than the actual length of the screen, the screen length (Le) and static water column depth or depth that the well penetrates the aquifer (Lw) need to be identical.*

Navy Response: In instances where the static water column is less than the screen length, the static water column will be set to equal to the screen length. The slug test results output (Appendix A) and Tables 5-2 and 6-7 will also be revised.

- *Based upon static water level elevations at the time of slug testing and well construction data, there are certain instances where falling head tests appear to have been performed in wells with partially submerged screens (e.g., MW03 during September 2010 and MW07A and MW15 during August 2012). Falling head tests performed on wells with partially submerged screens will not provide reliable measurements of hydraulic conductivity.*

Navy Response: In instances where the well screens were partially submerged, the falling head tests will not be evaluated. The slug test results output (Appendix A) and Tables 5-2 and 6-7 will also be revised.

- *On the falling head test for monitoring well MW01 (September 2012 - Hvorslev Method), a double straight-line effect is apparent in the data. Instead of analyzing the second slope* *of the line reflecting recharge from the aquifer, the tail end of the data was evaluated to estimate hydraulic conductivity which has in all likelihood resulted in an underestimate of hydraulic conductivity for this test. Please reanalyze the data for that portion of the data between the initial slope at the beginning of the test and the tail end of the curve. It is expected that the results will be more closely aligned with the results for the other two tests completed for this well during 2012.*

Navy Response: The falling head test response data from well MW01 showed underdamped conditions (undulating curve). Running the solution for that condition, a hydraulic conductivity of approximately 19 feet/day was estimated. This is compared to approximately 8 feet/day for the rising head test (which did not show underdamped conditions). Running the solution as indicated in the comment above, a hydraulic conductivity of approximately 8 feet/day was estimated. This correlates well with the rising head test. Therefore, this solution will be used. The slug test results output (Appendix A) and Tables 5-2 and 6-7 will also be revised.

- *Two different saturated thicknesses were assigned to the tests performed during September 2010 at monitoring well MW01: 18 feet was assigned for falling head tests and 30 feet was assigned for the rising head test. Please provide the rationale for the differences in saturated thickness.*

Navy Response: The use of 30 feet for the rising head test was in error. The saturation thickness of 18 feet will be used for the rising head test and rerun. The slug test results output (Appendix A) and Tables 5-2 and 6-7 will be revised.

- *Two different anisotropy ratios were used in the analysis of data for MW01. An anisotropy ratio of 1 was used for the analyses using the Hvorslev Method and an anisotropy ratio of 0.1905 was used for the Butler-Zhan Solution. Please discuss how the differences in anisotropy impact the estimates of hydraulic conductivity by the two methods.*

Navy Response: The Butler-Zhan Solution and results will be deleted since the falling head test using the Hvorslev Method correlated better with the rising head test results. An anisotropy ratio of 1.0 is used for all tests.

- *Water columns thicknesses depicted on several of the plots for tests performed during 2010 do not appear to be comparable with static water levels provided in the field notes and well construction data presented in Table 4.4. As one example, the total depth of monitoring well MW05 is 13.43 feet. The static water level at the time of the slug test was 4.55 feet yielding a static water column of 8.9 feet. The static water column and saturated thickness reported on the slug test plots for this well was only 3 feet which likely impacts the estimate of hydraulic conductivity.*

Navy Response: Static water levels were checked, and the data from the same source will be used (the data from the 9/22/2010 synoptic gauging event). The slug test results output (Appendix A) and Tables 5-2 and 6-7 will be revised. As a note, the differing water levels have little impact on the hydraulic conductivity estimate. Using 1738MW05 as an example, from the slug test date, the static water column of 8.9 feet yields a hydraulic conductivity estimate of 0.5 feet/day. From the 9/22/2010 synoptic gauging data, the static water column of 8.7 feet yields the same average hydraulic conductivity estimate of about 0.5 feet/day. Using a static water column of 100 feet, also yields the same average hydraulic conductivity estimate of about 0.5 feet/day.

Based upon the discrepancies identified above, please re-evaluate the slug test data for 2010 and 2012 and recalculate the estimates of hydraulic conductivity. The results of the re-evaluation may impact discussions of hydraulic conductivity and contaminant fate and transport in other parts of the report.

Navy Response: The discussions of hydraulic conductivity and contaminant fate and transport will be updated based on the re-evaluation of the slug test data.

PREQB Comment 2: *An important benchmark for evaluating changes in a plume over time and effectiveness of a remedy are the mass of contaminant in a source zone and mass flux. The data to evaluate these parameters and establish baseline conditions exists with the current data set. Please perform the calculations to establish baseline conditions for these parameters and include as part of the revised MtBE Investigation Report.*

Navy Response: Baseline mass discharge will be calculated using the Transects based on Isocontours as presented in Use and Measurement of Mass Flux and Mass Discharge (ITRC, 2010). Section 6.5.4 will be revised accordingly.

References cited in Navy Response to PREQB Comment 2:

Interstate Technology and Regulatory Counsel, August 2010. Use and Measurement of Mass Flux and Mass Discharge, ITRC Integrated DNAPL Site Strategy Team, Washington, DC.

PREQB PAGE-SPECIFIC COMMENTS

PREQB Comment 1: *Page 2-1, Section 2.2, 3rd Sentence: This sentence states "These USTs were reportedly removed in 1996. " Please con firm that the USTs were removed and if so, please remove the word "reportedly".*

Navy Response to PREQB Comment 1: According to the Blasland, Bouck & Lee, Inc. (BBL) Site Characterization report in 1999, the Navy removed the USTs in 1996. The word "reportedly" will be removed.

PREQB Comment 2*: Page 2-2, Section 2.3, Paragraph 1, Last Sentence: According to this sentence, the SCR stated that the effectiveness of remedial options such as soil vapor extraction and bioremediation would be limited by low permeability soil encountered at the Site. Please note that when re-evaluating corrective measures as proposed in the document, the ability to deliver amendments in low permeability formations to enhance bioremediation or chemical oxidation has been improved through use of tools available from Wavefront Technology (e.g., Prima Wave, sidewinder).*

Navy Response to PREQB Comment 2: The Navy recognizes that the BBL report was written in 1999 and technology has changed in the past 14 years. Corrective measures for the Site will initially be screened using the ITRC guidance entitled, "Evaluating LNAPL Remedial Technologies for Achieving Project Goals" (ITRC, 2009). This guidance screens site and contaminant characteristics, and evaluates nine factors of 17 different and proven general remedial technologies to select an appropriate corrective measure.

References cited in Navy Response to PREQB Comment 2:

Interstate Technology and Regulatory Counsel, December 2009. Evaluating LNAPL Remedial Technologies for Achieving Project Goals, ITRC LNAPL Team, Washington, DC.

PREQB Comment 3*: Page 2-2, Section 2.3, Paragraph 2, 4th Sentence: According to this sentence, "In Year 6 (May 2008) of the program, MtBE was added to the analytical suite due to the concern of gasoline additives in the environment." Please note that during the years that Site 1738 was operated as a gasoline station (i.e., since the late 1950s), certain regulated compounds have been used as gasoline additives (e.g., 1 ,2-dichloroethene and ethylene dibromide were used as anti-knock additives for leaded gasoline prior to the 1980s). Given that the gasoline station was operated when these additives were used and since site data demonstrates that gasoline was released at the site, at least one round of groundwater samples from site monitoring wells needs to be analyzed for these two compounds as well as lead to assess whether these constituents are also present in groundwater. In addition while specific remedial technologies have not yet been specified for evaluation at the site, if natural attenuation is a technology that Baker intends to evaluate for groundwater outside the NAPL source zone, it could be helpful for at least one future monitoring event to include analysis for tertiary butyl alcohol, a breakdown product of MtBE, and other electron acceptors/hydrocarbon degradation products e.g., methane and carbon dioxide).*

Navy Response to PREQB Comment 3: Under the MNA program, groundwater samples were analyzed for the Appendix IX VOC list that included 1,2-dichloroethene and ethylene dibromide (aka 1,2-dibromoethane). Neither compound was detected in groundwater. Lead was analyzed for, but not detected or detected only at trace levels in groundwater samples collected during the Site Characterization; lead analysis was not included in the MNA program. These three compounds are not contaminants of concern; however, 1,2-dichloroethene and ethylene dibromide will be continued to be monitored for under the MNA program since they are included in the Appendix IX VOC list. Lead will be sampled for and analyzed in one event to verify that is not a contaminant of concern at Site 1738. The Navy concurs that at least one future groundwater sampling event should include tertiary butyl alcohol, lead, and natural attenuation parameters (including carbon dioxide, methane, nitrate, ferrous iron, and sulfate). The recommendations in Section 7.3 will be revised to include these additional parameters.

PREQB Comment 4*: Page 2-3, Section 2.3, Last Paragraph, Last Sentence: According to this sentence, "This anaerobic condition tends to limit natural microbial bacteria from naturally degrading MtBE (Youngster, 2009)." Please note that significant biodegradation of MtBE has been documented under anaerobic conditions by numerous authors (Wilson, et. al., 2000; Hansen et. al., 2003).*

Navy Response to PREQB Comment 4: The Navy concurs. The last two sentences in the last paragraph of Section 2.3 will be deleted.

PREQB Comment 5*: Page 4-1, Section 4.0:*

a. Item#1: This item states that five soil borings were installed in the vicinity of the former pump island during the 2010 investigation. However, the last bullet on page 1-1 indicates that samples were collected from seven soil borings during the investigation, and Figure 4-1 shows six soil borings installed during the September 2010 investigation. Please clarify the text and figure as appropriate. Note that this comment also impacts the third sentence of Section 4.1 .2.

Navy Response to PREQB Comment 5a: Five soil borings were installed in the vicinity of the former pump island in 2010. The last bullet item on Page 1-1 and Figure 4-1 will be changed to show five soil borings.

b. *Next to Last Bullet at Bottom of Page: According to this bullet, seven borings (identified with SB in the sample ID) were installed in the upper portion of the Site during the June/August 2012 investigation. However, Figure 4-1 shows only six soil borings as being installed during 2012. Please add a note to Figure 4-1 to indicate that an additional boring was drilled at SB l 04 during 2012.*

Navy Response to PREQB Comment 5b: Boring location 1738SB104A is incorrectly identified as a 2010 location (blue font). This will be changed to identify it as a 2012 location (pink font).

***PREQB Comment 6**: Page 4-4, Section 4.1.3:*

a. *According to the field notes, the shallow subsurface soil sample from 1738SB108 on 8/15/12 could not be collected for BTEX/MtBE and GRO with the Terracore due to the gravel nature of the matrix. Please include this Work Plan deviation in this section of the report.*

Navy Response to PREQB Comment 6a: This Work Plan deviation will be included in Section 4.1.3.

b. *Please include an explanation in this sect ion as to why samples 1 738SB108-13, 1738SB109-10, 1738SB I 09-12, 1738SB110-08, 1738SB 110-10, and 1738SB110-12 were not submitted for TPH-DRO analysis, as per the Work Plan.*

Navy Response to PREQB Comment 6b: Borings 1738SB108, 1738SB109, and 1738SB110 were placed primarily to delineate observed residual-phase NAPL. The evidence collected up to that point suggested that the residual-phase NAPL was related to gasoline rather than diesel fuel. Thus, the Site Manager decided to focus the analysis on TPH GRO and BTEX/MtBE. That decision proved reasonable since detections of TPH DRO are generally low, even in the residual-phase NAPL area. Section 4.1.3 will be revised accordingly.

***PREQB Comment 7**: Page 4-7, Section 4.2.1, 2nd Bullet at the Top of Page. This bullet and a similar bullet on page 4-8 indicate that stabilization criterion for oxidation reduction potential is I 0 percent; however, low flow field forms indicate that the stabilization criterion for oxidation reduction potential is ± 10 millivolts. As appropriate, please revise the text.*

Navy Response to PREQB Comment 7: The text will be revised to reflect a stabilization criterion of +/- 10 millivolts.

***PREQB Comment 8:** Page 4-7, Section 4.2.2, First Sentence:*

a. *According to this sentence, fifteen monitoring wells were installed at seven locations; however, 10 locations are listed. One of the locations is repeated (1738MW15- the first reference should be 1738MWI4) and MW15 through MW16 are preceded by 1739 instead of 1738. Please revise accordingly.*

Navy Response to PREQB Comment 8a: The first sentence in Section 4.2.2 will be revised to read, "Fifteen monitoring wells were installed at ten locations (1738MW01, 1738MW02R,

1738MW07, 1738MW08, 1738MW09, 1738MW13, 1738MW14, 1738MW15, 1738MW16, and 1738MW17)…"

b. *According to the field notes, the groundwater sample from 1738MW01A in August 2012 went dry. Please include this Work Plan deviation in this section of the report.*

Navy Response to PREQB Comment 8b: Section 4.2.2 will be revised to discuss the referenced Work Plan deviation.

PREQB Comment 9: *Page 4-10, Section 4.4, Paragraph 1: This paragraph states that when analyzing the slug test data, the saturated thickness was set equal to the screen length for each well. However, an examination of the slug test plots indicates that in all cases, the screen length and saturated thicknesses arc not the same. Please clarify and revise the text/analysis as appropriate.*

Navy Response to PREQB Comment 9: The saturated thickness was set to equal the static water column height. The 5th paragraph in Section 4.4 will be revised. Also see Navy Response to PREQB General Comment 1 for specific slug test analysis corrections.

PREQB Comment 10: *Page 4-10, Section 4.4, Last Paragraph: This paragraph indicates that the Bouwer and Rice confined solution was used at several wells to determine if the K results were significantly different from those calculated using the Hvorslev Method. Given the discrepancies identified in General Comment 1, it is not clear if the comparison remains valid. Pending re-evaluation of the data to resolve the issues identified in General Comment 1, re-analysis of the results for selected wells using the Bouwer and Rice Method may be warranted for comparison with estimates obtained by the Hvorslev and Butler-Zhan Methods.*

Navy Response to PREQB Comment 10: Re-analysis was done using the Hvorslev method to address PREQB General Comment 1. Internal analysis and comparison of Bouwer and Rice Method versus Hvorslev and confined versus unconfined was performed. There was no significant difference between the methods or assumptions, so the results of the Hvorslev method will be presented in the report. Section 4.4 will be revised.

PREQB Comment 11*: Page 5-2, Section 5.2.1, Fourth Paragraph, First Sentence. Please indicate if the residuum is continuous or discontinuous and discuss its implication on vertical migration of contaminants of potential concern.*

Navy Response to PREQB Comment 11: The residuum is discontinuous in the upgradient portion of the Site. The discontinuous nature of the residuum appears to have no impact on vertical migration. There were little observable difference in the grain size of the residuum and underlying Saprolite. The residual-NAPL body appears to be mainly below the residuum where present (Figure 5-2 and Figure 5-3). The capillary forces and water pressure in the Saprolite below the potentiometric surface are likely the primary factors on vertical migration.

PREQB Comment 12*: Page 5-3, Section 5.2.2, 2nd Full Paragraph, Third Sentence: According to this sentence, well screen midpoints were used as the distances for the purpose of calculating vertical hydraulic gradients. This is appropriate for well screens that are fully submerged within the groundwater table but is not appropriate for calculating vertical gradients between a well couplet where one of the wells is screened across the phreatic surface. In these instances, the vertical hydraulic gradient needs to be based upon the distance from the phreatic surface to the midpoint of the well screen that is fully* *submerged within the aquifer. Please revise the text accordingly and calculations in Table 5-l if appropriate.*

Navy Response to PREQB Comment 12: A comparison of the elevation of the top of well screens and static groundwater elevations is presented below:

Well ID	Elevation Top of Screen	Static Groundwater Elevation 22-Sep-10	2-Nov-10	29-Jun-12	26-Aug-12
1738MW01A	105.4	--	--	104.9	104.4
1738MW01	109.1	108.1	107.6	104.7	104.3
1738MW01B	72.2	--	--	104.8	104.3
1738MW05	106	107.7	106.7	104.1	103.6
1738MW05R	95.1	107.6	106.6	104.0	103.5
1738MW05L	79.5	107.6	106.6	104.0	103.6
1738MW07A	92.6	--	--	103.8	103.3
1738MW07	102.1	107.3	106.3	103.8	103.5
1738MW07B	77.5	--	--	103.7	103.6
1738MW08	93.1	106.2	105.2	102.9	102.8
1738MW08A	100.9	--	--	102.8	102.7
1738MW08B	84.9	--	--	102.9	102.8
1738MW09A	93.2	--	--	101.7	102.9
1738MW09	101.2	107.0	106.1	103.4	100.2
1738MW09B	76.1	--	--	103.7	103.3

As shown in the table above, there are only a few instances in which the phreatic surface is within the well screen interval (cells are highlighted red). The vertical hydraulic gradients will be recalculated using the phreatic surface rather than the screen midpoint for these wells and presented on Table 5-1.

***PREQB Comment 13**: Page 6-1, Section 6.0: Please screen all analytical soil data using soil-to- groundwater screening criteria to evaluate the potential for residua soil contamination to be a continuing source of groundwater impacts. Please add the dilution/attenuation factor (DAF) 1 soils screening level (SSL) values listed in the current Regional Screening Level (RSL) table or site-specific DAF SSL values, with supporting calculations for the DAF.*

Navy Response to PREQB Comment 13: The continuing impact of residual soil contamination on groundwater is evident. BTEX compounds and MtBE were detected in soil and groundwater. There is also a correlation in the location of the residual soil contamination and the groundwater plume. Screening all the analytical soil data with the SSLs would not benefit the conceptual site model or aid in corrective measures evaluation. Therefore, SSLs will not be used.

***PREQB Comment 14**: Page 6-1, Section 6-1: Ecological screening criteria including a hierarchy of references are presented in this section and in Table 6-1 for surface soil and groundwater. The source used to select each ecological screening value needs to be identified on Table 6-1. Currently, it is unclear how the ecological soil screening values for benzene, ethylbenzene, toluene and total xylenes were determined. Assuming these soil screening values were derived from the MHSPE reference, please present the target and intervention values for each of these constituents as well as the values calculated based on the assumed organic carbon content of 2 percent. Intervention values based on environmental health versus* *human health need to be specifically identified. In addition, please justify the rational for using the arithmetic mean rather than the geometric mean (as is typically done in calculating a Maximum Acceptable Toxicant Concentration from NOAEL and LOAEL TRVs).*

Navy Response to PREQB Comment 14: Soil screening values for benzene, ethylbenzene, and toluene were calculated using Ministry of Housing, Spatial Planning and Environment (MHSPE, 2000) target and intervention values. Target values and intervention values published by MHSPE for these three VOCs are based on a standard soil with ten percent organic carbon. These values are listed within the embedded table below.

Chemical	Target Value (µg/kg)	Intervention Value (µg/kg)
Benzene	10	1,000
Ethylbenzene	30	50,000
Toluene	10	130,000

Target and intervention values for organic chemicals can be adjusted to account for the organic carbon content of soil (the organic carbon adjustment range is 2 percent to 30 percent). As a measure of conservatism, the target and intervention values used to derive the soil screening values for benzene, ethylbenzene, and toluene were adjusted to reflect an assumed organic carbon content of two percent (minimum value within the adjustment range) using the following correction formula (MHSPE, 2000):

$$(Target_{sa}/Intervention_{sa}) = (Target_{ss}/Intervention_{ss}) \times (\%\ organic\ matter/10)$$

where:

$Target_{sa}/Intervention_{sa}$ = Target value or intervention value for the soil to be assessed (µg/kg)
$Target_{ss}/Intervention_{ss}$ = Target value or intervention value for standard soil (µg/kg)

Using the formula above and an assumed organic carbon content of two percent, adjusted target and intervention values for benzene, ethylbenzene, and toluene are as follows:

Chemical	Target Value (µg/kg)	Intervention Value (µg/kg)
Benzene	2.0	200
Ethylbenzene	6.0	10,000
Toluene	2.0	26,000

The soil screening values listed in Table 6-1 were then derived by taking the average of these target and intervention values. MHSPE (2000) does not indicate the specific basis for the intervention values. However, the following is stated:

> "*The ultimate intervention values for soil and sediment are based on an integration of the human and ecotoxicological effects. In principle the most critical effects are definitive.*"

Information provided by Lijzen et al. (2001) indicate that the intervention values for benzene and ethylbenzene are human health-based values, while the intervention value for toluene is an ecological-based value. With regard to total xylenes, the soil screening value listed in Table 6-1 for this VOC is a USEPA Region 5 ecological screening level (ESL) based on exposure to plants.

USEPA Region 5 ESLs were inadvertently excluded from the hierarchy of references identified within Section 6.1.1.

The text within Section 6.1.1 will be revised to include the information presented above. Table 6.1.1 will also be revised to include footnotes that identify the source of the ecological-based soil and groundwater screening values.

The arithmetic mean of the target and intervention values were used as soil screening values in this investigation as this method of soil screening value development has previously been acceptable to the EPA and PREQB for ecological risk assessments (ERAs) conducted at SWMUs 14, 56, 59, 69, 74, and 79.

References cited in Navy Response to PREQB Page-Specific Comment 14:

Lijzen, J.P.A., A. J. Baars, P. F. Otte, M. G. J. Rikken, F. A. Swartjes, E. M. J. Verbruggen, and A. P. van Wezel. 2001. Technical Evaluation of the Intervention of Values for Soil/Sediment and Groundwater - Human and Ecotoxicological Risk Assessment and Derivation of Risk Limits for Soil, Aquatic Sediment and Groundwater. RIVM Report 711701 023.

Ministry of Housing, Spatial Planning and Environment (MHSPE). 2000. Intervention Values. Directorate-General for Environmental Protection, Department of Soil Protection, The Hague, Netherlands.

PREQB Comment 15*: Page 6-1, Section 6.1.1, First Paragraph: Please update the Regional Screening Level table values to the current version, which is November 2012. Note also that this section does not include a human health risk assessment, rather a preliminary screening has been conducted. Please revise the text accordingly.*

Navy Response to PREQB Comment 15: The November 2012 RSLs were used. Please refer to the Table foot notes. The text will be revised to indicate that November 2012 RSLs were used. The reference to the Human Health Risk Assessment (HHRA) will be deleted.

PREQB Comment 16*: Page 6-2, Section 6.1.2 and Table 6-1: Please add a discussion of the human health groundwater screening criteria presented on Table 6-1. Please ensure that the current RSL table is consulted for tapwater screening criteria. Also, please note that Puerto Rico Water Quality Standards are an Applicable, Relevant and Appropriate Requirement (ARAR) for this site, and the lower of the PRWQS or MCL applies. Please revise this section and Table 6-l accordingly.*

Navy Response to PREQB Comment 16: Section 6.1.2 will be revised to include the following paragraph:

> "The risk-based, human health screening values used in the comparison to the groundwater analytical data were tap water Regional Screening levels (RSLs) (USEPA, 2012), Maximum Contaminant Levels (MCLs) (USEPA, 2009a), and Puerto Rico Water Quality Standards (PRWQS) for groundwater (i.e., Class SG) contained within the Puerto Rico Water Quality Standards Regulation (PRWQSR) (PREQB, 2010). When MCL and Class SG PRWQS were available for a given chemical, the more conservative value was selected."

Based on consideration given to Class SG PRWQS, the groundwater screening value listed under the sixth column within Table 6-1 for ethylbenzene will be revised from 700 µg/L (MCL) to 530 µg/L (PRWQS). Tables 6-4a and 6-4b will also be revised to reflect an MCL/PRWQS value of 530 ug/L. Finally, detected ethylbenzene concentrations greater than 530 µg/L will be discussed where appropriate within the document.

References cited in Navy Response to PREQB Page-Specific Comment 16:

Puerto Rico Environmental Quality Board (PREQB). 2010. Puerto Rico Water Quality Standards Regulation. Regulation No. 7837. March 31, 2010.

USEPA. 2012. Regional Screening Levels Table. http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. November 2012.

USEPA. 2009a. Drinking Water Regulations and Health Advisories. Office of Water. Washington, D.C. http://www.epa.gov/safewater/contaminants/index.html#mcls. May 2009.

PREQB Comment 17*: Page 6-5, Section 6.2, Paragraph 1, Last Sentence: According to this sentence "No constituents in surface soil exceeded PREQB Target Levels." Please also state that no constituents exceeded the human health and ecological screening criteria as well.*

Navy Response to PREQB Comment 17: The last sentence in Paragraph 1 of Section 6.2, will be revised to read, "No constituents exceeded PREQB Target Levels or human health and ecological screening criteria."

PREQB Comment 18*: Page 6-5, Section 6-2:*

a. *Paragraph 4, 4th Sentence: According to this sentence, TPH DRO exceeded the PREQB Target Level in only one soil sample below 16 feet (i.e., 1738MW02R-10). However, TPH DRO also exceeded the Target Level in soil boring1738SB111-08 at a depth of 17 to 18 feet bgs. Please revise the text accordingly. Please note that this change also impacts the 7th sentence of this paragraph.*

Navy Response to PREQB Comment 18a: This referenced sentence will be revised to read, "…only two samples (210 mg/kg at 1738MW02R-10 and 170 mg/kg at 1738SB111-08)." The "7th sentence" referenced in this comment will be revised to read, "The distribution of TPH DRO mimics that of TPH GRO; however, it was not mapped since there were only two detections above the PREQB Target Level."

b. *Paragraph 5: The text states that TPH-GRO exceeded the PREQB Target Level in only one sample below 20 feet bgs (1738MW13-12). However, the PREQB Target Level was also exceeded for TPH-GRO in samples 1738SB107-11 and 1738SB110-10, both of which were below 20 feet bgs. Please revise the text accordingly.*

Navy Response to PREQB Comment 18b: The discussion of TPH GRO exceedences above the PREQB Target Level is actually based on a depth of 22-feet bgs. The text and figures will be revised to indicate a 22-foot depth (e.g., "16- to 22-feet bgs" or "below 22-feet bgs").

c. *Paragraph 5: The text states that BTEX exceeded 5000 ug/kg in only one sample below 20 feet bgs (1738MW 13-12). However, 5000ug/kg was also exceeded for BTEX in samples 1738SBI07-11, 1738SB110-10, and 1738SB111-11, all of which were below 20 feet bgs. Please revise the text accordingly.*

Navy Response to PREQB Comment 18c: The discussion of BTEX exceedences above 5,000 mg/kg is actually based on a depth of 22-feet bgs. The text and figures will be revised to indicate a 22-foot depth (e.g., "16- to 22-feet bgs" or "below 22-feet bgs").

PREQB Comment 19*: Page 6-6, Last Paragraph, 3rd Sentence: According to this sentence, concentrations of MtBE have increased in wells 1737MW07 through 1737MW09 compared with September 2010. The increasing concentrations at these wells would suggest an expanding plume. Please reconcile this statement with a later statement made in the last paragraph on page 6-12 which states " ...based upon professional judgment, the groundwater contamination is not migrating." Also, please identify the wells as1738MW07 through 1 738MW09, instead of 1737MW07 through 1 737MW09.*

Navy Response to PREQB Comment 19: The navy agrees that the MtBE plume appears to be expanding: however, that is based on only two observations. Additional monitoring is necessary to assess concentration trends with any confidence.
Also see Navy Response to USEPA Comment 10.

PREQB Comment 20*: Page 6-6, Section 6.3:*

a. Paragraph 1: Change the sentence which refers to Table 6-3 for detected results in groundwater to Table 6-4.

Navy Response to PREQB Comment 20a: That 4th sentence in the 1st paragraph of Section 6.3 is redundant and will be deleted. Subsequent sentences reference Tables 6-4a and 6-4b.

b. Paragraph 2: The text states that TPH-GRO was well below the PREQB Target Level in all groundwater samples. However, TPH-GRO was detected at 40 ug/L in sample 1738MW03-12C, which is just slightly below the PREQB Target Level of 50 ug/L. Please revise the text accordingly.

Navy Response to PREQB Comment 20b: The word "well" will be deleted from the 3rd sentence in the 2nd paragraph of Section 6.3

c. Paragraph 4: Correct all sample identifications to represent 1738 instead of 1737.

Navy Response to PREQB Comment 20b: Sample ID prefixes will be changed to "1738." A global check will be performed to assure that all prefixes read "1738."

d. Paragraph 4: The text discusses increases in concentrations of MTBE from 2010 to 2012 for select wells but is missing 1738MW05 which increased from 5100 ug/L in 2010 to 6700 ug/L in 2012. Please revise the text accordingly.

Navy Response to PREQB Comment 20b: The context of the above-referenced paragraph is MtBE plume delineation and the mention of increasing concentrations in downgradient wells is supporting that argument. It is acknowledged that the MtBE concentration in well 1738MW05 has increased between 2010 and 2012; however, 1738MW05 is not located on the edge of the plume and is therefore not germane to the argument.

PREQB Comment 21*: Page 6-7, Section 6.4.1, Last Paragraph, 3rd Sentence: According to this sentence, no TPH GRO was detected in the seven trip blanks collected during 2012.*

However according to Table 6-5b, trip blanks collected during 2012 were not analyzed for TPH GRO or DRO. Please clarify. Also the last sentence of this paragraph suggests that other than toluene, no constituents were detected in the rinsate blanks analyzed during 2012. According to Table 6-5b, however, TPH DRO was present in every equipment rinsate sample. These detections, their impact on data, and any qualifying actions to the data as a result of these detections need to be discussed in this section.

Navy Response to PREQB Comment 21: Trip blanks were analyzed for TPH-GRO, but not TPH-DRO. Table 6-5b will be revised to indicate this. TPH-DRO was detected in every equipment rinsate and field blank sample analyzed during 2012. Based on USEPA Region II blank contamination guidance, this resulted in 31 samples being qualified as "U" for TPH-DRO. The data validation reports, Appendix B Table and Table 6-3b have been revised to indicate this. Sentences will be added to the end of the last paragraph in Section 6.4.1 of the text that will read, "In addition, TPH DRO was detected at low levels in all equipment rinsate and field blank samples. The detections were generally one or two orders of magnitude lower than detections in soil samples."

In addition, the last paragraph of Section 6.4.2 has been revised as follows:

For the June/August 2012 Investigation, there were only minor QA/QC variances. For example, in SDG 680-80447-3, samples 1738MW09B-03 and 1738MW09B-03D exhibited a noncompliant Relative Percent Difference (RPD) and concentrations were estimated "J". All equipment rinsate and field blank samples had detections of TPH-DRO. Based on USEPA Region II blank contamination guidance, 31 samples were qualified as "U" at the reported concentration. Since no data was qualified as "rejected" for the Site 1738 MtBE 2012 Investigation, the completeness goal of 90 to 95% for each parameter was met with 100% completeness and a 97.5% completeness for the 2010 and 2012 combined data.

***PREQB Comment 22**: Page 6-10, Site Geology, Paragraph 4: According to this paragraph, groundwater was encountered in thin discontinuous zones. However, discontinuous zones of groundwater would not explain the widespread distribution of MtBE in groundwater and is inconsistent with groundwater equipotential contours that indicate groundwater flow behavior for equivalent porous media. Please reconcile or clarify the interpretation of groundwater being present in discontinuous zones with contaminant distribution and equipotential contours indicating flow consistent with a porous (or equivalent porous) media.*

Navy Response to PREQB Comment 22: See Navy Response to USEPA Comment 1.

***PREQB Comment 23**: Page 6-12, Last Paragraph, First Sentence: According to this sentence, it is not clear if the plume, particularly MtBE is migrating. With additional monitoring events, it would be possible to evaluate the stability and potential expansion of the plume using statistical analysis (e.g., Mann Kendall test for trend). Please include this type of analysis as part of the ongoing monitoring program at the site to evaluate plume stability.*

Navy Response to PREQB Comment 23: Section 7.3 will be revised to include the following recommendation: "A groundwater concentration trend analysis should be performed after several rounds of groundwater sampling (e.g., two years of quarterly monitoring). An examination of the concentration trends in downgradient wells (1738MW07, 1738MW08, 1738MW09) may provide evidence of plume stability. Seasonal trends will need to be evaluated. If no seasonal effects are evident, the Mann-Kendall trend analysis will be used to detect a trend. If seasonal effects are evident, the Seasonal-Kendall trend analysis can be used to detect a trend."

PREQB Comment 24: Page 7-1, Section 7.l Conclusions

a. *Paragraph 1: Please include "define the vertical extent of MTBE in groundwater" as one of the primary objectives of this investigation.*

Navy Response to PREQB Comment 24a: A bullet item will be added to the primary objectives that will read, "Define the vertical extent of MtBE in groundwater."

b. *Paragraph 4:*

   a. *Please add 1738MW01B to the list of wells with MTBE concentrations above the PREQB Target Level that require further vertical delineation.*

Navy Response to PREQB Comment 24b1: Well 1738MW01B will be added to the list of wells with MTBE concentrations above the PREQB Target Level in the 4th paragraph of Section 7.1.

   b. *Please note that the MtBE contamination has also not been delineated laterally in the area of l738MW16 or vertically at wells 1738MW07B, 1738MW08B, or 1738MW09B as concentrations of MtBE in these wells also exceeded the PREQB Target Level.*

Navy Response to PREQB Comment 24b2: An additional deep well will be proposed below 1738MW08B to provide vertical delineation along Cross Section E-E', which parallels the primary groundwater flow direction. Additional vertical delineation wells will be warranted below 1738MW07B and 1738MW09B, and lateral delineation well(s) north and east of 1738MW16 if continued groundwater monitoring shows elevated MtBE concentrations. Bullet items 1 and 2 of Section 7.3 will be revised.

PREQB Comment 25: Page 7-3, Section 7.2, Item j of conceptual site model: Please add "residual gasoline will continue to act as a source of BTEX and MtBE impact to groundwater until this source is removed through active remediation or these compounds are depleted from residual LNAPL through weathering and other processes."

Navy Response to PREQB Comment 25: Item 5j of the conceptual site model will read, "Residual gasoline constituents will continue to act as a source of BTEX and MtBE impact to groundwater until this source is removed through active remediation or these compounds are depleted from residual LNAPL through weathering and other processes."

PREQB Comment 26: Page 7-3, Section 7.3, Recommendations:

a. *According to the 2010 Work Plan, groundwater monitoring wells l738MW07, 1738MW08 and 1738MW09 were installed to determine if contamination has migrated farther horizontally. Based on the results from these wells, it appears that the lateral extent of contamination has not been delineated, as also indicated in Paragraph 4 of Section 7.1. Please clarify why further lateral delineation is not included in this section.*

Navy Response to PREQB Comment 26a: Based on the 2010 analytical results, horizontal delineation was achieved. The 2012 groundwater analytical data indicated screening criteria exceedences at wells 1738MW07, 1738MW08, and 1738MW09. Two data points are insufficient to define a concentration trend. Therefore, additional sampling will be recommended followed by trend analysis. At that point, consideration will be given to additional wells for horizontal delineation. Also see Navy Response to PREQB Comment 24b2.

b. Paragraph 2: This paragraph presents two possible remediation NAPL remediation strategies: NAPL mass reduction to decrease NAPL saturation, which will reduce mass (not necessarily concentrations) in soil and NAPL composition reduction to reduce concentrations of the fuel constituents impacting groundwater. Unless significant reductions in NAPL mass can be achieved, elevated concentrations will persist in groundwater. LNAPL composition reduction if focused on constituents impacting groundwater would have the greatest impact on improving groundwater quality, thus PREQB believes that the NAPL remediation strategy needs to include the reduction of concentrations of volatile contaminants in NAPL in addition to mass reduction to achieve soil and groundwater cleanup criteria.

Navy Response to PREQB Comment 26b: There are some nuances between NAPL mass reduction and NAPL composition reduction. Selection of the 17 common and appropriate NAPL remedial technologies (ITRC, 2009) is predicated on selecting a NAPL mass or NAPL composition reduction strategy. Based on the comment above, a NAPL composition reduction appears to be the preferred strategy. Focusing on selectively reducing the mass of BTEX constituents and MtBE will have the greatest impact on improving groundwater quality by reducing BTEX and MtBE concentrations in soil. Thus, soil and groundwater cleanup of BTEX constituents and MtBE will be achieved; however, residual TPH DRO and GRO soil contamination may remain. A treatment train that includes subsequent TPH DRO and GRO can be implemented; however, because TPH DRO and GRO contamination was observed to be relatively limited and are generally less toxic, the remnant soil contamination may not pose a risk.

References cited in Navy Response to PREQB Comment 26b:

Interstate Technology and Regulatory Counsel, December 2009. Evaluating LNAPL Remedial Technologies for Achieving Project Goals, ITRC LNAPL Team, Washington, DC.

***PREQB Comment 27**: Page 7-3, Section 7.3, Recommendations: Additional borings are proposed north of 1738SB107 to better delineate the source zone. Note that there is limited information to the east and west of 1738SB107. Two additional borings need to be completed approximately 50 feet to the east and west of 1738SB107 and sampled to delineate the source zone. To the extent practicable, the borings need to be completed to a depth sufficient to delineate the vertical extent of impact to PREQB Target Levels.*

Navy Response to PREQB Comment 27: It is agreed that east and west boring locations will assist with delineation. While there is data to provide gross east/west delineation (e.g., 1738MW15 and 1738MW01B), additional borings will refine that delineation. The 3rd paragraph of Section 7.3 will be revised to read, "A limited soil sampling program is recommended. Additional soil borings (a maximum of ten) should be placed north of boring 1738SB107 in the downgradient area, and also to the east and west of boring 1738SB107 in the upgradient area to more fully delineate the soil source zone." The spacing suggested above will be considered in the planning process.

***PREQB Comment 28**: Page 7-3, Section 7.3, Item #1: Several deep wells are proposed to delineate the vertical extent of impact at the site however no additional wells are proposed to define the lateral extent of impact downgradient of the Site. Based upon a comparison* *of MtBE concentrations versus distance along a flowpath extending from well 1738MW02R through 1738MW08B, the extent of MtBE impact above the 20 ug/L PREQB Target Level likely extends much further to the north than indicated on Figure 6-8. In order to delineate the lateral extent of impacts, please install and sample an additional well couplets north of well 1738MW08 and northeast of well 1738MW16. Data from these wells can be used to verify that the plume is not expanding, a key piece of data to support MNA.*

Navy Response to PREQB Comment 28: Additional lateral delineation north of well clusters 1738MW07, 1738MW08, and 1738MW09, as well as north and east of 1738MW16 will be warranted if continued groundwater monitoring shows elevated and increasing MtBE concentrations. If continued groundwater monitoring shows low or occasionally elevated MtBE concentrations, then the wells are at the approximate leading edge of the MtBE plume. A contingency will be added indicating that additional wells will be required for lateral delineation if continued groundwater monitoring shows consistently elevated MtBE concentrations. Bullet item 1 will be revised.

***PREQB Comment 29**: Page 7-4, Section 7.3, Item #2: PREQB agrees that long-term groundwater monitoring needs to resume at the site until full scale remediation is initiated and a performance monitoring program is developed for full scale remediation. Please include additional monitoring wells and parameters in the monitoring program as follows:*

a. Please include the following wells in the long-term monitoring program in addition to those proposed in the report; 1738MW06, 1738MW07A, 1738MW08B, 1738MW09B, 1738MW12, 1738MW16 and any new wells. Well 1738MW12 provides a background monitoring location. Monitoring wells 1738MW06 and1738MW16 will provide data to verify the lateral stability of the plume. Wells 1738MW07A, 1738MW08B, and 1738MW09B contained the highest concentrations of MtBE at the downgradient portion of the plume. Data from these wells will provide insight regarding plume stability.

Navy Response to PREQB Comment 29a: The Navy agrees to the additional wells, with the exception of 1738MW12. The objective is to delineate to screening criteria and assess plume stability. The addition of background data does not support this objective.

b. In addition to the current suite of analytical parameters, at least one round of groundwater monitoring needs to include the following parameters to verify that other regulated gasoline additives used during the period that gasoline was stored at the site have not impacted groundwater and that biodegradation of dissolved contaminants is occurring: ethylene dibromide, 1,2 dichloroethane, tert butyl alcohol, carbon dioxide, methane, nitrate, ferrous iron, and sulfate.

Navy Response to PREQB Comment 29b: The VOC analysis already includes ethylene dibromide, and 1 ,2 dichloroethane. Additional analysis will include tert butyl alcohol, carbon dioxide, methane, nitrate, ferrous iron, and sulfate. Section 7.3 will be revised accordingly

PREQB COMMENTS ON TABLES

***PREQB Comment 1**: Table 4-1:*

a. According to the field notes, soil samples at 1738MW11 were collected on 9/12/10. However, this table and the chain-of-custody in Appendix A show 9/13/10.

Please clarify and revise, as needed.

Navy Response to PREQB Comment 1a: The field notes from Robert Roselius indicate mobilization on 9/12/10 and 1738MW11 sampling on 9/13/10. 9/13/10 is correct and Table 4-1 will be revised.

b. *According to the boring log, a surface soil sample, shallow subsurface soil sample and subsurface soil samples were collected on 6/13/12 at 1738MW01A, not 1738MW01B, as indicated on this table. Please clarify and revise, as needed.*

Navy Response to PREQB Comment 1b: Soil samples were collected during 1738MW01B borehole advancement on 6/13/2012 (and submitted to the laboratory on 6/18/2012); however, due to the presence of coarse gravel and hard bedrock, the well could not be installed. An air rotary rig was brought on Site on 6/20/2013 to complete well installation. Due to collapsing borehole conditions at 1738MW01B on 6/20/13, it was decided to install the shallow well at that location, which was named 1738MW01A. A footnote will be added to the logs for 1738MW01A that will read, "This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed." It should be noted that figures show the data in the correct spatial location.

c. *738SB104-10 collected on 6/27/12:*
   1. *Please change the identification on this table to 1738SB104A, as per the Figures.*
   2. *According to the field notes, this sample was collected for SPLP BTEX/MtBE but the associated results and chain-of-custody do not indicate this. Please clarify.*

Navy Response to PREQB Comment 1c1: This Site ID will be changed to 1738SB104A; however, the sample ID will not be changed. That would affect the reporting tables, the appendix tables, as well as laboratory and data validator designations.

Navy Response to PREQB Comment 1c2: SPLP analysis was not part of the scope of work for Site 1738. The PM asked the field crew to collect some samples to provide some information for petroleum-contaminated sites at NAPR in general. The PM later decided not to submit the samples.

d. *It appears that the duplicate for the surface soil sample collected from 1738MW16 needs to be assigned to sample ID 1738MW16-00D instead of 1738MW16-00 as shown in the table.*

Navy Response to PREQB Comment 1d: The "Duplicate" comment was moved to be associated with 1738MW16-00D.

e. *1738M W17-10: Please revise the depth to 20-21 ft bgs, as per the boring log.*

Navy Response to PREQB Comment 1e: The correct depth is 19-20.2 feet bgs. The boring log will be corrected.

PREQB Comment 2: *Table 4-2:*

a. *Please define TCLP, GRO, and RCI in the notes.*

Navy Response to PREQB Comment 2a: The notes will be revised.

b. *Per the field notes, 1738ER04 and 1738ER05 are also representative of the bladder pump. Please revise accordingly.*

Navy Response to PREQB Comment 2b: The comments will be revised to include the bladder pump.

PREQB Comment 3*: Table 5-2 and Table 6-7: Please revise as appropriate based upon General Comment 1.*

Navy Response to PREQB Comment 3: Tables 5-2 and 6-8 [formerly Table 6-7] will be revised based on changes made in response to PREQB General Comment 1. The revisions will affect 17 separate test resuls on Table 5-2 (and will also affect the average K value and Figures 5-11 and 5-12). With the inclusion of a new table, Table 6-7 will become Table 6-8. All the K values on Table 6-8 will be changed based on the slug test reanalysis, and will change the velocity calculation.

PREQB Comment 4: *Table 4-4: The screened interval for 1738MW09 should be 12-24 feet bgs according to the 9/16/10 field notes in Appendix A. Please revise accordingly.*

Navy Response to PREQB Comment 4: The screen lengths used were 10 feet. The boring log for 1738MW09 shows a ten foot screen (14-24 feet bgs). Table 4-4 is correct; the field notes appear to be incorrect.

PREQB Comment 5: *Table 6-1: An ecological groundwater screening value needs to be presented for MTBE. The chronic LOAEL for saltwater listed in the Screening Quick Reference Tables (SQuiRTs) from Buchman (2008) adjusted by a safety factor of 5 is specifically referenced as a screening value source in the text of the report (page 6-4). Based on the saltwater LOAEL for MBTE (5,000 ug/L) and the safety factor an ecological-based screening value of 1,000 ug/L should be selected for MTBE. Please add this value to Table 6-1 and discuss monitoring wells where samples exceeded this screening threshold where appropriate in the document.*

Navy Response to PREQB Comment 4: The Navy agrees that a groundwater screening value for MtBE can be identified from literature sources. However, the Navy believes that a more appropriate screening value is available from the literature than the value recommended within PREQB Comment 5 above. Mancini et al (2002), developed marine-based criteria (Criteria maximum Concentration [CMC] and Criteria Continuous Concentration [CCC]) for MTBE using established EPA guidance (Stephan et al., 1985). The Navy recommends that the CCC value from this study (18,050 µg/L) be used as the groundwater screening value for MtBE. It is noted that the EPA cites the CMC and CCC values developed and reported by Mancini et al. (2002) in a fact sheet entitled *Aquatic Life Criteria for MTBE – Methyl Tertiary Butyl Ether* (available at http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/mtbe/index.cfm).

Table 6-1 will be revised to include the CCC value from Mancini et al. (2002) as the groundwater screening value for MtBE. The text within Section 6.1.2 will also be revised to include literature-based criteria established using EPA guidance within hierarchy of references used to identify groundwater screening values. Finally, detected concentrations exceeding the CCC value will be highlighted within Tables 6-4a and 6-4b and discussed where appropriate within the document.

References cited in Navy Response to PREQB Page-Specific Comment 14:

Mancini, E.R., A. Steen, G.A. Rausiina, D.C.L. Wong, W.R. Arnold, F.E. Gostomski, T. Davies, J.R. Hockett, W.A. Stubblefield, K.R. Drottar, T.A. Springer, and P. Errico. 2002. MTBE Ambient Water Quality Criteria Development: A Public/Private Partnership. Environ. Sci. Technol. 36:125-129.

Stephen, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman and W.A. Brungs. 1985. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. PB85-227049. National Technical Information Service, Springfield, VA.

PREQB Comment 6: *Table 6-3b:*

a. Please add the results of total BTEX for sample 1738MW09B-03.

Navy Response to PREQB Comment 6a: The BTEX results (1.3 U) will be added.

b. 1738MW17-10: Please revise the depth to 20-21 ft bgs, as per the boring log.

Navy Response to PREQB Comment 6b: See Navy Response to PREQB Table comment 1e; the correct depth interval is 19.0 to 20.2 ft bgs.

c. 1738SB104-10 collected on 6/27/2012: Please change the identification on this table to 1738SB104A, as per the figures.

Navy Response to PREQB Comment 6c: See Navy Response to PREQB Comment 1c1; although the location identifier has been revised, the sample identifier will not be changed to maintain consistency with the chain of custody forms laboratory analytical data and data validation packages.

PREQB Comment 7: *Table 6-4a:*

d. The USEPA MCL and PREQB UST Standard for Total BTEX are listed as 50 ug/L. As per Table 6-1, these values should be listed as "NE". Please revise accordingly.

Navy Response to PREQB Comment 7a: The BTEX standards will be changed to “NE”.

e. Please add the results for 1738MW03, sampled on 9/18/10.

Navy Response to PREQB Comment 7b: The results for 1738MMW03 will be added.

PREQB Comment 8: *Table 6-6: Please add "Benzene" under the list of VOCs.*

Navy Response to PREQB Comment 8: "Benzene" will be added under the list of VOCs.

PREQB Comment 9: *Table 6-5b: According to this table, TPH DRO and total TPH were analyzed in equipment rinsate samples. Table 4-2 indicates that the samples were analyzed for TPH GRO but not total TPH. Please clarify and address this discrepancy.*

Navy Response to PREQB Comment 9: Total TPH was not an analyte. It is a sum in each table of DRO and GRO. Total TPH is not necessary on Table 6-5b and will be removed.

PREQB COMMENTS ON FIGURES

***PREQB Comment 1**:* Figure 5-2:

f. Well 1738MW01B falls on cross section A-A' but is not shown on Figure 5-2. Please include this well on the cross section.

Navy Response to PREQB Comment 1a: Well 1738MW01B was not shown on cross section A-A because no soil samples were collected for logging. Nonetheless, well 1738MW01B will be shown.

a. Please include the units for PID and analytical results in the legend. This comment also applies to Figures 5-3 through 5-6 and all other figures where analytical data are presented.

Navy Response to PREQB Comment 1b: The PID units (ppm) will be added along with MtBE units (ug/L).

b. It appears that the date of the static water level measurements needs to be 2012 rather than 2010. Please revise as appropriate.

Navy Response to PREQB Comment 1c: 2012 is correct. The figure will be revised accordingly.

c. There are notes on this and other cross sections such as "Residual NAPL Zone" and "Petroleum odor and staining". It is not clear whether these conditions apply to the entire area delineated as the "Estimated Extent of Source" or to specific areas within this zone. Please clarify. This comment also applies to Figures 5-3 to 5-6.

Navy Response to PREQB Comment 1d: The labels, "Petroleum odor and staining" and "Residual NAPL Zone" apply only to the specific areas within the purple, dashed lines. The font of these labels will be changed to the same purple as the dashed lines.

***PREQB Comment 2**: Figure 5-3 through Figure 5-6: The data of water level elevation indicated is September 2010 but the water level data shown on these figures appears to be from August 2012. Please confirm and revise as appropriate.*

Navy Response to PREQB Comment 2: The August 2012 is correct. Figures 5-3 through 5-6 will be corrected.

PREQB Comment 3: Figure 5-4: The water level shown for 1738MW11 does not match the water level data shown in Table 4-5. Please revise as appropriate.

Navy Response to PREQB Comment 3: The water level (104.37) shown on Table 4-5 is correct. Figure 5-4 will be revised.

***PREQB Comment 4**: Figure 5-9: The 104.75 foot contour is also labeled as 108.25. Please revise the figure in the final report.*

Navy Response to PREQB Comment 4: The 108.25 label will be removed.

***PREQB Comment 5**: Figures 5-11 and 5-12: These figures may be affected by General*

Comment 1. Please revise as appropriate.

Navy Response to PREQB Comment 5: Figures 5-11 and 5-12 will be revised to reflect changes in the hydraulic conductivity estimates.

***PREQB Comment 6**: Figure 6-1 - Distribution of TPH GRO in Subsurface Soil above the PREQB Target Level – 16-20 feet bgs: Note that the result shown for location 1738SB108 is for 15 to 16 feet bgs. The GRO result for the sample collected from 17 to 18 feet at this location is 580 mg/kg and needs to be used instead of the result from 15 to 16 feet bgs to develop the extent of GRO impact shown on this Figure. Please also note that the concentration of GRO at 1738SB107 from 17 to 18 feet ranges from 560 to 780 mg/kg. The 330 mg/kg concentration is from 21to 22 feet bgs. Please revise the figure using the data from the 17 to 18 foot intervals for these two locations.*

Navy Response to PREQB Comment 6: Figure 6-1 will be revised using 580 mg/kg at 1738SB108 and 780 mg/kg at 1738SB107 (using the environmental sample). Also note that the figure shows concentrations from a depth of 16-feet to 22-feet bgs. See Navy Response to PREQB Comment 18b.

***PREQB Comment 7**:* Figure 6-1:

a. *The figure currently shows all TPH-GRO results for samples from 16-20 ft bgs, not just those with concentrations above the PREQB Target Level. Please revise the title a ccordingly.*

Navy Response to PREQB Comment 7a: The title of Figure 6-1 is correct; though all TPH GRO data are used, the distribution of TPH GRO (shown by the filled contours) represents concentrations above the PREQB Target Level.

b. *I738SB107: The figure shows a result of 330 mg/kg. However, this is from 21-22 ft bgs. The sample from 17-18 ft bgs had a TPH-GRO result of 780 mg/kg. Please revise accordingly.*

Navy Response to PREQB Comment 7b: Figure 6-1 will be corrected; see Navy Response to PREQB Figure Comment 3.

c. *I738SB108: The figure shows a result of 0.57 mg/kg. However, this is from 15-16 ft bgs. The sample from 17-18 ft bgs had a TPH-GRO result of 580 mg/kg. Please revise accordingly.*

Navy Response to PREQB Comment 7c: Figure 6-1 will be corrected; see Navy Response to PREQB Figure Comment 3.

d. *1738SB110: The figure shows a result of 1900 mg/kg. However, this is from 20-21 ft bgs. The sample from 16-17 ft bgs had a TPH-GRO result of 220 mg/kg. Please revise accordingly.*

Navy Response to PREQB Comment 7d: Figure 6-1 represents a depth of 16-feet to 22-feet bgs, so the 1900 mg/kg concentration is used. See Navy Response to PREQB Comment 18b.

e. *1738MW01B: The figure shows a result of 0.11 mg/kg. However, this is from 11-13* *ft bgs. There were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 7e: That interval was used as a control point since data was not available from that depth. The PID, visual, and olfactory evidence suggest that the TPH GRO concentration would be low or non-detect. The label for well 1738MW01B will be changed to "NA" (not analyzed). "NA" will also be defined in the legend.

f. *1738MW04: The figure shows a result of 63 mg/kg. However, it is unclear where this result comes from. There were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 7f: The result of 63 mg/kg is associated with 1738SB104A (19.0 - 20.0 feet bgs).

g. *1738MW13: The figure shows a result of ND. However, it is unclear where this result comes from. There were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 7f: As noted, there was no sample collected from 1738MW13 from 16-22 feet bgs. A non-detect (ND) was originally used to represent that interval; however petroleum contamination was evident beginning at a depth of 19 feet bgs. The 23-24 foot bgs interval concentration (260 mg/kg) will be used to represent to the 16-22 foot bgs interval, and will be explained in Section 6.2.

h. *1738MW15: The figure shows a result of 0.073 mg/kg. However, this is from 9-11 ft bgs. The sample from 19-21 ft bgs was nondetect for TPH-GRO. Please revise accordingly.*

Navy Response to PREQB Comment 7h: Figure 6-1 will show "ND" for well 1738MW15.

i. *Several ND results were missing from the figure for the 16-20 ft bgs interval: 1738SB101, 1738SB102, l738MW11, and l738MW12.*

Navy Response to PREQB Comment 7i: An "ND" label will be added to wells 1738SB101, 1738SB102, 1738MW11, and 1738MW12.

***PREQB Comment 8**:* Figure 6-2:

a. *Please note that the units of mg/kg in the current title are incorrect.*

Navy Response to PREQB Comment 8a: The units will be changed to µg/kg.

b. *The BTEX result shown for 1738SB108(not detected) does not match the concentration reported in Table 6-3b (41,590 ug/kg). Similarly, the results reported for 1738MW2R do not match the results reported in Table 3b. Please revise the figure as appropriate.*

Navy Response to PREQB Comment 8b: The concentrations at 1738SB108 and 1738MW02R will be revised.

c. *1738SB107: The figure shows a result of 112,000 ug/kg. However, this is from 21-22 ft bgs. The sample from 17-18 ft bgs had a BTEX result of 292,000 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 8c: For intervals where two or more concentrations are available, the practice is to use the higher concentration. The concentration at 1738SB107 will be revised.

d. *1738SBI08: The figure shows a result of ND. The sample from 17-18 ft bgs had a BTEX result of 41,590 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 8d: See Navy Response to PREQB Comment 8b; a concentration of 41,590 µg/kg will be used.

e. *l738SB110: The figure shows a result of 194,600 ug/kg. However, this is from 20-21 ft bgs. The sample from 16-17 ft bgs had a BTEX result of 3100 pg/kg. Please revise accordingly.*

Navy Response to PREQB Comment 8e: The figure depth interval is 16-feet to 22-feet bgs, and where two or more concentrations are available, the practice is to use the higher concentration. Thus, 194,600 µg/kg will be used for 1738SB110.

f. *1738MW108: The figure shows a result of ND. However, this is from 11-13 ft bgs. There were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 8f: See Navy Response to PREQB Comment 8b; a concentration of 41,590 µg/kg will be used.

g. *1738MW02R: The figure shows a result of 122,000 ug/kg. However, according to Table 6-3b, this should be 125,[4]00 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 8g: See Navy Response to PREQB Comment 8b; a concentration of 125,400 µg/kg will be used.

h. *1738MW13: The figure shows a result of ND. However, this is from 5-7 ft bgs. There were no samples collected fron1 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 8h: There was no sample collected from 1738MW13 at the 16-22 feet bgs interval. A non-detect (ND) was originally used to represent that interval; however, petroleum contamination was evident beginning at a depth of 19 feet bgs. The 23-24 foot bgs interval concentration (6,100 µg/kg) will be used to represent the 16-22 foot bgs interval, and will be explained in Section 6.2.

i. *Please add the original 1738SB104 boring location to the figure (as in figure 6-1) and include a result of ND from the 15-17 ft bgs sample at this location.*

Navy Response to PREQB Comment 8i: The concentration 5,100 µg/kg will be associated with 1738SB104A, and ND will be associated with 1738SB104.

j. *Several ND results were missing from the figure for the 16-20 ft bgs interval: 1738SB101, 1738SB102, 1738MW11, and 1738MW12.*

Navy Response to PREQB Comment 8j: An "ND" label will be added to wells 1738SB101, 1738SB102, 1738MW11, and 1738MW12.

***PREQB Comment 9**:* Figure 6-3:

a. *The figure currently shows all MTBE results for samples from 16-20 ft bgs, not just those with concentrations above 20 ug/kg. Please revise the title accordingly.*

Navy Response to PREQB Comment 9a: The title of Figure 6-3 is correct; though all MtBE data are used, the distribution of MtBE (shown by the filled contours) represents concentrations above the PREQB Target Level. Also note that the figure shows concentrations from a depth of 16-feet to 22-feet bgs.

b. *1738SB104: The figure shows no result at this location. However, the sample from 15-17 ft bgs had a MTBE result of 4.9 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 9b: 1738SB104 will be revised to show a result of 4.9 µg/kg.

c. *1738SB 104A: The figure shows a result of ND. However, this is misleading as although the result was ND from 19-20 ft bgs, the quantitation limit exceeded the 20 ug/kg criterion. Please note this on the figure.*

Navy Response to PREQB Comment 9c: A note will be added that reads, "Not detected; however, quantitation limit was greater than the PREQB target level."

d. *1738SB107: The figure shows a result of 32,000 ug/kg. However, this is from 21-22 ft bgs. The sample from 17-18 ft bgs had a MTBE result of 3700 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 9d: As noted in Navy Response to PREQB Comment 9a, the figure shows concentrations from a depth of 16-feet to 22-feet bgs. Additionally, where two or more concentrations are available, the practice is to use the higher concentration.

e. *1738SB110: The figure shows a result of 5700 ug/kg. However, this is from 20-21 ft bgs. The sample from 16-17 ft bgs had MTBE result of 3000 ug/kg. Please revise accordingly.*

Navy Response to PREQB Comment 9e: As noted in Navy Response to PREQB Comment 9a, the figure shows concentrations from a depth of 16-feet to 22-feet bgs. Additionally, where two or more concentrations are available, the practice is to use the higher concentration.

f. *1738MW01B: The figure shows a result of ND. However, this is from 21-23 ft bgs. There were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 9f: As noted in Navy Response to PREQB Comment 9a, the figure shows concentrations from a depth of 16-feet to 22-feet bgs. It is noted that the sample interval is 21-23 feet bgs, but was nonetheless used for the 16-22 foot interval series figures because the 21-23 foot bgs interval overlaps the 16-22 foot bgs interval.

g. *1738MW 13: The figure shows a result of ND. However, there were no samples collected from 16-20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 9g: As noted in Navy Response to PREQB Comment 9a, the figure shows concentrations from a depth of 16-feet to 22-feet bgs. The ND was used for the 16-22 feet bgs even though the sample depth interval was slightly deeper (23-24 feet bgs). This will be explained in Section 6.2.

h. *The following results were not reported on the figure: 1738MW11: 3.6 ug/kg (15-17 ft bgs); 1738SB101: 37 ug/kg (15-17 ft bgs); 1738SB102: 130 ug/kg (15-17 ft bgs), 1738MW12: ND*

Navy Response to PREQB Comment 9h: The figure will be revised showing the above results.

i. *1738MW17: According to the boring log, the result reported on the figure of 3.3 ug/kg is actually from 20-21ft bgs and therefore should be on Figure 6-6 instead.*

Navy Response to PREQB Comment 9i: As noted in Navy Response to PREQB Comment 9a, the figure shows concentrations from a depth of 16-feet to 22-feet bgs.

***PREQB Comment 10**:* Figure 6-4:

a. *The figure currently shows all TPH-GRO results for samples below 20 ft bgs, not just those with concentrations above the PREQB Target Level. Please revise the title accordingly.*

Navy Response to PREQB Comment 10a: The title of Figure 6-4 is correct; though all TPH GRO data are used, the distribution of TPH GRO (shown by the filled contours) represents concentrations above the PREQB Target Level. Also note that the figure shows concentrations from a depth below 22-feet bgs.

b. *1738SB107: The figure shows a result of 0.47 mg/kg, which is from the 27-28 ft bgs sample. However, 330 mg/kg GRO was detected from 21-22 ft bgs at this location. Please add to the figure.*

Navy Response to PREQB Comment 10b: As noted in Navy Response to PREQB Comment 10a the figure shows a depth below 22-feet bgs. So, the result of 0.47 mg/kg is appropriate for 1738SB107.

c. *1738SB104A: The figure shows a result of 63 mg/kg. However, this is from 19-20 ft bgs. There were no samples collected from below 20 ft bgs at this location. Please revise accordingly.*

Navy Response to PREQB Comment 10c: The result shown for 1738SB104A will be removed.

d. *1738SB110: The figure shows a result of 0.1 mg/kg, which is from the 24-25 ft bgs sample. However, 1900 mg/kg GRO was detected from 20-21 ft bgs at this location. Please add to the figure.*

Navy Response to PREQB Comment 10d: As noted in Navy Response to PREQB Comment 10a the figure shows a depth below 22-feet bgs. So, the result of 0.1 mg/kg is appropriate for 1738SB110.

***PREQB Comment 11**:* Figure 6-5:

a. *The figure currently shows all BTEX results for samples from below 20 ft bgs, not just those with concentrations above 5000 ug/kg. Please revise the title accordingly. In addition, please note that the units of mg/kg in the current title are incorrect.*

Navy Response to PREQB Comment 11a: The title of Figure 6-5 is correct; though all BTEX data are used, the distribution of BTEX (shown by the filled contours) represents concentrations above 5,000 ug/kg. Also note that the figure shows concentrations from a depth below 22-feet bgs. The units in the title will be changed to µg/kg.

b. *l738SB107: The figure shows a result of 150 ug/kg, which is from the 27-28 ft bgs sample. However, 112,000 ug/kg of BTEX was detected from 21-22 ft bgs at this location. Please add to the figure.*

Navy Response to PREQB Comment 11b: As noted in Navy Response to PREQB Comment 11a the figure shows a depth below 22-feet bgs. So, the result of 150 µg/kg is appropriate for 1738SB107.

c. *1738SB110: The figure shows a result of 103 ug/kg, which is from the 24-25 ft bgs sample. However, 194,600 ug/kg BTEX was detected from 20-21 ft bgs at this location. Please add to the figure. In addition, the result from 24-25 ft bgs should be reported from the original sample (707 ug/kg) instead of the field duplicate location (103 ug/kg) which is much lower.*

Navy Response to PREQB Comment 11c: of the result of 707 µg/kg Will be used for 1738SB110.

d. *1738SB111: The figure shows a result of 762 ug/kg, which is from the 28-29 ft bgs sample. However, 35,100 ug/kg BTEX was detected from 21-22 ft bgs at this location. Please add to the figure.*

Navy Response to PREQB Comment 11d: As noted in Navy Response to PREQB Comment 11a the figure shows a depth below 22-feet bgs. So, the result of 762 µg/kg is appropriate for 1738SB111.

***PREQB Comment 12**:* Figure 6-6:

a. *The figure currently shows all MTBE results for samples from below 20 ft bgs, not just those with concentrations above 20 pg/kg. Please revise the title accordingly.*

Navy Response to PREQB Comment 12a: The title of Figure 6-6 is correct; though all MtBE data are used, the distribution of MtBE (shown by the filled contours) represents concentrations above the PREQB Target Level. Also note that the figure shows concentrations from a depth below 22-feet bgs.

b. *1738SB107: The figure shows a result of 8100 ug/kg, which is from the 27-28 ft bgs* *sample. However, 32,000 ug/kg MTBE was detected from 21-22 ft bgs at this location. Please add to the figure.*

Navy Response to PREQB Comment 12b: As noted in Navy Response to PREQB Comment 12a the figure shows a depth below 22-feet bgs. So, the result of 8100 μg/kg is appropriate for 1738SB107.

c. l738SB110: The figure shows a result of 1800 ug/kg, which is from the 24-25 ft bgs sample. However, 5700 ug/kg MTBE was detected from 20-21 ft bgs at this location. Please add to the figure.

Navy Response to PREQB Comment 12c: As noted in Navy Response to PREQB Comment 12a the figure shows a depth below 22-feet bgs. So, the result of 1800 μg/kg is appropriate for 1738SB110.

d. 1738SB111: The figure shows a result of 6400 ug/kg, which is from the 28-29 ft bgs sample. However, 48,000 ug/kg MTBE was detected from 21-22 ft bgs at this location. Please add to the figure.

Navy Response to PREQB Comment 12d: As noted in Navy Response to PREQB Comment 12a the figure shows a depth below 22-feet bgs. So, the result of 6400 μg/kg is appropriate for 1738SB111.

e. 1738MW04: The figure shows a result of ND at this location. However, there were no samples analyzed below 20 ft bgs at this location. Therefore, remove the ND.

Navy Response to PREQB Comment 12e: The ND noted above will be removed.

f. 1738MW01B and 1738MWI3: The figure shows results of ND at these locations. However, this is misleading as although the results were ND, the quantitation limits exceeded the 20 tg/kg criterion. Please note this on the figure.

Navy Response to PREQB Comment 12f: A note will be added that reads, "Not detected; however, quantitation limit was greater than the PREQB target level."

***PREQB Comment 13**:* Figure 6-7:

a. The figure currently shows all benzene results for 2012 groundwater samples, not just those with concentrations above 5 ug/L. Please revise the title accordingly and include "2012" in the title.

Navy Response to PREQB Comment 13a: The title of Figure 6-7 is correct; though all BTEX data are used, the distribution of BTEX (shown by the filled contours) represents concentrations above the PREQB Target Level. Also, "August 2012" will be included in the title.

b. Please add the following results to Figure 6-7:

(1) 1738MW01A: 2.4 ug/L

(2) l738MW01B, 1738MW05, 1738MW05L, 1738MW07A, 1738MW07B, 1738MW08A, 1738MW08B, l738MW09A, 1738MW09B: ND

Navy Response to PREQB Comment 13b-d: In the Navy Response to USEPA Comments 4 and 6, additional planview maps will be generated to represent all the screened intervals, and will include shallow, intermediate, and deep intervals. There are too few or no detections of BTEX in the shallow and deep intervals to create additional figures for BTEX.

PREQB Comment [14]: Figure 6-8:

a. *The figure currently shows all MTBE results for 2012 groundwater samples, not just those with concentrations above 20 pg/L. Please revise the title accordingly, include "2012" in the title and correct the criteria in the title from 12 ug/L to 20 ug/L.*

Navy Response to PREQB Comment 14a: The title of Figure 6-8 is correct; though all MtBE data are used, the distribution of MtBE (shown by the filled contours) represents concentrations above the PREQB Target Level. Also, "August 2012" will be included in the title and 12 ug/L will be changed to 20 ug/L.

b. *Please add the following results to Figure 6-8:*
    - *1738MW01A: 170 ug/L*
    - *1738MWOIB: 5600 ug/L*
    - *1738MW05: 6700 ug/L*
    - *1738MW05L: 2400 ug/L*
    - *1738MW07A: 130 ug/L*
    - *1738MW07B: 93 ug/L*
    - *1738MW08A: ND*
    - *1738MW08B: 590 ug/L*
    - *1738MW09A: 28 ug/L*
    - *1738MW09B: 260 ug/L*

Navy Response to PREQB Comment 14b: The intent of the figure is to show concentrations from wells screened at similar elevations. Therefore, the shallow and deep wells in clusters are not shown on the figure. This will be explained in Section 6.3.

PREQB Comment [15]: *Figure 6-9: The figure currently shows all MTBE results for 2010 groundwater samples, not just those with concentrations above 20 ug/L. Please revise the title accordingly and correct the criteria in the title from 12 ug/L to 20 ug/L.*

Navy Response to PREQB Comment 15: The title of Figure 6-9 is correct; though all MtBE data are used, the distribution of MtBE (shown by the dashed contours) represents concentrations above the PREQB Target Level. Also, 12 ug/L will be changed to 20 ug/L.

PREQB Comment 16: *Figure 6-8: Data for several monitoring wells were not included in this figure (e.g., data for wells l738MW01B, 1738MW07A/B, 1738MW08A/B, and 1738MW09B). Please include all data on this figure or provide the rationale for excluding these data.*

Navy Response to PREQB Comment 16: In the Navy Response to USEPA Comments 4 and 6, additional planview maps will be generated to represent all the screened intervals, and will include shallow, intermediate, and deep intervals. Figures 6-8A and 6-8C include the wells identified in the comment.

PREQB Comment 17: Appendix A:

a. *According to the field notes and the chains-of-custody, soil samples collected in 2010 for GRO analysis were not collected and preserved in accordance with SW-846 method 5035. As per Table 4-3, this method needs to have been used and samples should have been collected with methanol preservation or using EnCore™ samplers. As a result of the lack of preservation, the GRO nondetect results in all soil samples should have been rejected during data validation, in accordance with EPA Region II validation procedures for VOCs. Please revise the report to reflect this and provide a discussion on how these results are not usable for project objectives*

Navy Response to PREQB Comment 17: The data validation reports will be revised to correctly indicate that non-detect results for TPH-GRO in soil samples have been rejected. The data tables in Appendix B and Table 6-3a will also be revised. Additionally, the penultimate paragraph in Section 6.4.2 of the text has been revised as follows:

For the September 2010 Investigation, three samples from SDG 1009155, including 1738MW11-01, 1738MW11-04, and 1738MW11-08, were extracted one day outside the 14 day soil extraction holding time. As a result, the reported TPH-DRO results in these samples were qualified as estimated. In addition, all samples from SDGs 1009155 and 1009220 were not collected and preserved in accordance with SW-846 method 5035. As a result, all non-detect results for TPH-GRO were rejected. Since 25 results for TPH-GRO were rejected, the completeness goal of 90 to 95% for each parameter was not met. However, the completeness goal was met overall with 93.2% completeness for the data from the 2010 investigation and 97.5% completeness for the 2010 and 2012 combined data.

b. *It was observed that the well development and groundwater sampling activities in 2010 and 1738MW17-12C in 2012 were conducted between one and five days apart. It is a common practice to wait for a period of one to two weeks following well development before sampling is conducted (refer to the December 1995 USEPA OSWER article EPA/540/S-95/504 by Puls and Barcelona) to allow for physical and chemical equilibration in the area of newly-installed wells. Please provide an explanation as to the short timeframe between well development and sampling.*

Navy Response to PREQB Comment 17b: Regarding well 1738MW17, a grab sample was collected to quickly determine if SWMU 74, JP-8 Hill was impacting the site, so that additional investigation considerations could be implemented during the mobilization. In 2010, the time between development and sampling was shortened from the two-week ideal due to field scheduling and mobilizations.

c. *According to the field notes, groundwater samples were also collected from monitoring wells 1738GW01, 1738GW02, 1738GW03 and 1738MW05R on 11/2/10. Please explain why the results of these analyses were not provided in this report.*

Navy Response to PREQB Comment 17c: Groundwater samples were collected on 11/2/10 for the AOC F - MNA, Year 8/Quarter 3 event. Results of the sampling were included in a separate MNA report. These field notes should not have been included in this report, and will be removed from the final report.

d. *The depth of the pump intake in the 2010 and 2012 groundwater samples was not at the midpoint of the screened interval, as per the Region 2 low flow groundwater sampling protocol. In most instances, the depth of the pump intake was at the bottom of the* *screened interval. Please explain how the pump intake depths were determined and how the selected pump intake depths will provide the most representative results.*

Navy Response to PREQB Comment 17d: Using low-flow sampling techniques, groundwater drawdown is minimized. This means that pumping is at or near ambient yields. Thus, groundwater flow is from the higher K zone(s) within the screened interval. It can be argued then that the intake placement has no bearing on whether or not a sample is representative. It is well documented and conventionally understood that stabilization of certain water quality parameters (WQPs) is a determining factor of sample representativeness. Stabilization of the WQPs may take longer if the pump intake is farther from the higher K zone(s) because the water column between the higher K zone(s) and the pump intake need to be purged through the pump.

The pump intake was generally set at or near the screen midpoint for the 2012 groundwater sampling. In several instances the pump was set deeper than the screen midpoint to account for a drop in the water table (particularly where the water level was within the screen interval). These wells included 1738MW01A, 1738MW06, 1738MW07A, 1738MW08A, 1738MW09A, 1738MW12, and 1738MW15. For well 1738MW01B, the well depth was measured from the top of the PVC whereas the screen interval was measured from the ground surface. Accounting for this 2.7-foot discrepancy, the pump intake was actually near the well screen midpoint.

In addition, the following issues need clarification:

i. Sample 1738MW06: The depth of the pump intake was 16 ft bgs but according to Table 4-4, the screened interval is 5-15 ft bgs.

ii. Sample 1738MW01A (8/18/12): The depth of the pump intake is listed as 25-27 ft bgs but according to Table 4-4, the screened interval is 15-25 ft bgs.

iii. Sample 1738MW08A (August 2012):
1. The groundwater sample form lists the screened interval as 8.63-13.63 ft bgs, but Table 4-4 lists the screened interval as 6-11 ft bgs. Please clarify the screened interval.

2. The pump intake depth is listed as 11 ft bgs but Table 4-4 lists the well depth as 10.8 ft bgs.

Navy Response to PREQB Comment 17di-iii: The discrepancy is in the reference point. During construction, well screen depths were measured from the ground surface. These depths were used in boring logs. During groundwater sampling depth-to-water measurements and pump intake was measured from the top of the PVC casing. In most cases depths from the PVC were converted to depths from ground surface and recorded on the forms; however, this conversion was not performed in the instances listed in comments i-iii.

***PREQB Comment 18**: Appendix B: Please add the results for o-xylene to the analytical summary data tables for the 2010 soil, groundwater, and QA/QC samples.*

Navy Response to PREQB Comment 18: The appendix tables for 2010 soil, groundwater, and QA/QC samples have been revised to include results for o-xylene.

***PREQB Comment 19:** Appendix C: According to the data validation memo for laboratory sample delivery group I 0091 55, samples in this report were collected from 9/13/10 through 9/20/10. All samples were received by the laboratory on 9/21/10. Please explain where samples were stored between 9/13/10 and 9/20/10 (when they were shipped).*

Navy Response to PREQB Comment 19: Groundwater samples were stored in the Baker storage area at NAPR. This storage area is locked and only accessible to Baker personnel. The samples were stored in coolers on ice, which was frequently changed to maintain a sample temperature at or near 4°C.

Minor Comments

1. Please conduct a review of the document for typographical errors, several of which are identified below:

a. Page 1-1, Section 1.0, 1st sentence. It appears that the word "Fat" following "(aka Site 1738 or the Site)" should be the word "at".

b. Page 1-2, Section 1.3, 7th Sentence. Please expand this sentence to indicate that Section 6 also includes a discussion of the nature and extent of contamination as well as contaminant fate and transport.

c. Page 4-3, Section 4.1, 2nd Sentence. According to this sentence "Only subsurface soil samples were collected in September 2012." Since no investigations were performed in September 2012, it is presumed that the date referenced should be September 2010. Please revise the text accordingly.

d. Page 6-6, Section 6.3, 1st Paragraph, 4th Sentence. The table referenced in this sentence (Table 6-3) is incorrect and should be Table 6-4. Please revise accordingly.

e. Page 6-7, Section 6.4, 1st Sentence. Please note that the section referred to in this sentence should be Section 6.4.1. Please revise the text accordingly.

f. Page 6-7, Section 6.4.1, 3rd Paragraph, 1st Sentence. It appears that the TPH referred to in this sentence should be DRO rather than GRO based upon the data presented in Table 6-5a.

Navy Response to PREQB Minor Comment 1: The document will be reviewed for typographical errors, and the ones noted in comment 1 will be corrected.

2. Several acronyms are defined on more than one occasion in the text. In addition, certain acronyms (mostly in Section 6.1) are missing from the acronym list. Please review the report to make sure that all acronyms are defined once and are included on the acronym list.

Navy Response to PREQB Comment 19: The acronyms and acronym list will be checked and corrected as necessary.

REVISED FINAL
MtBE INVESTIGATION REPORT
AOC F - SITE 1738

For NAVAL ACTIVITY PUERTO RICO
EPA I.D. No. PR2170027203
CEIBA, PUERTO RICO

Prepared for:

Department of the Navy
NAVFAC SOUTHEAST
North Charleston, South Carolina

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Moon Township, PA

Contract No. N62470-10-D-3000
DO JM07

June 28, 2013

IQC for A/E Services for Multi-Media Environmental Compliance Engineering Support

REVISED FINAL

MtBE INVESTIGATION REPORT
AOC F - SITE 1738

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

JUNE 28, 2013

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N62470-10-D-3000
DELIVERY ORDER JM07

Prepared by:

MICHAEL BAKER JR., INC.
Moon Township, Pennsylvania

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: ___________________________

Name: _____________________________

Title: _____________________________

Date: _____________________________

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Puerto Rican Chemist Certification

2012 Data Validation Summaries
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TA-Savannah SDG 680-80447-3
TA-Savannah SDG 680-80651-1
TA-Savannah SDG 680-80791-1
TA-Savannah SDG 680-82411-3
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TA-Savannah SDG 680-82452-1
TA-Savannah SDG 680-82163-1
Puerto Rican Chemist Certification

LIST OF ACRONYMS AND ABBREVIATIONS

AFWTF	Atlantic Fleet Weapons Training Facility
AOC	Area of Concern
ASTM	American Society for Testing and Materials
Baker	Michael Baker Jr., Inc.
BBL	Blasland, Bouck, and Lee, Inc.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
bgs	below ground surface
BRAC	Base Realignment and Closure
CADD	Computer Aided Design and Drafting
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
COD	Chemical Oxygen Demand
CRQL	Contract Required Quantitation Limit
CMS	Corrective Measures Study
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DI	Deionized
DO	Dissolved Oxygen/Delivery Order
DPT	Direct Push Technology
DRMO	Defense Reutilization and Marketing Office
DRO	Diesel Range Organics
DTW	Depth to groundwater
E2SS3	Estuarine, intertidal, scrub-shrub, broad-leaved evergreen
EC_{50}	Median Effective Concentration
Eco-SSL	Ecological Soil Screening Level
ECOTOX	ECOTOXicology
ECP	Environmental Condition of Property
ESLs	ecological screening levels
F	Fahrenheit
FACU	Facultative Upland
FCV	Final Chronic Value
FDEP	Florida Department of Environmental Protection
f_{oc}	Fractional Organic Carbon
ft/d	feet per day
ft/y	feet per year
GIS	Geographic Information System
GPS	Global Positioning System
GRO	Gasoline Range Organics
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
HSA	Hollow-Stem Augers

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

IAS	Initial Assessment Study
ID	inside diameter
IDW	Investigation-Derived Waste
ILCR	Incremental Lifetime Cancer Risk
ITRC	Interstate Technology and Regulatory Council
IUR	Inhalation Unit RiskK hydraulic conductivity
kg/L	kilogram per liter
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
LC_{50}	Median Lethal Concentration
LNAPL	Light Non-Aqueous Petroleum Liquid
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest Observable Effect Level
MATC	Maximum Acceptable Toxicant Concentration
MC	Macro-Core®
MCL	Maximum Containment Level
MDL	Method Detection Limit
MGD	Million Gallons per Day
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
MNA	Monitored Natural Attenuation
ml	milliliter
msl	Mean Sea Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MHSPE	Ministry of Housing, Spatial Planning, and Environment
MtBE	Methyl tertiary-Butyl Ether
mV	Millivolts
NAPL	Non-aqueous phase liquid
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NAWQC	National Ambient Water Quality Criteria
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
NSRR	Naval Station Roosevelt Roads
NTUs	Nephelometric Tubidity Units
OD	outside diameter
ORP	Oxidation/Reduction Potential
PAH	Polynuclear Aromatic Hydrocarbon
PID	Photoionization Detector
PMO	Program Management Office
ppm	parts per million

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

PREQB	Puerto Rico Environmental Quality Board
PRWQS	Puerto Rico Water Quality Standard
PRWQSR	Puerto Rico Water Quality Standard Regulation
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RfC	Inhalation Reference Concentration
RfD	Inhalation Reference Dose
RPD	Relative Percent Difference
RSL	Regional Screening Level
RWEC	Right Way Environmental Contractors, Inc.
SCR	Site Characterization Report
SCV	Secondary Chronic Value
SDG	Sample Delivery Group
SE	Southeast
SL	Screening Level
SQUIRTs	Screening Quick Reference Tables
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TOD	Total Oxidant Demand
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents the results of the investigation of methyl tertiary-butyl ether (MtBE) in soil and groundwater, for Area of Concern (AOC) F - Site 1738 (aka Site 1738 or the Site) at Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico. This report has been prepared by Michael Baker Jr., Inc. (Baker), for the Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) Southeast (SE) office under contract with the Naval Facilities Engineering Command (NAVFAC), SE (Contract Number N62470-10-D-3000, Delivery Order [DO] JM07).

Monitored Natural Attenuation (MNA) is currently being conducted at NAPR at eight different underground storage tank (UST) sites which have been collectively designated as AOC F. In May 2008, MtBE was added to the list of parameters routinely monitored for Site 1738. MtBE has been consistently detected in four monitoring wells, and detected at relatively high concentrations in two wells (1738MW03 and 1738MW05R) prompting the recommendation that MtBE contamination be investigated independently from the MNA program. A Draft AOC F – Site 1738 MtBE Investigation Work Plan (Baker, 2010) was prepared based upon Navy responses dated December 30, 2009 and to United States Environmental Protection Agency (USEPA) comments dated September 29, 2009 on the Draft Monitored Natural Attenuation - AOC F Year 7 Annual Report. The Site 1738 MtBE Investigation Work Plan was approved by the USEPA on May 11, 2010. In addition, a final AOC F – Site 1738 MtBE Investigation Report (Baker, 2011) was prepared in January 2011. Two rounds of comments were made with Navy responses dated February 24, 2011 and May 24, 2011. In the report, recommendations were made for further delineation. This report presents the results of both phases of the MtBE investigation (September 2010 and June/August 2012).

1.1 Purpose of Report

This report has been developed to address MtBE contamination detected in the soil and groundwater at Site 1738 during the MNA monitoring activities. This report has been prepared to document the findings of the September 2010 and June/August 2012 MtBE investigations for Site 1738 in order to define the extent of MtBE contamination in soil and groundwater, as well as to characterize a source area.

1.2 Objectives

The objectives of the Site 1738 MtBE Investigation are to:

- Confirm the presence of a potential source area in the soil near the pump island
- Define the vertical and lateral extent of MtBE in groundwater

Note that the Work Plan (Baker, 2010) also identified conducting a pilot-scale treatability study as one of the project objectives. The Treatability Study Work Plan (Baker, 2011) is being delayed until site characteristics are better understood.

Specific elements of the September 2010 field effort performed to support this MtBE investigation included:

- Collection of 22 subsurface soil samples (excluding duplicates) from five boring locations;

- Collection of fourteen groundwater samples (excluding duplicates) from seven newly installed permanent monitoring wells, and seven existing permanent wells;

- Performing slug tests (aquifer characterization tests) at eleven monitoring well locations;

- Surveying newly installed borings and monitoring wells.

The June/August 2012 additional characterization fieldwork was conducted in two separate mobilizations due to the length of the field program and Site conditions.

Specific elements of the June/August 2012 field effort performed to support this MtBE investigation included:

- Collection of 53 surface and subsurface soil samples (excluding duplicates) from 17 boring locations (including monitoring well borings);

- Collection of 28 groundwater samples (excluding duplicates) from 15 newly installed permanent monitoring wells, and 13 existing permanent wells;

- Performing slug tests (aquifer characterization tests) at 10 newly installed monitoring wells;

- Surveying newly installed borings and monitoring wells.

1.3 Organization of the MtBE Investigation Report

This report is organized into eight sections. Section 1.0 of this document discusses the purpose and objectives of this MtBE investigation report. Section 2.0 presents a brief summary of the background of NAPR and the history and previous investigations at Site 1738. Section 3.0 discusses the climatology, topography, regional geology, hydrology and hydrogeology for NAPR. The activities of the field investigation are provided in Section 4.0. Section 5.0 presents and discusses the physical characteristics of the study area observed during this investigation including the site geology and hydrogeology. Section 6.0 presents the laboratory analytical results performed on the environmental samples, quality assurance/quality control (QA/QC) samples collected, nature and extent of contamination, and contaminant fate and transport. Section 7.0 presents the conclusions and recommendations and Section 8.0 lists report references.

2.0 SITE BACKGROUND

This section provides the history and description of current conditions at NAPR and Site 1738 and also includes a summary of the results of previous investigations conducted at Site 1738.

2.1 NAPR Description and History

NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico; along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance (see Figure 2-1). NAPR also occupies the immediately adjacent islands of Piñeros and Cabeza de Perro, as presented on Figure 2-2. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland (developable) property and 4,955 acres of environmentally sensitive areas including wetlands, mangroves, and wildlife habitat. The closest large town is Fajardo (population approximately 37,000), which is about 5 miles north of NAPR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR (see Figure 2-1).

The facility was commissioned in 1943 as a Naval Operations Base, and re-designated as Naval Station Roosevelt Roads (NSRR) in 1957. NSRR operated as a Naval Station from 1957 until March 31, 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port and over 30 tenant commands. NSRR played a major role in providing communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

Section 8132 of Fiscal Year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within 6 months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the BRAC Act of 1990. This legislation required that the base closure be conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act (CERFA). NSRR has undergone operational closure as of March 31, 2004 and has been designated as NAPR. The mission of NAPR is to protect the physical assets remaining, comply with environmental regulations, and sustain the value of the property until final disposal of the property. NAPR will continue until the real estate disposal/transfer is completed.

A monitored natural attenuation program was initiated at NAPR for several UST sites in 2000; additional sites have been added to the program since 2000. USEPA incorporated a total of eight UST sites (Sites 124, 520, 731, 734, 735, 1738, 1995 and 2842B) that were in the MNA program into the Resource Conservation and Recovery Act (RCRA) § 7003 Administrative Order on Consent dated January 29, 2007, USEPA Docket No. RCRA02-2007-7301 (USEPA, 2007a). These eight UST sites were designated as AOC F.

2.2 Site 1738 Description and History

Based on the information provided in the Site Characterization Report (SCR) prepared by Blasland, Bouck, and Lee, Inc., (BBL) in February 1999, four USTs operated until 1996 at Site 1738. Three of these USTs (10,000 gallon capacity each) contained unleaded gasoline, and the fourth UST (550 gallon capacity) contained waste oil. These USTs were removed in 1996. The SCR indicated that elevated concentrations of total petroleum hydrocarbons (TPH) were present in the subsurface soil and groundwater, and elevated concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in the groundwater. In addition, light nonaqueous phase liquid (LNAPL) was detected in well 1738MW02. The SCR recommended skimming of free product at well 1738MW02; however, it also recommended no corrective measures for soil, indicating that natural-attenuation processes would deplete the source area.

Site 1738 was included in an MNA program beginning in the year 2000. The initial MNA program did not include MtBE in the monitoring design. Groundwater samples were not analyzed for MtBE until Year 6 (May 2008) when a new work plan (Baker, 2008) was developed for the MNA program which identified the need for monitoring of MtBE.

A detailed description of the current site conditions is given in Section 5.1.

2.3 Previous Investigations

The BBL SCR (BBL, 1999) indicated the presence of soil contamination in the form of elevated total organic vapors and total petroleum hydrocarbon vapors below 18 feet below ground surface (bgs) based on field screening; however, samples for laboratory analyses were generally collected above 18 feet bgs. The BBL SCR did not discuss why soil samples were not collected at these deeper intervals. The BBL SCR stated that TPH was not detected above Puerto Rico Environmental Quality Board (PREQB) Target Level in any of the soil samples collected at the site. In addition, soil samples were analyzed for total BTEX, for which there is no PREQB Target Level. Total BTEX was elevated in only one soil boring, SB-2 (current location of MW03) at 14,388 milligrams per kilogram (mg/kg) from 0.5- to 3.5-feet bgs. The SCR recommended no further action for soil because no soil sample exhibited TPH above the PREQB Target Level. It addition, the SCR stated that the effectiveness of remedial options such as soil vapor extraction and bioremediation would be limited by low permeability soils encountered at the Site.

Monitoring wells 1738MW01 through 1738MW06 were installed in 1998 by BBL as part of the SCR. These wells have been sampled and analyzed for volatile organic compounds (VOCs) since 2000 as part of the MNA program; monitoring wells 1738MW04 and 1738MW06 were suspended from sampling, following the Year 4, Quarter 4 sampling event. Monitoring wells 1738MW01, 1738MW02, 17MW03, and 1738MW05R are sampled quarterly and analyzed for BTEX constituents and MNA parameters. In Year 6 (May 2008) of the program, MtBE was added to the analytical suite due to the concern of gasoline additives in the environment. Monitoring well 1738MW05R (screened at a depth of 14.5 to 24.5 feet bgs) which is nested next to 1738MW05 (screened from 3.5 to 10.5 feet bgs) also was included in the MNA program during Year 6.

Free product has not been detected at any monitoring well location at Site 1738 for five years. Free product was last detected at 1738MW02 in Year 2 Quarter 4. Beginning in November 2009, samples collected from monitoring well1738MW05R were considered more representative than monitoring well 1738MW05 because it is screened at a deeper interval which is more comparable to the depth intervals monitored by the other groundwater wells; therefore, the data from 1738MW05R began to be used for plotting trends in concentrations.

As measured during the MNA program, the general groundwater flow direction in the shallow water-bearing zone at the site is to the north towards the estuarine wetland located north of the site. Since MtBE was added to the MNA program in May 2008, it has been detected in all wells monitored at this site (1738MW01, 1738MW02, 1738MW03 and 1738MW05R [most down gradient well]). The MNA data showed that the extent of MtBE in groundwater has not been delineated towards the north. Because of the positive detections of MtBE in the groundwater from the most down gradient well at this site it was decided to collect surface water samples from the estuarine wetland north of the site in accordance with the Revised Final II Monitored Natural

Attenuation Work Plan for AOC F submitted on November 21, 2008. These surface water samples were collected during the Year 6 (Quarter 2) sampling event in August 2008 from the estuarine wetland north of the site and did not contain detectable concentrations of MtBE. The location of these surface water samples are presented on Figure 4-2.

Monitoring wells 1738MW04 and 1738MW06 were removed from the MNA program following the Year 4/Quarter 4 event. The Navy collected groundwater samples for analysis of MtBE and BTEX from 1738MW04 and 1738MW06 on March 23, 2010 to provide additional information to the east and west of the MtBE groundwater plume for preparation of the site characterization work plan. Results from these samples showed MtBE concentrations of 0.044J micrograms per Liter (µg/L) in 1738MW04 and not detected (at the detection limit of 0.5 U µg/L) in 1738MW06. Based upon these results, the groundwater MtBE plume migration in the eastern and western directions is not expected to be as significant as in the northern direction.

MtBE has been consistently detected in all four MNA monitoring wells (1738MW01, 1738MW02, 1738MW03, and 1738MW05R) since it was added to the sampling program in May 2008. As noted previously, 1738MW02 was not sampled during the SCR (due to the presence of free product in the well) and MtBE was not previously detected at 1738MW03.

The shallow groundwater conditions at the site are anaerobic as evidenced by historical field data. In particular, other than groundwater at monitoring well 1738MW05R, groundwater dissolved oxygen (DO) concentrations at the remaining monitoring wells during the Year 7/Quarter 4 (February 2010) sampling event were generally less than 1 part per million (ppm) and oxidation/reduction potential (ORP) measurements were negative.

3.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

The physical setting of NAPR was documented in the 1984 Initial Assessment Study (IAS) (Naval Energy and Environmental Support Activity [NEESA], 1984). This information is summarized in the paragraphs that follow.

3.1 Climatology

The climate associated with NAPR is characterized as warm and humid, with frequent showers occurring throughout the year. A major factor affecting the weather is the pattern of trade winds associated with the Bermuda High, the center of which is in the vicinity of 30^o North, 30^o West (central Atlantic Ocean). The prevailing wind direction reflects the easterly trade winds. The area receives a surface flow varying between the northeast to the southeast about 75 percent of the year, and as much as 95 percent of the time in July when the easterly winds are strongest. The differential heating of the land and sea during the day tends to give a more northerly component to the flow on the northern side of the island and a more southerly component on the southern side. During the night, a land breeze causes a prevailing southeasterly flow in the north and a prevailing northeasterly flow over the southern coast. The mean annual wind velocity is 5.5 knots, with a minimum in November and a maximum in August. Gales associated with westward moving disturbances in the trade winds or hurricanes passing either north or south of the area have the highest probability of occurrence from June through October.

Uniform temperatures prevail, with small diurnal ranges as a result of insular exposure and the relatively small land areas. The warmest months are August and September, while the coolest are January and February. Mean annual maximum temperatures range from 82.0° Fahrenheit (F) in January to 88.2° F in August. The mean annual minimum temperatures vary from 64.0° F in January to 73.2° F in June. The highest maximum temperature recorded was 95.0° F, while the lowest minimum was 59.0° F. Rain usually occurs at least nine days in every month, with an average of 60 inches per year although a dry winter season occurs from December through April. About 22 thunderstorm-days occur per year, with maximum frequencies of 3 days per month from May through October.

In late summer, the mean sky cover begins a steady decrease from a monthly maximum average of 6.5-tenths coverage in September to a minimum monthly average of 4.4-tenths coverage in February. From March through August, the monthly average cloud cover increases steadily from 4.5- to 6.0 tenths coverage during the period. Over the open sea, a maximum of clouds (usually broken stratocumulus) occurs during early morning, with the skies clearing or becoming scattered with cumulus by afternoon. Completely clear or overcast skies are rare during daylight hours, while clear skies frequently occur at night.

The hurricane season is from mid-June through mid-September; maximum winds exceed 95 knots during severe hurricanes. An average of two tropical storms per year occurs in the study area, one of which usually reaches hurricane intensity.

3.2 Topography

The regional area of NAPR consists of an interrupted, narrow coastal plain with small valleys extending from the Sierra de Luquillo range, which has been severely eroded by streams into valleys several hundreds of feet deep. Slopes of up to 60^o are common.

In the immediate area of NAPR, elevations range from sea level to approximately 295 feet. Immediately to the north of the NAPR boundary, the hills rise abruptly to heights of 800 to 1,050 feet above mean sea level (msl), with the tallest peak located within 2 kilometers of the NAPR boundary. There is a series of three hilly areas on NAPR, two of which separate the southern airfield area from the Port/Industrial, Housing, and Personnel Support areas. The third set of hills is in the Bundy area. These ridgelines not only separate sections of NAPR, but also dictate the degree of allowable development. The ridgeline south of the airfield provides an excellent barrier, which effectively decreases the aircraft-generated noise reaching the Unaccompanied Enlisted Personnel Housing areas to an acceptable level. Relief is low along the shoreline and lagoons and mangrove swamps are common.

Site 1738 consists of two areas; 1) an upgradient area where the gas station and associated facilities were, and 2) downgradient area, which is the undeveloped portion of the Site. The upgradient area is locally flat with an average elevation of approximately 23 feet above msl. The downgradient area is relatively flat with an average elevation of approximately 7 feet above msl. Section 5.1 provides additional information on these areas.

3.3 <u>Geology, Hydrology, and Hydrogeology</u>

The following subsections present the description of the geologic, hydrologic, and hydrogeologic conditions across NAPR. These are generally applicable, but may or may not be specifically-applicable, to the Site 1738 area. Site specific geologic, hydrologic, and hydrogeologic information can be found in Sections 5.2.1 and 5.2.2.

3.3.1 Soils

The soil associations found at NAPR are predominantly of two types typical of humid areas, namely the Swamps-Marshes Association and the Mabi-Rio-Arriba-Cayagua Association, as well as the Descalabrado-Guayama Association, which is typical of dry areas. In addition, isolated areas of the Caguabo-Mucara-Naranjito Association, the Coloso-Toa-Bajura Association, and the Jacana Amelia-Fraternidad Association are found at NAPR.

The Swamps-Marshes and Mabi-Rio-Arriba-Cayagua associations cover over one half of NAPR's surface area and are equally distributed. Primarily the Descalabrado-Guayama and Caguabo-Mucara-Naranjito associations cover the remaining area.

The Swamps-Marshes Association consists of deep, very poorly drained soils. This association is found in level or nearly level areas that are slightly above sea level but are wet, and when the tide is high, are covered or affected by saltwater or brackish water. The soils are sandy or clayey, and contain organic materials from decaying mangrove trees. Coral, shells, and marl at varying depths underlie them. The high concentration of salt inhibits the growth of all vegetation except mangrove trees, and in small-scattered patches, other salt-tolerant plants.

The Mabi-Rio-Arriba-Cayagua Association consists generally of deep, somewhat poorly drained and moderately well drained, nearly level to moderately steep soils found on foot and side slopes, terraces, and alluvial fans. Soils of this association at NAPR are basically clayey.

The Descalabrado-Guayama Association generally consists of shallow, well drained, strongly sloping to very steep soils on volcanic uplands. Soils of this association are found primarily in the hilly areas located directly inland and adjacent to the soils of the Swamps-Marshes Association.

The Caguabo-Mucara-Naranjito Association consists generally of shallow and moderately deep, well drained, sloping to very steep soils on volcanic uplands. This association consists of soils that formed in residual material weathered from volcanic rocks. This association is represented at NAPR by soils of the Sabana series, which are found on the side slopes and the hilly terrain west of Langley Drive in the Bundy area. These soils are suited for pasture and woodland. Steep slopes, susceptibility to erosion, and depth to bedrock are the main limitations for farming and for recreation and urban areas.

The Coloso-Toa-Bajura Association consists of deep, moderately well drained to poorly drained, nearly level soils found on floodplains. This soil association extends along the western boundary of NAPR and around the airfield. The soils of this association formed in fine-textured and moderately fine-textured sediment of mixed origin on floodplains. The Coloso soils are deep and somewhat poorly drained; the Toa soils are deep and moderately well drained; and the Bajura soils and Maunabo soils are deep and poorly drained. The Reilly soils, also part of this association, are shallow sand and gravel and are excessively drained; they lie adjacent to streams. The minor soils are Talante, Vivi, Fortuna, Vega Alta, and Vega Baja. The Talante, Vivi, Fortuna, and Vega Baja soils are found on floodplains, while the Vega Alta soils occupy slightly higher positions on terraces.

The Jacana-Amelia-Fraternidad Association consists generally of moderately deep and deep, well drained and moderately well drained, nearly level to strongly sloping soils on terraces, alluvial fans, and foot slopes. This association is represented at NAPR by soils of the Jacana series, which consist of moderately deep, well-drained soils found on the foot slopes and low rolling hills along Langley Drive and just east of the airfield. These soils formed in fine-textured sediment and residuum derived from basic volcanic rocks.

3.3.2 Regional Geology

The underlying geology of the NAPR area is predominantly volcanic (composed of lava and tuff), as well as sedimentary (rocks derived from discontinuous beds of limestone). These rocks all range in age from early Cretaceous to middle Eocene. The volcanic rocks and interbedded limestone have been complexly faulted, folded, metamorphosed, and variously intruded by dioritic rocks. This complex geological structuring occurred sometime after the deposition of the limestone during the middle Tertiary, when Puerto Rico was separated from the other major Antillean Islands by block faulting, and was arched, uplifted, and tilted to the northeast. Culebra, Vieques, and the Virgin Islands are part of the Puerto Rican block; they are separated from the main island simply because of the drowning that resulted from the tilting.

In addition to the predominant volcanic and sedimentary rock, unconsolidated alluvial and older deposits from the Quaternary period underlie the northwestern and western sectors of the base.

The primary geologic formations on and near NAPR are various beach deposits, alluvium, quartz diorite and granodiorite, quartz keratophyre, the Daguao Formation, and the Figuera Lava. The Peña Pobre fault zone traverses near NAPR.

3.3.3 Local Geology

In 2004, Baker conducted a Phase II Environmental Condition of Property (ECP) investigation involving 20 sites throughout NAPR (Naval Facilities Engineering Command, Atlantic Division [LANTDIV], 2004). Some consistent stratigraphic trends were observed during the ECP, which is discussed in this subsection. For the sake of simplicity, the NAPR regional geology can be divided into three regions:

- Upland areas
- Near-shore flat lands
- Inland flat lands

The upland areas of NAPR includes the hills encompassing the Tow Way Fuel Farm and hospital areas, and the hills encompassing the area behind the Exchange, the former Atlantic Fleet Weapons Training Facility (AFWTF) Command, and the Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering.

Typically, the bedrock is overlain be a relatively thin residual soil (i.e., residuum). Residuum is unconsolidated soil, originating from weathered-in-place bedrock. This residuum generally consists of sand, silt, and clay.

The near-shore areas include the mangrove swamp areas as well as the shores of Ensenada Honda and Puerca Bay. The near-shore areas are typically underlain by marine sand layers (with coral and shell fragments), silt and clay layers, and occasional peat layers. In some near-shore areas, particularly by the harbor and Camp Moscrip in the southeastern portion of the base, fill material overlays the marine layers. The fill consists of rock fragments, debris (e.g., brick), sand, silt, and clay.

The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land area is typically underlain by relatively thick residuum. The residuum generally consists predominately of clay. Fill material overlays the residuum in some areas, particularly the airfield, and generally consists of sand and gravel with lesser amounts of silt and clay.

3.3.4 Regional and Local Hydrology

The surface waters that flow across the northeastern plain of Puerto Rico, where NAPR is located, originate on the eastern slopes of the Sierra De Luquillo Mountains. Surface runoff is channeled into various rivers and streams that eventually flow into the Caribbean Sea. The Daguao River and Quebrada Seca Stream (a tributary to Rio Daguao) collect surface waters from the hills immediately north of NAPR and, in periods of heavy rain, flooding on NAPR occurs. The Daguao-Quebrada Seca watershed comprises an area of approximately 7.6 square miles (4,900 acres), and the river falls some 700 feet from its source to sea level. Increased development in the town of Ceiba, especially in areas adjacent to NAPR's northern boundary, has significantly increased the surface runoff reaching NAPR, causing ponding and erosion in the Boxer Drive area. Boxer Drive, for a major portion of its length, is subject to surface water flooding, as are Hangar 200 and Hangar 379 and adjacent apron areas. This condition has been alleviated by the construction of a new highway (Route 3) immediately outside the fence and the realignment of Boxer Drive both with attendant storm water management features.

In the low-lying shore areas, seawater flooding results from storms, wind, and abnormally high tides. The tidal ranges in the NAPR area are rather small, with a maximum spring range of less than three feet. The tides are semidiurnal and have a usual range of about one-foot in the main harbor of NAPR.

Little information exists in the literature concerning groundwater of NAPR. The only known potential sources of groundwater lie in lenticular beds of clay, sand and gravel, and rock fragments, which occur at a depth of less than 30 meters. No wells have been developed on site from these layers. Some wells had been developed upgradient of NAPR in Ceiba, some three kilometers from base headquarters, but were abandoned due to high levels of salinity.

The quality of surface waters is variable, reflecting the drainage area through which the water flows. Generally, surface waters have high turbidities and bio-organics (naturally occurring organics, such as decay products of vegetable and animal matter) due to the periodic heavy rains that can easily erode soils from steep slopes, exposed areas and disturbed streambeds. Water from alluvial aquifers along the coast of NAPR is of a calcium bicarbonate type, and has high concentrations of iron and manganese. The source of these minerals is unknown, but they may be derived from buried swamp or lagoon deposits.

A seawater-freshwater interface is present in the aquifers throughout the coastal areas of Puerto Rico, usually within a short distance inland of the coastline.

The NAPR potable water treatment plant receives raw water from the Rio Blanco through a 27-inch reinforced concrete pipe that replaced the old, open channel. The intake is located at the foot of the El Yunque rain forest. This buried raw water line traverses a distance of 14 miles from the intake to the NAPR boundary. A raw water reservoir is located at the water treatment plant and has a 45 million gallon capacity. Additionally, there are two fire protection storage reservoirs with a total capacity of 520,000 gallons.

NAPR has been served for over 30 years by the present water treatment facility. The plant (Building 88) has a capacity of 4.0 million gallons per day (MGD). Water flows by gravity into a 45 million-gallon raw water storage basin from which the plant draws its supply at a rate of 1.3 MGD on average. Treatment consists of pre-chlorination, coagulation sedimentation, filtration, and post-chlorination.

4.0 SITE INVESTIGATION ACTIVITIES

This section summarizes the Site 1738 MtBE field investigation, analytical, and data validation activities that were associated with the two field investigation phases.

The September 2010 field investigation included the following activities:

1. Installation of five soil borings in the vicinity of the former pump island with the collection of a total of 16 subsurface soil samples for BTEX, TPH diesel range organics (DRO), TPH gasoline range organics (GRO) and MtBE analyses;

2. Installation of seven soil borings for monitoring well installation. Three subsurface soil samples each were collected from two borings (1738MW11 and 1738MW12) for a total of six subsurface soil samples for BTEX, TPH DRO, TPH GRO and MtBE analyses.

3. Installation of a total of seven groundwater monitoring wells.

4. Collection of groundwater samples from all (seven) existing monitoring wells and seven newly installed wells for a total of 14 groundwater samples for BTEX, TPH DRO, TPH GRO and MtBE analyses.

   - Conducting slug tests (aquifer characterization tests) in 11 of the 14 monitoring wells.

   - Abandoned monitoring well TEMPORARY WELL.

   - Surveying the newly installed borings and monitoring wells as well as resurveying the existing monitoring wells.

   - Additional field activities conducted in support of this investigation include utility clearance, site clearing, and management of investigation-derived wastes (IDW).

The June/August 2012 field investigation had two primary tasks; installation and sampling of additional groundwater monitoring wells to delineate the MtBE plume, and advancement of soil borings and collection of soil samples to further define the presence or absence of a potential source zone. The June 2012 mobilization provided some evidence that a potential source zone was present. The August 2012 mobilization focused on source zone characterization and delineation, based on the evidence from the June 2012 mobilization. The details of the evidence that a potential source zone exists are presented in Section 6.2. The June/August 2012 field investigation included the following activities:

- Installation of seven soil borings (identified with an "SB" in the sample ID) in the upper portion of the Site with the collection of a total of 53 surface and subsurface soil samples for BTEX, TPH DRO, TPH GRO, MtBE, fractional organic carbon (f_{oc}), and/or total oxidant demand (TOD) analyses. One of the seven borings was an extension of SB104. This boring was drilled to a depth of 19 feet bgs in September 2010, and was extended to a depth of 32 feet in June 2012.

- Installation of 15 soil borings for monitoring well installation. In general, one surface soil sample was collected from each soil boring, along with two or three subsurface soil samples (identified with an "MW" in the sample ID). Analysis included BTEX, TPH DRO, TPH GRO and MtBE.

- Installation of a total of 15 groundwater monitoring wells.

- Collection of groundwater samples from 13 existing monitoring wells and 15 newly installed wells for a total of 28 groundwater samples for BTEX, TPH DRO, TPH GRO and MtBE analyses.

- Conducting slug tests (aquifer characterization tests) in 10 newly installed monitoring wells.

- Surveying the newly installed borings and monitoring wells as well as resurveying the existing monitoring wells.

- Additional field activities conducted in support of this investigation include utility clearance, site clearing, and management of IDW.

The June/August 2012 investigation was completed in two mobilizations due to the length of the field program and Site conditions. The first mobilization occurred between June 11 and July 1, 2012. The main activities included installation of 14 monitoring wells and attempting soil borings. A Geoprobe® 7822DT rig was used for soil sampling (Macro-Core® Sampler [MC]) and well installation (4-1/4 inch inside diameter [ID] hollow stem augers [HSAs]). There were two difficulties with well installation, heaving sediments and hard gravel or bedrock. Heaving sediments were encountered during well installation in the downgradient area. Well installation was slow and two wells (MW16 and MW07B) had to be re-installed due to collapsing formation during sand pack placement. Auger refusal or very slow advancement rates were encountered at several wells in the upper area (including wells MW01A, MW02R, and MW13) due to hard gravel or saprolite/weathered bedrock. In addition, two soil borings could not be fully completed in the upper area (SB104A and SB106) due to hard saprolite or weathered bedrock. To overcome these difficulties, an air rotary rig was brought on site during the first mobilization to complete well installation (wells MW01A, MW01B, MW02R, MW14, and MW15). In addition, an auger rig was brought on site during the second mobilization to complete boring advancement/soil sampling (SB106A – SB111). Additional detail is provided in the sections that follow. The second mobilization occurred between August 13 and August 29, 2012. The main activities included groundwater sampling, boring advancement/soil sampling, and installation of one additional monitoring well.

Both phases of the investigation were conducted in accordance with the Draft MtBE Investigation Work Plan, AOC F - Site 1738 (Baker, 2010). Deviations from the Work Plan are described within subsequent sections of this report, as appropriate. Refer to Figure 4-1 for soil boring and monitoring well locations.

The environmental and QA/QC samples collected from the site were analyzed at a fixed-base laboratory (see Section 4.11) and the data was validated by an independent third party (see Section 4.12). A summary matrix listing the primary environmental samples collected and the analyses conducted on each sample is shown in Table 4-1. Field duplicates and matrix spike/matrix spike duplicate samples and the analyses conducted on these samples are also shown in Table 4-1. Other QA/QC samples (trip blanks, field blanks, and equipment rinsates) collected and the analyses conducted on these samples are shown in Table 4-2. The list of analytical parameters and the Contract Required Quantitation Limits (CRQLs) are provided in Table 4-3.

Field notes containing descriptions of the site activities, site photographs (including a photograph location map), soil boring logs, and chain-of-custody records are presented in Appendix A.

Laboratory analytical results for soil, groundwater, QA/QC, and IDW are presented in Appendix B. Data Validation report summaries are provided in Appendix C.

4.1 Soil Sampling

Surface and subsurface soil samples were collected as part of the 2012 Site investigation. Only subsurface soil samples were collected in September 2010. The sections that follow detail soil sampling.

4.1.1 Surface Soil – June/August 2012

Surface soil samples were collected during the June 2012 mobilization from nine well borings as shown on Table 4-1. Surface soil samples were collected at locations as proposed in the Draft MtBE Investigation Work Plan. The samples were collected during soil boring advancement using a track-mounted direct push technology (DPT) rig (Geoprobe 7822 DT rig operated by JFA, Inc., of Aguadilla, Puerto Rico) and samples were collected using a 4-foot long Geoprobe® MC Sampler and disposable, clear acetate liners. Soil boring logs are presented in Appendix A.

Soil samples were field-screened for non-specific, total VOCs using a photoionization detector (PID) equipped with a 10.2 eV bulb and calibrated to isobutylene. The PID readings were recorded on the drilling logs for each boring (Appendix A). The field screening procedure for soils collected using the DPT MC sampler involved making a longitudinal cut along the entire length of the MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID at approximately 1-foot intervals. No measurable VOC vapors were detected in the surface soil samples.

Surface soil samples were composited over a one-foot interval (0- to 1-foot bgs). Samples for BTEX, MtBE, and TPH GRO were taken directly from the MC liner. Method 5035 was utilized in collection of the BTEX, MtBE, and TPH GRO samples. These samples were collected using a cut off plastic syringe to estimate 5 grams and were placed into 40 milliliter (ml) vials containing sodium bisulfite (2 vials) and methanol (1 vial). The sodium bisulfite preservative was for low levels and the methanol preservative for high levels. Samples for TPH DRO were placed in a clean, single-use aluminum pie pan, homogenized, and transferred to the sample container. All samples were placed on ice after collection. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix A) to the fixed-base analytical laboratory for analysis. Surface soil samples were analyzed for MtBE, BTEX, TPH DRO and TPH GRO as outlined in the Work Plan and summarized on Table 4-1.

4.1.2 Subsurface Soil - September 2010

Two sets of soil borings were advanced at Site 1738: one set in the vicinity of the pump island (1738SB101 through 1738SB105) and one set for monitoring well installation (1738MW05L and 1738MW07 through 1738MW12). Boring locations are shown on Figure 4-1. As shown on Table 4-1, 16 subsurface soil samples were collected from the five soil borings installed in the vicinity of the pump island, three subsurface soil samples were collected from 1738MW11 and three subsurface soil samples were collected from 1738MW12. The same installation procedure, as discussed in the following paragraphs, was used for all of the soil borings. Table 4-4 summarizes the soil boring and monitoring well specifications and construction information. The soil borings and associated monitoring wells were installed at the locations proposed in the work plan, with the exception of boring 1738SB103, which was moved several times to the north, for a total of six feet to avoid an obstruction at one foot bgs.

Soil borings were advanced using a track-mounted DPT rig (Geoprobe 6610 DT rig operated by GeoEnviroTech, Inc., of San Juan, Puerto Rico) and samples were collected using a 5-foot long Geoprobe MC Sampler and disposable, clear acetate liners. Soil boring logs are presented in Appendix A.

Soil samples were field-screened for non-specific, total VOCs using a PID equipped with a 10.2 eV bulb and calibrated to isobutylene. The PID readings were recorded on the drilling logs for each boring (Appendix A). The field screening procedure for soils collected using the DPT MC sampler involved making a longitudinal cut along the entire length of the MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID at approximately 0.5 foot intervals. Measurable organic vapors above background levels were detected at boring locations 1738SB101, 1738SB102, and 1738SB104. These readings ranged from a few ppm to a maximum of 90 ppm at 1738SB104 near the water table. Organic vapors were detected (1 to 3 ppm) in only one monitoring well location, 1738MW05L, below the water table.

Subsurface soil samples were collected from varying depths ranging from the 1 to 3 foot interval, to the 15 to 17 foot interval bgs. According to the Work Plan, subsurface soil samples were collected from 1 to 3 feet bgs, from whatever interval was just above the water table, and any interval which recorded an elevated PID concentration. In the case of no elevated PID measurements, samples were collected to verify clean soil conditions at various elevations. In some cases up to four samples were collected per boring for verification. Soil samples were composited over the entire two foot interval by taking representative soil portions and avoiding mixing and volatilization loss. The samples were transferred directly into pre-labeled, laboratory provided sample jars and placed on ice. Method 5035 was utilized in collection of the VOC samples. VOC samples were collected using a cut off plastic syringe to estimate 5 grams and were placed into 40ml vials containing sodium bisulfite (2 vials) and methanol (1 vial). The sodium bisulfite preservative was for low levels of VOCs and the methanol preservative for high levels of VOCs. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix A) to the fixed-base analytical laboratory for analysis. Subsurface soil samples were analyzed for MtBE, BTEX, TPH DRO and TPH GRO as outlined in the Work Plan and summarized on Table 4-1.

4.1.3 Subsurface Soil – June/August 2012

Soil borings were advanced at Site 1738 for two purposes; 1) to characterize and delineate the potential source zone, and 2) install monitoring wells. Boring locations are shown on Figure 4-1. As shown on Table 4-1, 19 subsurface soil samples were collected from six soil borings advanced in the upper area. Sixteen subsurface soil samples were also collected from ten monitoring well borings. The same advancement/sampling procedure, as discussed in the following paragraphs, was used for all of the soil borings. Note that a sample could not be collected from the 1 to 3 foot bgs interval at 1738SB108 due to the gravelly nature of the subsurface material at that depth. Also note that TPH DRO analysis was not performed on the deep samples from borings 1738SB108, 1738SB109, and 1738SB110. These borings were placed primarily to delineate observed residual-phase non-aqueous phase liquid (NAPL), which is primarily related to gasoline constituents. This represents a Work Plan deviation. Table 4-4 summarizes the soil boring and monitoring well specifications and construction information. The monitoring well borings were advanced at the locations proposed in the Draft MtBE Investigation Work Plan. The location of the soil borings changed from the locations proposed in the Draft MtBE Investigation Work Plan. Observations during installation of wells MW02R and MW13 suggested that soil contamination existed primarily below a depth of 18 feet and encompassed a large portion of the upper area.

To characterize and delineate the potential source zone, a dynamic field approach was used. This approach consisted of collection of soil samples below the water table, visual observations, and field screening. Field screening included the PID and a hydrophobic dye shake test (using Oil-N-Soil™ kits). Observations and field screening evidence from wells MW02R and MW13 (see boring logs in Appendix A) provided an initial estimate of the horizontal extent of the source zone. The subsequent soil borings were advanced in locations to provide additional nature characterization and delineation.

Soil borings were advanced using a track-mounted DPT rig (Geoprobe 7822 DT rig and samples were collected using a 4-foot long Geoprobe® MC Sampler and disposable, clear acetate liners. Soil boring logs are presented in Appendix A.

Soil samples were field-screened for non-specific, total VOCs using a PID equipped with a 10.2 eV bulb and calibrated to isobutylene. The PID readings were recorded on the drilling logs for each boring (Appendix A). The field screening procedure for soils collected using the DPT MC sampler involved making a longitudinal cut along the entire length of the MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID at approximately 1-foot intervals. Measurable organic vapors above background levels were detected at most boring locations below a depth of 20 feet, which was generally below the first encountered groundwater. Readings were above 1,000 ppm in the suspected source zone area.

Select soil samples were field-screened for the presence of NAPL. The Oil-N-Soil™ kit consists of a 2-ounce plastic container with a hydrophobic dye-impregnated sugar cube adhered to the lid. The user adds soil to a line on the label, adds water to another line on the label, and shakes the jar to release the dye. A colored ring or spots indicates the presence of NAPL.

Subsurface soil samples were collected from varying depths. According to the Work Plan, subsurface soil samples were collected from 1 to 3 feet bgs, from whatever interval was just above the water table, and any interval which recorded an elevated PID concentration. A 1 to 3 foot interval was collected from all of the deep well soil borings, and three of the soil borings. Deeper subsurface soil samples were collected from varying depths, at the geologist's discretion. These deeper subsurface soil samples were collected to characterize the nature of the source zone, and provide delineation. Selection of sampling intervals was based on PID readings, visual observation, or NAPL identification field tests. Samples were collected below the water table since PID reading and field screening evidence suggested that soil contamination extended below the water table.

Soil samples were composited over one- or two-foot intervals based on the distribution of observable contamination. In some instances, observable contamination was in a fairly narrow interval, so as to not dilute the concentration the sampling interval was limited. Samples for BTEX, MtBE, and TPH GRO were taken directly from the MC liner. Method 5035 was utilized in collection of the BTEX, MtBE, and TPH GRO samples. These samples were collected using a cut off plastic syringe to estimate 5 grams and were placed into 40ml vials containing sodium bisulfite (2 vials) and methanol (1 vial). The sodium bisulfite preservative was for low levels and the methanol preservative for high levels. Samples for TPH DRO were placed in a clean, single-use aluminum pie pan, homogenized, and transferred to the sample container. All samples were placed on ice after collection. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix A) to the fixed-base analytical laboratory for analysis. Subsurface soil samples were generally analyzed for MtBE, BTEX, TPH DRO and TPH GRO as outlined in the Work Plan and summarized on Table 4-1. In addition, select samples were analyzed for f_{oc} and TOD.

4.2 Monitoring Well Installation and Groundwater Sampling

Monitoring wells were installed as part of the Site investigation during both the September 2010 and June/August 2012 field efforts. The sections that follow detail well installations.

4.2.1 Monitoring Well Installation and Sampling - September 2010

Monitoring wells were installed at seven locations (1738MW05L, 1738MW07, 1738MW08, 1738MW09, 1738MW10, 1738MW11, and 1738MW12) using 3-1/4-inch ID HSAs. Refer to Figure 4-1 for soil boring and monitoring well locations and Table 4-4 for soil boring and monitoring well specifications and construction information. The monitoring well network was proposed in order to further delineate the downgradient (northern) and sidegradient extent of MtBE at Site 1738 and to establish upgradient monitoring points. The monitoring wells were installed at the approximate locations that were proposed in the work plan.

Monitoring wells were constructed of 2.0-inch ID, Schedule 40 polyvinyl chloride (PVC), with flush joint threads. Each well was constructed with 10-foot long well screens (0.01-inch slots) and attempts were made to install the screens to straddle the water table. The well screen and bottom cap were set at the bottom of the borehole and the screen was connected to threaded, flush-joint riser. The annular space around the well screen was backfilled with a well-graded, fine to medium sand as the augers were withdrawn from the borehole. The sand was extended to approximately two feet above the top of the screened interval. An approximately two-foot thick sodium bentonite seal was placed above the sand pack. The bentonite was hydrated with potable water and allowed to set for one hour. The annular space above the bentonite seal was backfilled with a cement/bentonite grout to prevent surface water from infiltrating into the screened groundwater monitoring zone. An expandable water tight locking cap with a vent hole was placed at the top of the casing. The wells were completed at the surface with approximately three feet of four-inch square protective casing, with the exception of 1738MW11 which was finished at the ground surface with a flushmount cover due to potential traffic and grass cutting in this area. The protective casing was placed over the riser and surrounded by an approximate 2 feet by 2 feet (length x width) and 6 inches thick concrete pad. Four steel bollards were installed around the concrete pad in areas of high vehicular traffic (1738MW12) as additional protection and painted a bright color to aid in visibility.

Monitoring well development consisted of surge and bail using a decontaminated bailer. A minimum of three well volumes were bailed from each of the newly installed wells. In most cases more than three well volumes were removed in an effort to reduce turbidity and improve clarity to ensure successful low flow sampling parameter equilibrium. Ideally, an attempt is made to reduce turbidity to less than 50 Nephelometric Turbidity Units (NTUs), which is stated in the Revised Final Monitored Natural Attenuation Work Plan for AOC F, dated September 8, 2008. A two-week waiting period between well completion and well development is standard procedure when possible at NAPR. Due to schedule and mobilizations, this two-week period did not occur. Records of the well development calculations and volumes are in the field notebooks found in Appendix A.

The groundwater was sampled using a decontaminated bladder pump and low-flow sampling techniques at each well. Field parameters of pH, temperature, turbidity, conductivity, dissolved oxygen, and oxidation-reduction potential were measured and recorded on the well detail and sampling logs presented in Appendix A. The sampling criteria were met as there were no significant deviations of the required sample purge field parameters. The required field parameter criteria included:

- pH +/- 0.1 units
- Specific Conductance +/- 3 percent
- Dissolved Oxygen +/- 10 percent
- Oxygen Reduction Potential +/- 10 millivolts (mV)
- Turbidity +/- 10 percent

The groundwater samples, designated as “GW” for the well location, were placed into appropriate laboratory supplied containers. The groundwater sample designations correspond to the representative monitoring well location. For example, the groundwater sample collected from monitoring well location 1738MW02 was designated 1738GW02. Following completion of sampling and surveying, each well was secured with a padlock.

Fourteen groundwater monitoring wells, including the seven newly installed wells (1738MW05L, 1738MW07, 1738MW08, 1738MW09, 1738MW10, 1738MW11, and 1738MW12) and seven existing wells (1738MW01, 1738MW02, 1738MW03, 1738MW04, 1738MW05, 1738MW05R, and 1738MW06), were sampled. The samples were transferred directly into pre-labeled, laboratory provided sample jars and placed on ice. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix A) to the fixed-base analytical laboratory for analysis. Groundwater samples were analyzed for MtBE, BTEX, TPH DRO and TPH GRO as outlined on Table 4-1.

4.2.2 Monitoring Well Installation and Sampling – June/August 2012

Fifteen monitoring wells were installed at ten locations (1738MW01, 1738MW02R, 1738MW07, 1738MW08, 1738MW09, 1738MW13, 1738MW14, 1738MW15, 1738MW16, and 1738MW17) using 4-1/4 inch ID HSAs (and 3-1/4 inch ID HSAs at 1738MW17). Refer to Figure 4-1 for soil boring and monitoring well locations and Table 4-4 for soil boring and monitoring well specifications and construction information. The monitoring wells were proposed to supplement the existing network to provide vertical and horizontal delineation of the MtBE groundwater plume. The monitoring wells were installed at the approximate locations that were proposed in the work plan.

Monitoring wells were constructed of 2.0-inch ID, Schedule 40 PVC, with flush joint threads. Most of the shallow wells (1738MW07A, 1738MW08A, and 1738MW009A) were installed with 5-foot long well screen (0.01-inch slots). The remaining wells were constructed with 10-foot long well screen (0.01-inch slots). The well screen and bottom cap were set at the bottom of the borehole and the screen was connected to threaded, flush-joint riser. The annular space around the well screen was backfilled with a well-graded, fine to medium sand as the augers were withdrawn from the borehole. The sand was extended to approximately two feet above the top of the screened interval (one foot above the top of the screened interval for most of the shallow wells). An approximately two-foot thick sodium bentonite seal was placed above the sand pack. The bentonite was hydrated with potable water and allowed to set for at least one hour. The annular space above the bentonite seal was backfilled with a cement/bentonite grout to prevent surface water from infiltrating into the screened groundwater monitoring zone. An expandable water tight locking cap with a vent hole was placed at the top of the casing. The wells were completed at the surface with approximately three feet of four-inch square protective casing. The protective casing was placed over the riser and surrounded by an approximately 3 foot by 3 foot (length x width) and 6 inches thick concrete pad. Four steel bollards were installed around the concrete pad. To aid in visibility, the well casings and bollards were painted a bright color and a 1-inch outside diameter (OD), 10-foot long PVC pipe was installed at each pad.

Monitoring well development consisted of surge and purge. Surging was accomplished using a decontaminated, 2-inch diameter QWater-brand surge block. Purging was accomplished using a decontaminated PVC bailer. Well development was performed at each well for 2 hours, with alternating surging and purging. At least three well volumes were removed in an effort to reduce turbidity and improve clarity to ensure successful low flow sampling parameter equilibrium. Ideally, an attempt is made to reduce turbidity to less than 50 NTUs, which is stated in the Revised Final Monitored Natural Attenuation Work Plan for AOC F, dated September 8, 2008. Records of the well development calculations and volumes are in the field notebooks found in Appendix A.

The groundwater was sampled using a decontaminated bladder pump and low-flow sampling techniques at each well. Field parameters of pH, temperature, turbidity, conductivity, dissolved oxygen, and oxidation-reduction potential were measured and recorded on the well detail and sampling logs presented in Appendix A. The sampling criteria were met as there were no significant deviations of the required sample purge field parameters. The required field parameter criteria included:

- pH +/- 0.1 units
- Specific Conductance +/- 3 percent
- Dissolved Oxygen +/- 10 percent
- Oxygen Reduction Potential +/- 10 mV
- Turbidity +/- 10 percent

The groundwater samples were placed into appropriate laboratory supplied containers. The groundwater sample designations correspond to the representative monitoring well location. For example, the groundwater sample collected from monitoring well location 1738MW02R was designated 1738GW02R. In addition, a suffix, "-12C" was added to distinguish different sampling events ("-12C" means the third quarter of the year 2012).

The entire monitoring well network (28 groundwater monitoring wells) was sampled. The samples were transferred directly into pre-labeled, laboratory provided sample jars and placed on ice. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix A) to the fixed-base analytical laboratory for analysis. Groundwater samples were analyzed for MtBE, BTEX, TPH DRO and TPH GRO as outlined on Table 4-1. One deviation from the Work Plan occurred; well 1738MW01A was purged dry despite setting the pump to the lowest sustainable flow rate. The water level was allowed to recover so that a sample could be collected.

4.3 <u>Groundwater Level Measurements</u>

Groundwater levels were gauged as part of the Site investigation during both the September 2010 and June/August 2012 field efforts. The sections that follow detail groundwater level measurement.

4.3.1 Groundwater Level Measurement - September 2010

Depth to groundwater (DTW) measurements were collected from each of the newly installed monitoring wells shortly after installation and prior to and after well development and sampling activities. Additionally, groundwater measurements were collected from existing wells 1738MW01, 1738MW02, 1738MW03, 1738MW04, 1738MW05, 1738MW05R, and 1738MW06 prior to and after sampling activities. Groundwater elevations were measured in all monitoring wells at the end of the field investigation on September 22, 2010 and on November 2, 2010 during the Year 8 third quarter MNA sampling event. All groundwater level measurements are provided in the field logbooks in Appendix A; the September 22 and November 2, 2010 measurements are summarized on Table 4-5.

Groundwater levels were measured from the top of the PVC riser and the groundwater elevations were calculated from the surveyed elevation of the top of riser. A discussion of the survey activities is provided in Section 4.9. The groundwater level measurements were used during well development and sampling activities (e.g., calculate well volumes and monitor draw down) and to develop a potentiometric surface/groundwater contour map. Groundwater elevation contour maps for Site 1738 were developed using data collected on September 22, 2010 and on November 2, 2010. Site hydrogeology is discussed in Section 5.2.2.

4.3.2 Groundwater Level Measurement – June/August 2012

DTW measurements were collected from each of the newly installed monitoring wells shortly after installation and prior to and after well development and sampling activities. In addition, synoptic DTW measurements were performed on June 29, 2012 and August 26, 2012. All groundwater level measurements are provided in the field logbooks in Appendix A; and are summarized on Table 4-5. All wells in the network were gauged (including 1738MW17 on August 26, 2012) to support groundwater flow direction and gradient evaluation. Site hydrogeology is discussed in Section 5.2.2.

Groundwater levels were measured from the top of the PVC riser and the groundwater elevations were calculated from the surveyed elevation of the top of riser. A discussion of the survey activities is provided in Section 4.9. The groundwater level measurements were used during well development and sampling activities (e.g., calculate well volumes and monitor draw down).

4.4 Slug Testing

Slug tests were performed on 11 monitoring wells during the September 2010 field investigation, including: 1738MW01, 1738MW02, 1738MW03, 1738MW05, 1738MW05R, 1738MW05L, 1738MW07, 1738MW08, 1738MW10, 1738MW11 and 1738MW12. Slug tests were also performed on 10 monitoring wells during the August 2012 field investigation, including: 1738MW01B, 1738MW02R, 1738MW07A, 1738MW07B, 1738MW08A, 1738MW008B, 1738MW09A, 1738MW09B, 1738MW13, and 1738MW15. Slug tests from two other wells (1738MW04 and 1738MW06) were conducted during the 1998 site characterization conducted by BBL.

The purpose of the slug tests was to estimate the hydraulic conductivity (K) of the saturated zone in the immediate vicinity of the monitoring well by measuring the aquifer response to a change in static conditions induced by introduction or removal of a slug of known volume from the well. A 5-foot long, 1.5-inch diameter slug was used for the deeper wells, and a 3-foot long, 1.5-inch diameter slug was used for the shallow wells.

Each test was initiated by measuring the static water level in the well and total well depth and recording this information in the field notes. A pressure transducer attached to a computerized data logger was then installed in the well and the water levels allowed to re-equilibrate. The slug was introduced into the well and the change in the water level over time was measured for the falling head portion of the slug test. Measurements continued until water levels stabilized at which point the slug was removed from the well and the change in water level was again measured until the water levels stabilized for the rising head portion of the test.

The electronic water level measurements were processed using Microsoft Excel and AQTESOLV® for Windows®, version 3.5. The Hvorslev method for confined aquifers (Hvorslev, 1951) was used for analyzing slug test data. As noted in Section 5.2.2 there is evidence to suggest that groundwater exists in confined conditions.

Special consideration was given to the saturated thickness input into AQTESOLV®. Groundwater yields were observed in narrow zones, significantly less than the screen length. An error note is returned in AQTESOLV® when the saturated thickness is less than the screen length. To avoid this error, the saturated thickness was set to equal the static water column height at each well. The saturated thickness was subsequently varied (by an order of magnitude) to test if the saturated thickness impacted the K results. This sensitivity analysis indicated that the change in K was negligible compared with the change in the saturated thickness.

The remaining input parameters used for calculating hydraulic conductivity, in addition to the time and water level measurements, included initial displacement, total well penetration depth, static water column height, boring radius, casing radius, and screen length. Aquifer anisotropy does not affect the K results. These parameters varied by well location based on well construction and water level. A summary of the input parameters used for calculating the hydraulic conductivity and the graphical analysis is provided in Appendix A. The results from monitoring wells 1738MW07 and 1738MW08 were not used in the average calculation because slug tests were performed the same day as sample collection and the wells may not have reached total equilibrium.

The slug test result at well 1738MW01 was re-evaluated due to the oscillation noticed in the falling head test data. This is a common (but not necessary) phenomenon in wells with a long screen length or where the K is high, and is called underdamping. The screen length of well 1738MW01 is 15 feet, and may be the cause of the underdamping. AQTESOLV® has several solution options for underdamped conditions. The Butler-Zhan (2004) solution was attempted. The curve fit to the data was not ideal, and the hydraulic conductivity estimate was more than twice rising head test estimate. The Hvorslev method provided a similar estimate as the rising head test. Therefore, this estimate was reported since the rising head test data did not exhibit undulating response data, and the falling head test solution using Hvorslev was similar to the rising head test estimate.

Internal analysis and comparison of Bouwer and Rice Method versus Hvorslev, and confined versus unconfined assumptions was performed. There was no significant difference between the methods or assumptions, so the results of the Hvorslev method are presented.

4.5 Well Abandonment

The monitoring well "TEMPORARY WELL", located in the southern portion of the site was abandoned as part of the September 2010 investigation. Removal of the riser and screen was attempted; however, the casing broke approximately one foot below the ground surface. The well was subsequently filled with grout to the ground surface.

4.6 Utility Clearance

All proposed boring locations were first checked for the presence of subsurface utilities. Base utility mapping did not indicate the presence of utilities within the 1738 site boundary or vicinity; although, it is known that the Solid Waste Management Unit (SWMU) 74 fuel pipeline runs along Forrestal Road, south of the site. The sampling locations were field-located using a Global

Positioning System (GPS), and the absence of subsurface utilities was field verified to the extent possible. Underground utilities were not encountered during drilling activities.

4.7 Site Clearing

Once the proposed sample locations were located using a GPS unit and utility clearance was achieved, site clearing activities were performed to provide access routes for the drill rig to the proposed sample locations. Specifically, site clearing was needed for monitoring well locations 1738MW07, 1738MW08, 1738MW09, 1738MW10, 1738MW15, and 1738MW16. Due to the dense vegetation present on site, an ASV RC-100 skidsteer equipped with a Magnum Systems Inc. mulcher (operated by Right Way Environmental Contractors, Inc. [RWEC Inc.]) was used for site clearing.

4.8 Decontamination and Investigation Derived Waste

Disposable sampling tools were used to the extent practicable in order to minimize the generation of liquid IDW from decontamination. Non-disposable groundwater sampling equipment (stainless steel bladder pump components) was decontaminated both daily and between wells following USEPA's Ground Water Sampling Procedures, Low Stress (Low Flow) Purging and Sampling (USEPA, 1998). Additionally, portions of the pump (after disassembly) were decontaminated by rinsing with a 10 percent nitric acid solution (September 2010 only), followed by a deionized water rinse, rinsing with pesticide grade methanol followed by a second deionized water rinse. A 10 percent nitric acid solution rinse during the June/August 2012 field effort was not required because samples were not collected for metals analysis.

IDW associated with monitoring well installation, including soil cuttings, groundwater sampling purge water, and decontamination fluids, was containerized and stored in 55-gallon drums. Two IDW samples were collected during the September 2010 field effort. One composite aqueous sample (1738IDW01) was collected from drums containing decontamination fluid (from sampling equipment and drill rig), and one composite solid sample (1738IDW02) was collected from drums containing drill cuttings. Two IDW samples were also collected during the June/August 2012 field effort. One composite aqueous sample (1738IDW03) was collected from drums containing decontamination fluid (from sampling equipment and drill rig), and one composite solid sample (1738IDW04) was collected from drums containing drill cuttings. The soil IDW sample was analyzed for toxicity characteristic leaching procedure (TCLP) VOCs and metals, ignitability, reactive sulfide, reactive cyanide, corrosivity, TPH DRO and TPH GRO; while the aqueous IDW sample was analyzed for TPH DRO and TPH GRO. The IDW analytical data is presented in Appendix B. The drums were moved and stored at a secure location on base following the field work completion. The drums from the September 2010 field effort were disposed at the Penuelas Valley Landfill on March 31, 2011. Documentation is provided in Appendix A. Arrangements to remove and properly dispose of the June/August 2012 IDW by an approved vendor were ongoing at the submittal of this report.

4.9 Surveying

Prior to entering the field, an electronic "shape file" (which included each proposed soil boring location) was uploaded to the GPS data collector. Once in the field, the GPS unit was used to navigate to each sample location. Each sample location was flagged and identified using the numbering system as described in the work plan.

As a sub-consultant to Baker, PJDC, Inc. conducted a site survey at Site 1738 in September 2010, July 2012, and September 2012. After the monitoring wells were installed, their coordinates were more accurately surveyed using conventional survey methods. Conventional surveying was selected specifically because of the accuracy of data they provide: +/- 0.01 feet vertical and +/- 0.05 feet horizontal.

Each existing and newly installed monitoring well at Site 1738 was surveyed. An elevation was obtained from the top of PVC riser for water level elevation calculations and a spot ground surface elevation was also obtained. In addition to the monitoring well survey; the locations of soil borings 1738SB101 through 1738SB111 were also surveyed by PJDC.

All survey data was submitted to Baker for use in office application software such as Auto Computer Aided Design and Drafting (CADD). Coordinates were obtained and input into a CADD/Geographic Information System (GIS) to produce the maps used in this report. The datum for reporting elevations is the Mean Low Water plus 100.00 feet, as established by the U. S. Navy Survey Section (November, 1941).

4.10 QA/QC Sampling

The following QA/QC samples were collected during the investigation of this site:

- Field Duplicates
- Trip Blanks
- Matrix Spike/Matrix Spike Duplicates (MS/MSDs)
- Field Blank
- Equipment Rinsate Blanks

Tables 4-1 and 4-2 provide a summary of the QA/QC samples collected and their associated laboratory analysis.

4.10.1 Field Duplicates

4.10.1.1 September 2010

Field duplicates were collected at a target rate of 10 percent of primary environmental samples. A total of 22 subsurface soil samples were collected as part of this investigation with three associated field duplicate samples; 1738101-01D, 1738105-01D, and 1738MW12-01D. Two field duplicates for groundwater samples (1738GW02D and 1738GW04D) were collected corresponding to 14 groundwater samples. Field duplicates were analyzed for the same parameters as the primary environmental samples and the results were used to evaluate the field sampling methodology. Field duplicate samples are shown on Table 4-1.

4.10.1.2 June/August 2012

Field duplicates were collected at a target rate of 10 percent of primary environmental samples. A total of 53 surface and subsurface soil samples were collected as part of this investigation with seven associated field duplicate samples; 1738MW07B-00D, 1738MW16-00D, 1738MW14-01D, 1738MW08B-03D, 1738MW09B-03D, 1738SB107-09D, and 1738SB110-12D. Three field duplicates for groundwater samples (1738MW02R-D-12C, 1738MW07D-12C, and 1738MW16D-12C) were collected corresponding to 28 groundwater samples. Field duplicates were analyzed for the same parameters as the primary environmental samples and the results were used to evaluate the field sampling methodology. Field duplicate samples are shown on Table 4-1.

4.10.2 Trip Blanks

4.10.2.1 September 2010

One trip blank sample was included in each cooler containing the samples from the site intended for BTEX, MtBE or TPH GRO analysis to evaluate whether cross contamination occurred during handling of samples. As shown on Table 4-2, a total of three trip blanks (1738TB01, 1738TB02, and 1738TB03) accompanied samples from this site to the analytical laboratory and were analyzed for BTEX, MtBE, and TPH GRO.

4.10.2.2 June/August 2012

One trip blank sample was included in each cooler containing the samples from the site intended for BTEX, MtBE and TPH GRO analysis to evaluate whether cross contamination occurred during handling of samples. As shown on Table 4-2, a total of seven trip blanks (1738TB04 through 1738TB10) accompanied samples from this site to the analytical laboratory and were analyzed for BTEX, MtBE, and TPH GRO.

4.10.3 Matrix Spike/Matrix Spike Duplicates

4.10.3.1 September 2010

MS/MSDs were collected at a target rate of approximately five percent of primary environmental samples from the subsurface soil and groundwater. Two MS/MSD sets (1738SB101-01MS/MSD and 1738SB12-01MS/MSD) were collected corresponding to 22 subsurface soil samples. One MS/MSD set (1738GW04MS/1738GW04MSD) was collected corresponding to 14 groundwater samples. The MS/MSD samples were analyzed for the same parameters as the primary environmental samples and the results were used to evaluate the effect of each type of matrix on the analytical method. The MS/MSD samples are shown on Table 4-1.

4.10.3.2 June/August 2012

MS/MSDs were collected at a target rate of approximately five percent of primary environmental samples from the subsurface soil and groundwater. Three MS/MSD sets (1738MW09B-00MS/MSD, 1738SB106-01MS/MSD, and 1738MW16-03MS/MSD) were collected corresponding to 53 surface and subsurface soil samples. Two MS/MSD sets (1738MW02R-MS/MSD-12C and 1738MW07MS/MSD-12C) were collected corresponding to 28 groundwater samples. The MS/MSD samples were analyzed for the same parameters as the primary environmental samples and the results were used to evaluate the effect of each type of matrix on the analytical method. The MS/MSD samples are shown on Table 4-1.

4.10.4 Field Blanks

4.10.4.1 September 2010

One field blank sample (1738FB01) was collected from laboratory-grade deionized (DI) water used as the source water for the equipment rinsate samples. The field blank sample was analyzed for BTEX, MtBE, TPH DRO and TPH GRO to determine whether the water used for generating the equipment rinsates and for decontamination was free of chemicals at levels of concern for the site. The field blank sample is shown on Table 4-2. 4.10.3.2 June/August 2012.

Two field blank sample (1738FB03 and 1738FB04) was collected from laboratory-grade deionized (DI) water used as the source water for the equipment rinsate samples. One field blank was collected for the soil sampling effort and one field blank was collected for the groundwater sampling effort. The field blank samples were analyzed for BTEX, MtBE, TPH DRO and TPH GRO to determine whether the water used for generating the equipment rinsates and for decontamination was free of chemicals at levels of concern for the site.

4.10.5 Equipment Rinsates

4.10.5.1 September 2010

One equipment rinsate was collected per day for one piece of sampling equipment (i.e., groundwater sampling equipment, and macro core liners) and the selected analysis for the rinsate samples corresponds to the sampling and analytical program developed for SWMU 1738. Equipment rinsate samples 1738ER01 and 1738ER02 were collected from disposable acetate MC Liners used on September 13 and 14, 2010. Equipment rinsate sample 1738ER03 was collected on September 16, 2010 from groundwater sampling equipment (i.e., stainless steel pump components). Equipment rinsate samples 1738ER04, 1738ER05, and 1738ER06 were collected from Teflon lined groundwater sampling tubing used on September 17, 18, and 19, 2010. On September 20 and 21, 2010, 1738ER07 and 1738ER08 were collected from groundwater sampling equipment (with Teflon bladders) used for groundwater sampling. All equipment rinsate samples were analyzed for BTEX, MtBE, TPH GRO, and TPH DRO.

4.10.5.1 June/August 2012

Equipment rinsate samples were collected at a target rate of one per day per media sampled. There were exceptions to this, particularly with soil sampling. Equipment rinsate samples were collected at the discretion of the Geologist to maximize daily sample collection when possible. Furthermore, single-use equipment (e.g., MC Liners, pie pans, disposable stainless steel spoons) was used for soil sampling. In addition, equipment rinsate samples were not collected during groundwater sampling if only one or two samples were collected in a given day, and also to maximize daily sample collection when possible.

Equipment rinsate samples 1738ER10 and 1738ER14 were collected from disposable acetate MC Liners used on June 16 and 27, 2012. Equipment rinsate samples 1738ER09, 1738ER12, and 1738ER16 were collected from disposable aluminum pie pans used on June 17 and 21, 2012, as well as August 17, 2012. Equipment rinsate samples 1738ER11 and 1738ER13 were collected from disposable stainless steel spoons used on June 17 and 24, 2012. Equipment rinsate sample 1738ER21 was collected on August 24, 2012 from a split-spoon sample barrel. Equipment rinsate samples 1738ER15, 1738ER17-1738ER20, and 1738ER22 were collected from the bladder pump and tubing on August 17, 18, 19, 21, 24, and 26, 2012. All equipment rinsate samples were analyzed for BTEX, MtBE, TPH GRO, and TPH DRO.

4.11 Laboratory Analysis

For the September 2012 Investigation, fixed-base laboratory analysis was conducted by CompuChem Laboratories, Cary, North Carolina. For the June/August 2012 Investigation, fixed-base laboratory analysis was conducted by Test America Savannah, Savannah, Georgia. The list of parameters under the analytical program and the CRQLs are provided in Table 4-3. The laboratory analytical results are provided as Appendix B.

4.12 Data Validation

All fixed-base laboratory data was validated by DataQual Environmental Services, LLC. of St. Louis Missouri, an independent third party. The USEPA Region II Data Validation Standard Operating Procedures were followed. Data Validation Summaries for each Sample Delivery Group (SDG) and the Puerto Rican Chemist Certifications are provided as Appendix C.

5.0 PHYSICAL RESULTS

The following sections provide a brief discussion of the current site conditions at Site 1738 based on the September 2010 and June/August 2012 MtBE investigations. The site geology and hydrogeology, as ascertained from the soil boring program and other available information, is described herein.

5.1 Current Conditions

Site 1738 is located along Forrestal Drive, across from JP-5 Hill, and the Defense Reutilization and Marketing Office (DRMO) facility (Buildings 1973, 2009, 2009A, 2009B, 2009C, and 2009D). The entire site is approximately 2.1 acres in size (most of which is heavily vegetated). There are no structures located on site.

Site 1738 is comprised of two distinct areas; an upgradient (raised surface/fill) area and a downgradient area. The upgradient area is not heavily vegetated as the site is bisected by an overhead utility right-of-way. The field team observed mowing on September 20, 2010, but no maintenance is evident since then. The upgradient area includes monitoring wells 1738MW01, 738MW01A, 738MW01B, 1738MW02, 1738MW02R, 1738MW03, 1738MW04, 1738MW11, 1738MW12, 1738MW13, 1738MW14, and 1738MW15. Ground elevations in this upgradient area range between 122 and 125 feet above datum. The downgradient area, in contrast, does not contain fill and is heavily vegetated with secondary growth. This area includes monitoring wells 1738MW05, 1738MW05L, 1738MW05R, 1738MW06, 1738MW07, 1738MW07A, 1738MW07B, 1738MW08, 1738MW08A, 1738MW08B, 1738MW09, 1738MW09A, 1738MW09B, 1738MW10, and 1738MW16. Ground elevations in this downgradient area range between approximately 107 and 112 feet above datum.

A cursory field inspection of the wetland boundary north of Site 1738 was conducted on September 13, 2010, while locating proposed environmental sampling locations. A field delineation of the wetland boundary was deemed unnecessary, as no obvious discrepancies were observed with the December 1999 delineation by GeoMarine. The previous delineation by GeoMarine identified one unit, E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) with the boundary approximately 95 feet northeast of monitoring well 1738MW08 (see Figure 4-1). The furthest downgradient groundwater monitoring well clusters (1738MW07, 1738MW08, and 1738MW09) are located in an upland transitional area, which was evident by the dominant herbaceous species; guinea grass (*Urochloa maxima*). Guinea grass is considered a facultative upland (FACU) plant. FACU plants occur sometimes (1-33%) in wetlands, but occur more often (67%-99%) in non-wetlands.

Sitewide, dominant vegetation within the herbaceous layer includes guinea grass (*Urochloa maxima*), ocean blue morning glory (*Ipomoea indica*), crack open (*Casearia sylvestris*), small flower swallow-wort (*Cynanchum parviflorum*), wild pea (*Vigna adenantha*), small cane (*Lasiacis divaricata*), and goatweed (*capraria biflora*). Dominant trees and shrubs identified include white lead tree (*Leucaena leucocephala*), red manjack (*Cordia collococca*), white indigo berry *(Randia aculeata)*, gumbo limbo (*Bursera simaruba*), and sweet acacia (*Acacia farnesiana*).

5.2 Geology/Hydrogeology

The following sections discuss the geology and hydrogeology in the vicinity of AOC F - Site 1738.

5.2.1 Geology

Site 1738 is located in an upland area within the Forrestal Area of the base. The upland areas of NAPR include the hills encompassing the Tow Way Fuel Farm and hospital areas, and the hills encompassing the area behind the Exchange, the former AFWTF Command, and the Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering. Typically, the bedrock is overlain by a relatively thin residual soil (i.e., residuum). Residuum is unconsolidated soil, originating from weathered-in-place bedrock. This residuum generally consists of clay, silt, and/or sand. Below the residuum, chemically weathered bedrock or saprolite, typical in hot humid climates, is present to some degree. This “saprolite” retains the bedrock structure but is weathered to a brittle consistency.

Twelve soil borings were advanced at Site 1738 to identify a source area for MtBE in the vicinity of the former pump island and tank pit. Geologic cross sections were prepared to depict the shallow subsurface conditions at Site 1738. The cross section locations are provided on Figure 5-1 and cross sections A-A’ through E-E’ are shown on Figures 5-2 through 5-6, respectively. Boring logs are provided in Appendix A. Note that the datum plane used is the Mean Low Water plus 100.00 foot as established by the U.S. Navy Survey Section (November 1941).

The upgradient area of Site 1738 is underlain by gravelly silt and clay fill material. A predominant gravel fill was observed in the vicinity of 1738MW01A. In addition, pea gravel was observed during the BBL investigation where the former tank pits and fuel lines were located. The fill appears to be the thickest in the north central portion of the Site (18-feet thick near 1738MW03 on cross section C-C’, Figure 5-4). The fill thins southward, which was observed to be less than 1-foot thick at 1738MW12.

The fill is underlain by a relatively thin silt and clay residuum in the northern portion of the upgradient area (cross sections A-A’ and B-B’, Figures 5-2 and 5-3, respectively). The silt and clay residuum thickens northward in the downgradient area (cross section E-E’, Figure 5-6). Off cross section borings such as 1738MW09B exhibit residuum at least 12 feet thick.

Bedrock, exhibiting varying degrees of weathering, was encountered throughout the Site beneath the residuum. The top of the bedrock undulates considerably, but generally dips southward. The top of the bedrock is near the surface, in the vicinity of 1738MW12, to 16-feet bgs near 1738MW05L (cross section E-E’, Figure 5-6). The bedrock is generally saprolitic in appearance and weathered. The exception is in the vicinity of 1738SB106A, where very hard, less weathered gabbro was observed. The saprolite tends to be silt and clay in content, but can be gravelly (notably at 1738MW13 and 1738SB110).

5.2.2 Hydrogeology

Groundwater was encountered approximately 15 to 20 feet below the ground surface in the upgradient area to less than 5 feet below the ground surface in the downgradient area. During drilling groundwater was encountered in the saprolite (upgradient area) and in the residuum (downgradient area) and saprolite in relatively thin, discontinuous zones.

Groundwater flow in the fine-grained residuum and saprolite appears to be behaving like non-porous media (e.g., bedrock). The degree of groundwater yield observed during drilling varied greatly; from a trace amount of moisture on particle surfaces, to flowing water. In a bedrock aquifer, the matrix is saturated below the groundwater table, but groundwater yield is predominantly from fractures. Likewise, the residuum and saprolite are saturated below the first encountered groundwater; however, there are a few thin water producing zones (possibly associated with weathered zones and fractures) separated by relatively damp matrix.

The groundwater appears to be confined. Gauged water levels in all the newly installed monitoring wells (shallow and deep) are higher than when groundwater was first encountered during drilling for these wells. A similar trend is apparent for the existing monitoring wells. Groundwater within the weathered and fractured zones appears to be under a pressure greater than atmospheric pressure.

Groundwater contour maps were developed from synoptic DTW gauging in September and November 2010, and June and August 2012. Figures 5-7 through 5-10 shows the potentiometric surface based on September 2010, November 2010, June 2012, and August 2012 gauging data, respectively. All four months show a consistent overall flow pattern to the north. There are some minor variation in direction and gradient. In September and November 2010 groundwater in the upgradient area appears to be slightly mounded in the vicinity of the former USTs. Note that monitoring wells 1738MW02 and 1738MW03 were reportedly installed through the pea gravel backfill. These wells generally exhibit slightly higher groundwater elevations compared with surrounding monitoring wells. The groundwater flow gradient varies temporally and spatially. Temporally the groundwater flow gradient between the upgradient and downgradient areas is generally 0.01 feet/foot. The exception is November 2010, in which the gradient was 0.02 feet/foot. Spatially, the groundwater flow gradient tends to be flat in the upgradient area. For example, in August 2012 the groundwater flow gradient was calculated to be 0.002 feet/foot; an order of magnitude less than between the upgradient and downgradient areas.

Groundwater elevations from the nested well clusters (1738MW01, 1738MW05, 1738MW07, 1738MW08, and 1738MW09) were examined for indications of vertical hydraulic gradient trends. The USEPA's on-line site assessment vertical gradient calculator (http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.html) was used as the basis for vertical gradient calculations presented in Table 5-1. Well screen midpoints were used for the distance. Table 5-1 shows spatial and temporal changes in the vertical gradient using the mid-point value calculations. The upgradient area well cluster (1738MW01) generally shows an overall downward gradient trend in June and August 2012, with a slight upward trend in the lower portion of the monitored aquifer in June 2012. Well cluster 1738MW05 shows an overall downward gradient trend in three of the four months gauged, with the lower portion of the monitored aquifer generally showing an upward gradient trend. Well clusters 1738MW07, 1738MW08, and 1738MW09 show a variable overall gradient trend in June 2012, with differences in the shallow and deeper portions of the monitored aquifer. Well clusters 1738MW07, 1738MW08, and 1738MW09 show a consistent upward gradient trend in August 2012. The limited data at this time suggests that the upgradient area (at least in the vicinity of 1738MW01) is a groundwater recharge area with a fairly consistent, albeit weak downward trend. The downgradient area vertical gradient appears to vary temporally. This area can be characterized as a predominantly lateral groundwater flow regime, with variable and generally weak vertical gradient (predominantly upward) in June 2012, but exhibits a generally weak upward gradient in August 2012.

A summary of the results of the slug test analysis is presented in Table 5-2. The average K values (rising head and falling head) calculated from the slug test data ranged from approximately 0.004 feet per day (ft/d) at well 1738MW04 to 17.5 ft/d at well 1738MW13. The site-wide average K value was calculated from the slug test data determined representative and summarized on Table 5-2. The average hydraulic conductivity for Site 1738 is approximately 2.5 ft/d.

The distribution of K was modeled for Site 1738 to ascertain any spatial patterns. Wells exhibiting similar screen interval elevations were examined separately. Figure 5-11 shows the distribution of K for the relatively shallow wells. There appears to be some zones of relatively high K in the upgradient area within Site 1738. The relatively high K zones appear in the vicinity of wells 1738MW01 and 1738MW13. It is not clear if theses zone are interconnected and create a larger preferential pathway that could extend north of well 1738MW01. The well configuration and density are such that the presence of this preferential pathway cannot be determined. The relatively low K values at wells 1738MW02 and 1738MW03 suggest that there is limited connection. A relatively low K zone is apparent between wells 1738MW02 and 1738MW07A, where the K value is approximately an order of magnitude lower than other wells in the downgradient area of Site 1738. The relatively high K of the pea gravel backfill is not reflected in this distribution figure since well 1738MW02 was screened below the pea gravel.

Figure 5-12 shows the distribution of K for the relatively deep wells. A moderate K zone is apparent in the vicinity of wells 1738MW01B and 1738MW05L. A relatively low K zone is apparent in the downgradient area of Site 1738.

6.0 ANALYTICAL RESULTS

This section discusses the analytical results of environmental samples collected from Site 1738 during the September 2010 and June/August 2012 field investigations. The validated analytical data tables are included in Appendix B; data validation report narratives and Puerto Rican Chemist certifications are provided in Appendix C.

6.1 Screening Criteria

Soil and groundwater samples collected at Site 1738 were analyzed for MtBE, BTEX, TPH DRO and TPH GRO. Detected compounds for each media are compared to the applicable PREQB Target Levels. These Target Levels are summarized in Table 6-1.

For completeness, detected analytical results for the soil and groundwater samples were also compared to applicable human health and ecological screening criteria, which are summarized in Table 6-1.

6.1.1 Soil Screening Values

The RgionalSL Tables contains human health risk-based screening levels derived from standardized equations (representing ingestion, dermal contact, and inhalation exposure pathways), calculated using the latest toxicity values, default exposure assumptions and physical and chemical properties. The screening levels (SLs) contained in the RSL Table are generic; they are calculated without site-specific information. RSLs should be viewed as Agency guidelines, not legally enforceable standards. The SLs for potentially carcinogenic chemicals are based on a target Incremental Lifetime Cancer Risk (ILCR) of $1x10^{-06}$. The SLs for noncarcinogens are based on a target hazard quotient (HQ) of 1.0. However, in order to account for cumulative risk from multiple chemicals in a medium, the noncarcinogenic SLs were divided by a factor of ten, yielding a target HQ of 0.1. For potential carcinogens, the toxicity criteria applicable to the derivation of SL values are oral Cancer Slope Factors (CSFs) and inhalation unit risk (IUR) factors; for noncarcinogens, they are chronic oral reference doses (RfDs) and inhalation reference concentrations (RfCs). These toxicity criteria are subject to change as more updated information and results from the most recent toxicological/epidemiological studies become available. The SL table is updated periodically to reflect such changes. The November 2012 RSL table was used in this evaluation.

USEPA ecological soil screening levels (Eco-SSLs) (documentation available at http://www.epa.gov/ecotox/ecossl/) were preferentially used as soil screening values.

Eco-SSLs have been developed for eight receptor groups: plants, soil invertebrates, avian herbivores, avian ground insectivores, avian carnivores, mammalian herbivores, mammalian ground insectivores, and mammalian carnivores. For a given chemical, the lowest Eco-SSL value for plants, soil invertebrates, avian herbivores, avian ground insectivores, avian carnivores, mammalian herbivores was selected as the soil screening value. Eco-SSLs for mammalian ground insectivores were not considered for soil screening value development because there are no mammalian ground insectivores in Puerto Rico (mammalian insectivores are limited to aerial insectivores [i.e., bats]). As discussed in Guidelines for Developing Ecological Soil Screening Levels (USEPA, 2005), aerial and arboreal insectivorous birds and mammals were excluded from Eco-SSL development because they are considered inappropriate (i.e., they do not have a clear or indirect exposure pathway link to soil [indirect exposure pathways involve ingestion of prey that have direct contact with soil]). Eco-SSLs for mammalian carnivores also were not considered for soil screening value development because there are no carnivorous mammals on Puerto Rico.

With the exception of bats, the terrestrial mammals represented by potentially complete exposure pathways are limited to nonindigenous, nuisance species (i.e., Norway rat, black rat, and mongoose) that have been implicated in the decline of native reptilian and bird populations (Mac et al., 1998 and United States Fish and Wildlife Service [USFWS], 1996). Eco-SSLs for mammalian herbivores are considered appropriate for soil screening value development based on the presence of fruit-eating and nectarivorous bats in Puerto Rico.

For those chemicals lacking plant, soil invertebrate, avian herbivore, avian ground insectivore, avian carnivore, and mammalian herbivore Eco-SSLs, the literature-based toxicological benchmarks listed below were used as soil screening values.

- USEPA Region 5 (2003) ecological screening levels (ESLs) for soil based on exposures to plants or invertebrates

- Toxicological thresholds for earthworms and microorganisms (Efroymson et al., 1997a)

- Toxicological thresholds for plants (Efroymson et al., 1997b)

Identical to the Eco-SSLs, when more than one screening value was available for a given chemical from USEPA (2003) and Efroymson et al. (1997a and 1997b), the lowest value was selected as the soil screening value. For those chemicals lacking plant, soil invertebrate, avian herbivore, avian ground insectivore, avian carnivore, and mammalian herbivore Eco-SSLs, USEPA Region 5 ESLs based on exposure to plants or terrestrial invertebrates, and a toxicological threshold from Efroymson et al. (1997a and 1997b), the following literature-based values, listed in their order of decreasing preference, were used as soil screening values:

- Toxicity reference values for plants and invertebrates listed in USEPA (1999)

- Soil standards developed by the Ministry of Housing, Spatial Planning and Environment (MHSPE, 2000)

- Canadian soil quality guidelines (agricultural land use) developed by the Canadian Council of Ministers of the Environment (CCME, 2001 and 2007)

Soil screening values developed by CCME (2001 and 2007) were given the lowest preference since many are based on background concentrations or detection limits, not effect-based concentrations.

As evidenced by Table 6-1, soil screening values for benzene, ethylbenzene, and toluene are based on soil standards developed by MHSPE (2000). MHSPE (2000) soil standards are expressed as target values and intervention values. The target and intervention values published by MHSPE for these three VOCs are based on a standard soil with ten percent organic carbon. These values are listed within the table below.

Chemical	Target Value (µg/kg)	Intervention Value (µg/kg)
Benzene	10	1,000
Ethylbenzene	30	50,000
Toluene	10	130,000

Target and intervention values for organic chemicals (excluding polynuclear aromatic hydrocabons [PAHs]) can be adjusted to account for the organic carbon content of soil (the organic carbon adjustment range is 2 percent to 30 percent). As a measure of conservatism, the target and intervention values used to derive the soil screening values for benzene, ethylbenzene, and toluene were adjusted to reflect an assumed organic carbon content of two percent (minimum value within the adjustment range) using the following correction formula (MHSPE, 2000):

$$(Target_{sa}/Intervention_{sa}) = (Target_{ss}/Intervention_{ss}) \times (\%\ organic\ matter/10)$$

where:

$Target_{sa}/Intervention_{sa}$ = Target value or intervention value for the soil to be assessed (microgram per kilogram [µg/kg])
$Target_{ss}/Intervention_{ss}$ = Target value or intervention value for standard soil (µg/kg)

Using the formula above and an assumed organic carbon content of two percent, adjusted target and intervention values for benzene, ethylbenzene, and toluene are as follows:

Chemical	Target Value (µg/kg)	Intervention Value (µg/kg)
Benzene	2.0	200
Ethylbenzene	6.0	10,000
Toluene	2.0	26,000

The soil screening values listed in Table 6-1 were derived by taking the average of the adjusted target and intervention values.

6.1.2 Groundwater Screening Values

The risk-based, human health screening values used in the comparison to the groundwater analytical data were tap water RSLs (USEPA, 2012), Maximum Contaminant Levels (MCLs) (USEPA, 2009a), and Puerto Rico Water Quality Standards (PRWQS) for groundwater (i.e., Class SG) contained within the Puerto Rico Water Quality Standards Regulation (PRWQSR) (PREQB, 2010]). When an MCL and Class SG PRWQS were available for a given chemical, the more conservative value was selected.

PRWQS for Class SB coastal and estuarine waters listed in the PRWQSR) dated March 31, 2010 (PREQB, 2010) were preferentially used as ecological-based groundwater screening values. PRWQS for Class SB coastal and estuarine waters were selected based on groundwaqter flow direction (i.e., toward an estuarine wetland) and the classifications contained within Rule 1302.1 of the PRWQSR. For those chemicals lacking PRWQS for Class SB coastal and estuarine waters, groundwater screening values were identified from the following information listed in their order of decreasing preference:

- Chronic saltwater National Ambient Water Quality Criteria (NAWQC) (USEPA, 2009b) or, in the absence of NAWQC, chronic literature-based values derived in accordance with USEPA guidance (Stephan et al., 1985).

- Final Chronic Values (FCVs) for saltwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996)

- USEPA Region 4 chronic screening values for saltwater contained in Ecological Risk Assessment Bulletins – Supplement to Risk Assessment Guidance for Superfund (RAGS) (USEPA 2001)

- Minimum chronic toxicity test endpoints (No Observed Effect Concentration [NOEC], No Observed Effect Level [NOEL], and Maximum Acceptable Toxicant Concentration [MATC] values based on reproduction, growth, or survival) for marine species reported in the ECOTOXicology (ECOTOX) Release 4.0 Database System (USEPA, 2007b)

- Chronic Lowest Observable Effect Levels (LOELs) for saltwater contained in National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRTs) (Buchman, 2008) with a safety factor of 5 (Wentsel et al., 1996)

The order of preference was selected based on their level of protection. For example, NAWQC and FCVs would be expected to offer a greater degree of protection than a single species NOEC, MATC, or LOEL since their derivation considers a larger toxicological database. In the absence of the above-mentioned NAWQC, FCVs, USEPA Region 4 chronic screening values, chronic test endpoints, and chronic LOELs, screening values were derived from the literature-based acute saltwater values listed below:

- Acute LOELs for saltwater contained in NOAA SQUIRTs (Buchman, 2008)

- Acute toxicity test endpoints (NOEC, NOEL, LOEL, Lowest Observed Effect Concentration [LOEC], median lethal concentration [LC_{50}], and median effective concentration [EC_{50}] values) for marine species contained in the ECOTOX Release 4.0 Database System (USEPA, 2007b)

- LC_{50} values for marine species contained in Superfund Chemical Matrix (USEPA, 2004)

Chronic-based screening values were extrapolated from acute NOEC, NOEL, LOEC, LOEL, LC_{50}, and EC_{50} values as follows:

- A safety factor of 30 was used to convert an acute NOEC or NOEL to a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 50 was used to convert an acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value (Wentsel et al., 1996)

When acute toxicity data were used to extrapolate a chronic screening value, NOECs/NOELs were given preference over LOECs/LOELs, LOECs/LOELs were given preference over LC_{50} and EC_{50} values, and EC_{50} values were given preference over LC_{50} values. When more than one value was available from the literature for a given test endpoint (e.g., NOEC), the minimum value was conservatively used to extrapolate a chronic screening value.

For those chemicals lacking saltwater toxicological thresholds and literature values (i.e., xylenes), surface water screening values were identified or developed from freshwater values using the sources and procedures listed below.

PRWQS for Class SD surface waters listed in the PRWQSR dated March 31, 2010 (PREQB, 2010) were preferentially used as freshwater screening values. PRWQS for Class SD surface waters were selected based on the classifications contained within Rule 1302.2 of the

PRWQSR. For those chemicals lacking PRWQS for Class SD surface waters, screening values were identified from the following information listed in their order of decreasing preference:

- Chronic freshwater NAWQC (USEPA, 2009b) or, in the absence of NAWQC, chronic literature-based values derived in accordance with USEPA guidance (Stephan et al., 1985)

- FCVs for freshwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996)

- USEPA Region 4 chronic screening values for freshwater contained in Ecological Risk Assessment Bulletins – Supplement to RAGS (USEPA 2001a) and USEPA Region 5 ESLs (http://www.epa.gov/reg5rcra/ca/ESL.pdf) (USEPA, 2003)

- Minimum chronic toxicity test endpoints (NOEC, NOEL, and MATC values based on reproduction, growth, or survival) for freshwater species reported in the ECOTOX Release 4.0 Database System (USEPA, 2007b)

- Great Lakes basin Tier II Secondary Chronic Values (SCVs) listed in the Great Lakes Initiative Toxicity Data Clearinghouse (http://www.epa.gov/gliclearinghouse/) (USEPA, 2011)

- Chronic LOELs for freshwater contained in NOAA SQUIRTs (Buchman, 2008) with a safety factor of 5 (Wentsel et al., 1996)

Identical to the marine/estuarine-based groundwater screening values presented, the order of preference was selected based on their level of protection. It is noted that USEPA Region 4 and Region 5 screening values were given equal preference. When a value was available from both sources, the minimum value was selected as the surface water screening value.

Further evaluation is not needed because the above procedures resulted in the identification of screening values for the chemicals of concern (MtBE, BTEX, TPH DRO, and TPH GRO).

6.1.3 PREQB Target Levels

The PREQB promulgated Underground Storage Tank Control Regulations in 1990, with amendments in 2002. Rule 606 regulates investigations for soil and groundwater cleanup, and Rule 607 regulates corrective action plans. PREQB Target Levels were established to set standards for cleanups and are used in the detection summary tables. These PREQB Target Levels were used for each site within the MNA Program and carried over to this investigation and are shown on Table 6-1.

6.2 Soil Sampling

Nine environmental surface soil samples (excluding duplicates) were collected during the June/August 2012 investigation and analyzed during the investigation for BTEX, MtBE, TPH DRO and TPH GRO as outlined on Table 4-1. Detected results for the surface soil data set are presented in Table 6-2. No constituents exceeded PREQB Target Levels or human health and ecological screening criteria.

Twenty-two environmental subsurface soil samples (excluding duplicates) were collected during the September 2010 investigation and analyzed during the investigation for BTEX, MtBE, TPH DRO and TPH GRO as outlined on Table 4-1. Detected results for the subsurface soil data are presented in Table 6-3a. Forty-one environmental subsurface soil samples (excluding duplicates) were collected during the June/August 2012 investigation and analyzed for BTEX, MtBE, TPH DRO and/or TPH GRO as outlined on Table 4-1. Detected results for the subsurface soil data are presented in Table 6-3b. The complete data set is provided in Appendix B.

The data indicates that BTEX, MtBE, TPH DRO and TPH GRO were generally not detected in the surface or near subsurface soil samples collected. Detections were scattered and well below PREQB Target Levels. TPH DRO was detected in 36 samples (including duplicates) and generally at low levels; however two samples exceeded PREQB Target Levels.

Significant detections of BTEX, MtBE, and TPH GRO were observed in samples collected below 16-feet bgs. MtBE and TPH GRO were most frequently detected, in 25 and 21 of 47 samples (including duplicates), respectively. Total xylenes exhibited the highest observed concentration (240,000J ug/kg at 1738SB107-09D, 17- to18-feet bgs). TPH DRO was the most frequently detected constituent (in 36 of 41 samples analyzed), but exceeded the PREQB Target Level in only two samples (210 mg/kg at 1738MW02R-10 and 170 mg/kg at 1738SB111-08).

The horizontal distributions of contaminants were mapped using the 2012 analytical data. Two zones were mapped separately in planview:

1. 16- to 22-feet bgs zone, which exhibits the most frequent detections and the highest concentrations

2. Below 22-feet bgs, which exhibits significant reduction in concentrations

More than one sample might have been collected from some borehole locations from the zones identified above. The highest concentration was selected for mapping. Depictions included total BTEX, MtBE, and TPH GRO. The individual BTEX compounds exhibited similar distribution patterns, so were combined for one figure. The distribution of TPH DRO mimics that of TPH GRO; however, it was not mapped since there were only two detections above the PREQB Target Level. Figure 6-1 shows the distribution of TPH GRO in subsurface soil samples collected from approximately 16- to 22-feet bgs. A relatively narrow zone of TPH GRO is present above the PREQB Target Level of 100 mg/kg with the highest concentrations present west and south of the area that once contained two USTs. The distribution model uses deeper soil samples from well 1738MW13 (23-24 feet bgs) to represent the 16- to 22-foot bgs interval since no soil samples were collected from that interval. The distribution of TPH DRO mimics that of TPH GRO; however, it was not mapped since there were only two detections above the PREQB Target Level. Figure 6-2 shows the distribution of total BTEX constituents above the PREQB Target Level of 5,000 ug/kg (the lowest PREQB constituent Target Level; benzene) in subsurface soil samples collected from approximately 16- to 22-feet bgs. The BTEX constituents are presented as total in one figure since the distribution of the individual constituents share nearly identical footprints. The distribution model uses deeper soil samples from well 1738MW13 (23-24 feet bgs) to represent the 16- to 22-foot bgs interval since no soil samples were collected from that interval. The BTEX footprint is quite similar to the TPH GRO footprint, but with much higher concentrations west and south of the area that once contained two USTs. Figure 6-3 shows the distribution of MtBE above the PREQB Target Level of 20 ug/kg in subsurface soil samples collected from approximately 16- to 22-feet bgs. The highest levels of MtBE correspond to the TPH GRO/BTEX footprints; however, its overall distribution is somewhat more extensive.

Concentrations of BTEX, MtBE, and TPH GRO diminish in samples collected below 22-feet bgs. Figure 6-4 shows the distribution of TPH GRO in subsurface soil samples collected below approximately 22-feet bgs. Only one sample exhibits a concentration above the PREQB Target

Level of 100 mg/kg (260 mg/kg at 1738MW13-12). Likewise, the same sample exhibits the only total BTEX constituent detection above 5,000 □g/kg (Figure 6-6). Figure 6-7 shows that MtBE is still persistent with depth, but with diminished concentrations.

The presence of free-phase or residual-phase LNAPL was analyzed in the field using a dye-shake test (Oil-N-Soil™ kits). The results of the dye shake test are presented on the boring logs in Appendix A and interpreted on the cross sections (Figure 5-2 through Figure 5-6). No free-phase LNAPL was observed; however, residual-phase LNAPL was observed in several samples that appeared to be homogeneously distributed and contributed to the interpretation of the source zone area (discussed in detail in Section 6.6). A discussion of the nature and extent of the soil source zone is given in Section 6.6.4.

To support remedial selection, select subsurface soil samples were collected for f_{oc} and TOD during the June/August 2012 Investigation (Table 6-3b). In addition, several additional analyses were performed in the 2010 Investigation, including iron, manganese, chemical oxygen demand (COD), nitrate, and microbial plate counts in groundwater and total organic carbon (TOC) in subsurface soil. These results are presented in Appendix B, Additional Data Table. A discussion and evaluation of the results will be included in the remedial alternative re-evaluation (which is proposed in Section 7.3).

6.3 <u>Groundwater</u>

Fourteen groundwater samples were collected from the monitoring well network that existed from the September 2010 investigation. Twenty-eight groundwater samples were collected from the expanded monitoring well network during the June/August 2012 investigation. All groundwater samples from both investigations were analyzed for BTEX, MtBE, TPH DRO and TPH GRO as outlined on Table 4-1. Detected results for the groundwater data set are presented in Table 6-4a for the 2010 sampling and Table 6-4b for the 2012 sampling. The complete data set is provided in Appendix B.

MtBE appears to be the primary contaminant in groundwater at Site 1738. MtBE was detected in 24 of 28 samples. MtBE exhibited the highest observed concentration (43,000 ug/L at well 1738MW03), and the highest average concentration in groundwater (approximately 5,050 ug/L). TPH GRO was the next most-frequently detected contaminant (19 of 28 samples), but concentrations were below the PREQB Target Levels. Of the BTEX constituents, benzene was the most frequently detected (in eight of 24 samples), and exhibited the highest concentrations (up to 19,000 ug/L at well 1738MW03).

The distributions of contaminants were mapped using the 2012 analytical data. The distribution of benzene and/or MtBE was mapped for three zones within the aquifer. This includes Figure 6-7 (benzene in the intermediate zone), Figure 6-8A (the shallow zone including the “A” series wells), Figure 6-8B (an intermediate zone including wells without a letter suffix), and Figure 6-8C (a deep zone including the “B” series wells and 1738MW05L). Benzene was detected in one shallow zone well (1738MW01A at 2.4 ug/L), and no deep zone wells; therefore, no figures were created. Toluene, ethylbenzene, xylenes, TPH GRO, and TPH DRO were mapped for evaluation, but not presented. The concentrations are mostly below PREQB Target Levels, and the distributions are within the footprint of benzene plume footprint. The distributions of benzene and MtBE in groundwater are presented in plain view on Figure 6-7 and Figure 6-8, respectively. Figure 6-9 shows the estimated horizontal extent of MtBE in groundwater based on the September 2010 data for comparison purposes. The distributions of benzene and MtBE are also presented in cross section parallel to groundwater flow (Cross Section E-E’) on Figure 6-10 and Figure 6-11, respectively.

Figure 6-7 shows that the extent of benzene in groundwater is limited to the upgradient area of Site 1738, and is generally collocated with the BTEX soil source zone (Figure 6-3). Figure 6-10 shows the limited extent of benzene in the upgradient area, but with an unbounded vertical extent below wells 1738MW02R and 1738MW03.

Figure 6-8 shows that the extent of MtBE is larger compared with benzene, with MtBE present in the downgradient area of the Site. The area exhibiting the highest MtBE concentrations is generally collocated with the MtBE soil source zone (Figure 6-4). The horizontal extent is not bounded to the PREQB Target Level in the downgradient direction due to an increase in concentrations in wells 1738MW07, 1738MW08, and 1738MW09 compared with September 2010 (Figure 6-9). Figure 6-11 shows that MtBE has spread vertically (e.g., wells 1738MW05R and 1738MW05L). MtBE concentrations have not been bounded vertically, and are present in the deepest wells on Site (1738MW01B at an elevation of approximately 62.2-feet above datum and 1738MW05L at an elevation of approximately 64.5-feet above datum.

The presence and location of benzene and MtBE in groundwater makes sense given the nature and extent of the soil source zone. While wells 1738MW11 and 1738MW13 are hydraulically upgradient of the former USTs and pump island, these wells are near or within the soil source zone. In addition, temporal groundwater mounding is evident near the former UST area, with a minor, southerly groundwater flow component.

6.4 <u>Laboratory Data Validation Summary</u>

A discussion of the compounds detected in the field QA/QC samples is presented in Section 6.4.1. A summary of the data validation findings is provided in Section 6.5.2. Data validation reports are included in Appendix C. In addition, the Puerto Rican Chemist Certification for each SDG is also presented in Appendix C.

6.4.1 Summary of Detected Compounds in Field QA/QC Samples

Field generated QA/QC samples for the Site 1738 MtBE Investigation consisted of three field blanks, ten trip blanks, and 22 equipment rinsates. Trip blanks were only analyzed for MtBE, BTEX and TPH GRO. Field blanks and equipment rinsates were analyzed for MtBE, BTEX, TPH DRO and TPH GRO. Table 6-5a and Table 6-5b present the detected compounds in the trip blanks, equipment rinsates, and field blanks from 2010 and 2012, respectively.

Overall, toluene was detected in every September 2010 Investigation QA/QC sample with a low estimated “J” qualified detection.

Detections in September 2010 Investigation field blank 1738FB01 included a low detection of TPH-DRO (0.091 J milligrams per Liter [mg/L]), in addition to toluene. Detections in June/August 2012 Investigation field blanks 1738FB03 and 1738FB04 were limited to low levels of TPH DRO.

Three trip blanks were collected during the September 2010 Investigation, and one trip blank 1738TB02 reported a low estimated detection of benzene at a concentration of 0.11 J µg/L, in addition to toluene. Seven trip blanks were collected during the June/August 2012 Investigation. No BTEX constituents or TPH GRO were detected in these trip blanks. Analysis of the eight equipment rinsate samples, during the September 2010 Investigation, indicated detections of three VOCs (benzene, ethylbenzene, and MtBE) in addition to toluene. Each of these detections were estimated detections below the method detection limit (MDL). In the June/August 2012 Investigation, toluene was detected in only two of 14 equipment rinsate samples, at low estimated

"J" qualified detections. In addition, TPH DRO was detected at low levels in all equipment rinsate and field blank samples. The detections were generally one or two orders of magnitude lower than detections in soil samples.

No other constituents were detected in these equipment rinsate samples.

6.4.2 Validation Summary

For the September 2010 Investigation, laboratory analyses were performed by CompuChem, a Division of Liberty Analytical Corporation located in Cary, North Carolina. For the June/August 2012 Investigation analyses were performed by the Savannah laboratory of Test America, Inc. Validation services for both the 2010 and 2012 investigations were provided by DataQual Environmental Services, LLC located in St. Louis, Missouri. For the September 2010 Investigation, there were a total of six SDGs, including two SDGs for IDW water and soil (1009240 and 1009241) that were not validated. For the June/August 2012 Investigation, there were a total of nine SDGs, including one SDG for IDW (680-82452-1 [but is not shown since the data were not validated]). Validation conclusions are provided in Appendix C. Each SDG is certified by a Puerto Rico Chemist, these certifications are included as part of Appendix C.

The validation indicted that most sample preparation and analysis was performed within Region II and/or method holding time requirements, exceptions are discussed below. Changes in the results due to the application of the data validation objectives did not significantly compromise the data quality objectives for this investigation. The data, as qualified by the validator is acceptable for its intended use.

For the September 2010 Investigation, three samples from SDG 1009155, including 1738MW11-01, 1738MW11-04, and 1738MW11-08, were extracted one day outside the 14 day soil extraction holding time. As a result, the reported TPH-DRO results in these samples were qualified as estimated. In addition, all samples from SDGs 1009155 and 1009220 were not collected an preserved in accordance with SW-846 method 5035. As a result, all non-detect results for TPH-GRO were rejected. Since 25 results for TPH-GRO were rejected, the completeness goal of 90 to 95% for each parameter was not met. However, the completeness goal was met overall with 93.2% completeness for the data from the 2010 investigation and 97.5% completeness for the 2010 and 2012 combine data (Table 6-7).

For the June/August 2012 Investigation, there were only minor QA/QC variances. For example, in SDG 680-80447-3, samples 1738MW09B-03 and 1738MW09B-03D exhibited a noncompliant Relative Percent Difference (RPD) and concentrations were estimated "J". All equipment rinsate and field blank samples had detections of TPH-DRO. As a result, 31 samples were qualified as "U" at the reported concentration. Since no data was qualified as "rejected" for the Site 1738 MtBE 2012 Investigation, the completeness goal of 90 to 95% for each parameter was met with 100% completeness and a 97.5% completeness for the 2010 and 2012 combined data (Table 6-7).

6.5 Conceptual Site Model

The Conceptual Site Model (CSM) that follows in a synthesis of data and information from the investigations conducted to date. This section is designed to be easily updated (as needed) as additional data/information is obtained. This CSM combines normally separated information and compiles it into one coherent section. The American Society for Testing and Materials (ASTM) E1689-95 guidance (ASTM, 1995) was used to develop the CSM.

6.5.1 Background Information

According to the BBL Site Characterization report, Site 1738 was an industrial gas station in operation from the late-1950s to the early or mid-1990s. One 10,000 gallon gasoline UST was in operation beginning in 1959. Two additional 10,000 gallon gasoline USTs became operational in 1973. One 550 gallon waste oil UST was added in 1984. All four USTs were reportedly removed in 1996. The US Navy reported to BBL that no accidental releases occurred at the Site. Consequently, the age and duration of the release responsible for site contamination is not known, nor is the quantity of gasoline released known.

MtBE was first used in the United States in 1979 as an octane enhancer for gasoline (at 3 percent to 8 percent of gasoline). The use of MtBE in gasoline as an oxygenate (at 11 percent to 15 percent) was initiated by the U.S. Environmental Protection Agency in 1992 to reduce carbon monoxide and ozone emissions (Florida Department of Environmental Protection [FDEP], 2007 and GeoInsight, 2000). The USEPA designated certain metropolitan areas in the United States as nonattainment in terms of air pollution and mandated the use of reformulated gasoline or oxygenated gasoline.

The properties of MtBE make it more mobile in the environment compared with other gasoline-related compounds. MtBE is more soluble than other constituents in gasoline, and only weakly absorbs onto soil particles (U.S. Geological Survey [USGS], 1998). According to one case study, the natural attenuation of MtBE is generally not completed in a reasonable timeframe (Carpenter, 2000). Thus, MtBE can be present on the leading edge of plumes and remain after other gasoline-related compounds have attenuated.

6.5.2 Site Topography, Surface Features, and Surface Drainage

Site 1738 consists of two areas; 1) an upgradient area where the gas station and associated facilities were, and 2) downgradient area. The upgradient area is locally flat with an average elevation of approximately 23 feet above msl. The downgradient area is relatively flat with an average elevation of approximately 7 feet above msl. Section 5.1 provides additional information on these areas. The two areas are divided by a fairly steep slope across the Site, but becomes less steep toward the western end of the Site.

The upgradient area is heavily vegetated near the steep slope. Much of the upgradient area is not heavily vegetated; however, since maintenance is no longer being performed at the Site, grasses are becoming overgrown. The surface of the upgradient area is gravelly, and a portion of the asphalt driveway remains. Ground elevations in this upgradient area range between 122 and 125 feet above datum (i.e., Mean Low Water plus 100 feet).

The downgradient area contains a mix of wooded and grassy areas. Wooded areas occur along the western overhead utility right-of-way, and near the steep slope that divides the two areas. Much of the downgradient area is dominated by Guinea grass. The surface of the downgradient area is native residual soil. Ground elevations in this down gradient area range between approximately 107 and 112 feet above datum.

Surface drainage is controlled by the grasses and wooded areas. Overland sheet flow is likely to be limited by the vegetation. No engineered surface drainage ways were noted at the Site.

6.5.3 Hydrogeology

This section presents the regional geology/hydrogeology of NAPR and Site 1738 based on published literature and information and data from the investigations.

Regional Geology/Hydrogeology
{tc \l 23 ".4 Geology "**}**
For the sake of simplicity, the NAPR regional geology can be divided into three regions:

- Upland areas
- Near-shore flat lands
- Inland flat lands

The upland areas of NAPR includes the hills encompassing the Tow Way Fuel Farm and hospital areas, and the hills encompassing the area behind the Exchange, the former AFWTF Command, and the Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering. Typically, the bedrock is overlain be a relatively thin residual soil (i.e., residuum). Residuum is unconsolidated soil, originating from weathered-in-place bedrock. This residuum generally consists of sand, silt, and clay.

The near-shore areas include the mangrove swamp areas as well as the shores of Ensenada Honda and Puerca Bay. The near-shore areas are typically underlain by marine sand layers (with coral and shell fragments), silt and clay layers, and occasional peat layers. In some near-shore areas, particularly by the harbor and Camp Moscrip in the southeastern portion of the base, fill material overlays the marine layers. The fill consists of rock fragments, debris (e.g., brick), sand, silt, and clay.

The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land area is typically underlain by relatively thick residuum. The residuum generally consists predominately of clay. Fill material overlays the residuum in some areas, particularly the airfield, and generally consists of sand and gravel with lesser amounts of silt and clay.

Site Geology

Site 1738 lies in a transition between the Upland (the upgradient area) and the Inland flat lands (the downgradient area). The upgradient area of Site 1738 is underlain by gravelly silt and clay fill material. A predominantly gravel fill was observed in the vicinity of 1738MW01A. In addition, pea gravel was observed during the BBL investigation where the former tank pits and fuel lines were located. The fill appears to be the thickest in the north central portion of the Site (18-feet thick near 1738MW03). The fill thins southward. It was observed to be less than 1-foot thick at 1738MW12.

The fill is underlain by a relatively thin silt and clay residuum in the northern portion of the upgradient area. The silt and clay residuum thickens northward in the downgradient area. Borings in the downgradient area such as 1738MW09B exhibit residuum at least 12 feet thick.

Bedrock, exhibiting varying degrees of weathering, was encountered throughout the Site beneath the residuum. The top of the bedrock undulates considerably, but generally dips northward. The top of the bedrock is near the surface, in the vicinity of 1738MW12, to 16-feet bgs near 1738MW05L. The bedrock is generally saprolitic in appearance and weathered. The exception is in the vicinity of 1738SB106A, where very hard, less weathered Gabbro was observed. The saprolite tends to be silt and clay in content, but can be gravelly (notably at 1738MW13 and 1738SB110).

Groundwater was encountered approximately 15 to 20 feet below the ground surface in the upgradient area to less than 5 feet below the ground surface in the downgradient area. Groundwater was encountered in the residuum (downgradient area) and saprolite in relatively thin, discontinuous zones. Groundwater flow in the fine-grained residuum and saprolite appears to be behaving like non-porous media (e.g., bedrock). The degree of groundwater yield observed during drilling varied greatly; from a trace amount of moisture on particle surfaces, to flowing water. In a bedrock aquifer, the matrix is saturated below the groundwater table, but groundwater yield is predominantly from fractures. Likewise, the residuum and saprolite are saturated below the first encountered groundwater; however, there are a few thin water producing zones (possibly associated with weathered zones and fractures) separated by relatively damp matrix.

The groundwater appears to be confined. Gauged water levels in all the newly installed monitoring wells (shallow and deep) are higher than the first encountered groundwater during drilling for these wells. A similar trend is apparent for the existing monitoring wells. Groundwater within the weathered and fractured zones appears to be under a pressure greater than atmospheric pressure.

Groundwater consistently flows north across Site 1738, with small spatial and temporal variations. In 2010, groundwater in the upgradient area appeared to be slightly mounded in the vicinity of the former USTs. This may be a result of preferential recharge due to the presence of pea gravel backfill in the vicinity of wells 1738MW02 and 1738MW03. The hydraulic gradient in the upgradient area tends to be less than in the downgradient area; 0.002 to 0.008 feet/foot in the upgradient area, and 0.01 to 0.02 feet/foot in the downgradient area.

Vertical flow in the upgradient area (at least in the vicinity of 1738MW01) is weakly downward, suggesting a groundwater recharge area. The downgradient area can be characterized as a predominantly lateral groundwater flow regime, with variable and generally weak vertical gradients.

The average K value across the entire Site is approximately 2.5 ft/d; however, some distributional heterogeneities were observed. There appears to be some zones of relatively high K in the upgradient area within Site 1738. The K in the vicinity of wells 1738MW13 and 1738MW01 is at least 5 ft/d. This relatively high K area might be a preferential pathway that could be connected, and extend north of 1738MW01. A relatively low K zone is apparent between wells 1738MW02 and 1738MW07A, where the K value is less than 1 ft/d. A moderate K zone is apparent in the vicinity of deeper wells 1738MW01B and 1738MW05L, and is at least 2 ft/d. The relatively low hydraulic gradient observed in portions of the upgradient area may be related to the presence of a relatively high K zone; groundwater flows relatively fast through the high K zone, but slows and "backs up" in the lower K downgradient area manifesting in tightly spaced isoelevation lines.

6.5.4 Nature and Extent of Contamination

This section presents findings related to contaminants of concern, background concentrations, source characteristics, migration pathways, and identification of receptors.

Contaminants of Concern

The contaminants of concern appear to be gasoline-related constituents, including BTEX and MtBE. Three 10,000 gallon UST were reportedly used for the storage of gasoline. One small UST (550 gallons) was added for the storage of waste oil relatively late in the operation of the gas station. The analytical data indicate that individual gasoline constituents such as benzene, xylene, ethylbenzene, toluene, and MtBE have significantly partitioned into the environment, leaving low remnant concentrations of gasoline. TPH GRO is present throughout the soil source zone area, but mostly below the PREQB Target Level. TPH DRO was present in soil samples, but at concentrations below TPH GRO concentrations and generally below the PREQB Target Level.

Source Characteristics and Contaminant Distribution in Soil

Soil contamination is evident in the upgradient area (between borings 1738SB107 and 1738SB110), and is relatively thin in the east-west direction. Soil contamination has been currently observed below 16-feet bgs, but was in the past observed to be shallow in the boring for well 1738MW03, near the former pump island (BBL, 1999). Table 6-6 shows average concentrations of BTEX, MtBE, and TPH GRO within the estimated source zone area. Within this zone, total xylenes exhibited the highest average concentration (approximately 52,682 ug/kg). MtBE exhibited an average concentration within the soil contamination zone of approximately 9,288 ug/kg. The average concentration of TPH GRO is approximately 407 mg/kg. It appears that the gasoline (observed as TPH GRO) has mostly dissociated into its constituents, including BTEX and MtBE.

LNAPL has been observed at Site 1738. Free-phase LNAPL was observed in well 1738MW02 until 2002. Free-phase LNAPL was not observed in the current investigation. Residual-phase LNAPL was observed in relatively small, discontinuous zones, and associated with the higher BTEX and MtBE concentrations observed in soil.

Migration Pathways

Neither the time of the release nor its duration is known. Given the age of the USTs (1959 to 1996) and the use of MtBE (1979 with phase outs beginning in 2000), the release probably occurred between 1979 and 1996. The fact that TPH was detected only at relatively low levels compared with BTEX in the 1998 BBL site characterization, the release may have occurred in the 1980s.

The release appears to have occurred at the two former USTs near well 1738MW02, and/or near the former pump island (based on the BBL report and findings herein). The specific gravity of gasoline ranges from approximately 0.7 kilograms per liter (kg/L) to nearly 0.8 kg/L depending on the literature source, so the NAPL at Site 1738 is light. Migration of NAPL follows the same principles from site to site, and can be summarized as follows. LNAPL will migrate downward and laterally through the vadose zone by gravity and fluid pressure, often following tortuous path controlled by the pore space pressures. This vertical migration will end when pore pressures meet or exceed NAPL fluid pressure, which is often near the water table. Lateral migration of NAPL can follow the predominant groundwater flow direction, but can also follow preferential pathways of low capillary pressure that may be different from groundwater flow. A relatively permeable zone is evident near well 1738MW13 (upgradient from the suspected source area), and it is apparent that the NAPL migrated to/through this zone. The NAPL continues to migrate as long as the release continues. Once the release stops, the NAPL could still migrate under the influence of fluid pressure. As the NAPL migrates the fluid pressure dissipates. LNAPL does not float on the water table in a homogeneous mass, but is rather heterogeneously distributed, following a vertical equilibrium model (as described in Interstate Technology and Regulatory Counsel [ITRC] documents and training. At a certain point the capillary pressure becomes greater than the fluid pressure resulting in the cessation of NAPL migration. It is widely accepted that NAPL migration ceases within weeks or months of the release cessation.

Figure 6-12 shows the estimated horizontal extent of residual-phase NAPL based on the dye shake test results and interpolation support from elevated PID readings. It is important to note that the NAPL in this area is not a continuous body, but is probably distributed like ganglia. Residual-phase NAPL was observed in areas located hydraulically upgradient of the probable release area(s) (e.g., 1738MW13). It is likely that this distribution is the result of migrating NAPL encountering the relatively permeable material between wells 1738MW01 and 1738MW13 (Figure 5-11).

Within the vadose zone, volatilization, sorption, biodegradation, vapor advection, and diffusion are the primary attenuation processes. The fuel constituents will partition from the source material at different rates based on their chemical properties. Volatilization of released fuel will occur into the air-filled pore spaces of the vadose zone (ITRC, 2005). The partial pressure of MTBE and other ether oxygenates in recently released oxygenated fuels is initially higher than other fuel constituents, and will volatilize more readily during the time period immediately following the release. As a result of volatilization, however, the partial vapor pressure is reduced, making it more difficult for the remaining constituents to completely volatilize. Soil moisture in the vadose zone will interact with soil vapor and allow exchange of volatile fuel constituents between the air phase and the water phase. If the soil moisture content in the vadose zone is moderate to high (as it is at NAPR), then fuel constituents with a relatively low Henry's law constant will partition into the water phase. In comparison to benzene, MtBE tends to partition strongly from the gas phase into the water phase. Recharging groundwater will migrate downward to the aquifer. The residual gasoline constituents in soil will also partition to the water phase driven by a concentration gradient.

Dissolved contaminant migration in groundwater is controlled by advection. Natural attenuation of BTEX and MtBE is primarily through dilution, dispersion, sorption, diffusion, and biodegradation (ITRC, 2005). Dispersion is more apparent in more heterogeneous aquifer systems, such as observed at the Site. Dilution of dissolved constituents by mixing with unaffected groundwater recharge is also common, especially in unconfined aquifers. At a certain point (in time and/or space) the natural attenuation processes can stop plume migration.

Elevated concentrations of BTEX and MtBE in groundwater generally correspond spatially to elevated concentrations in soil. The exception is in the eastern portion of the downgradient area where the MtBE plume is broad. It is possible that the preferential pathway in the vicinity of wells 1738MW13 and 1738MW01 has influence migration of MtBE.

Based on the MtBE investigation, it is not clear if the plume, particularly MtBE, is migrating; however, based on professional judgment, it is believed that the groundwater contamination is migrating. There is limited data to make this conclusion. So, the confidence level is low. The MtBE investigation groundwater sampling show increasing concentrations in the downgradient wells; however, there are only two data points, and the magnitude of the concentration change is within the Monitored Natural Attenuation program quarter-to-quarter historical fluctuations. The hypothesis of MtBE plume migration will be tested with continued groundwater monitoring (Section7.3), and will be revised as necessary.

Based on the fate and transport characteristics, BTEX and MtBE tend to exhibit the following characteristics, and are manifest at Site 1738:

- BTEX and MtBE will initially volatilize in the vadose zone; however, this process slows as the partial vapor pressure decreases. Figure 6-2 and Figure 6-3 show that BTEX and MtBE remain in soil.

- MtBE may be at lower concentrations in soil compared with BTEX due to higher vapor pressure and initial volatilization loss (Figure 6-2 shows higher BTEX concentrations remaining in soil compared with MtBE shown on Figure 6-3).

- Due to the physical properties of MtBE (e.g., solubility, octanol-water partition coefficient, and distribution coefficient), it preferentially partitions to water compared with BTEX. In addition, there is a greater potential for BTEX constituents to degrade compared with MtBE. Thus, MtBE may appear in groundwater at higher concentrations (compare the benzene plume on Figure 6-7 with the MtBE plume on Figure 6-8).

- MtBE is more mobile than the BTEX constituents. This may partially explain the relatively small benzene plume on Figure 6-7 compared with the relatively larger MtBE plume on Figure 6-8).

The estimated average linear groundwater velocity was calculated by using a variation of Darcy's equation as shown on Table 6-8. As shown on Table 6-8, groundwater velocities vary spatially and temporally, from approximately 0.22 ft/d (80 feet/year [ft/y]) in the downgradient area to 0.83 ft/d (303 ft/y) in the upgradient area.

Natural attenuation processes affect the fate and transport of contaminants such as BTEX and MtBE. These natural attenuation processes conventionally include advection, mechanical dispersion, diffusion, sorption, biodegradation, infiltration, and volatilization. Due to these natural attenuation processes, contaminant velocities can be substantially less than groundwater velocities. For example, the velocity of MtBE aqueous transport relative to the transport of groundwater is not significantly retarded by sorption and tends to be transported at velocities near the rate of groundwater flow. A retardation factor can be calculated as shown on Table 6-9. The velocity of MtBE is calculated at 0.39 ft/d (143 ft/y), compared with benzene at 0.17 ft/d (64 ft/y).

Adsorption alone tends to overestimate contaminant velocity in groundwater. Other processes further inhibit migration of contaminants such as BTEX and MtBE. Biodegradation for example, is an important process since it destroys both BTEX and MtBE mass; however, degradation of MtBE is slower than BTEX constituents. Branched compounds like MtBE are more resistant to biodegradation than cyclic compounds like benzene (Lyman, et al 1982). MtBE degrading bacteria are slower to grow than other bacteria (Wilson, 2005), resulting in slower MtBE degradation relative to BTEX. Thus, the extent of MtBE in groundwater is expected to be much larger than that of benzene. This is evident in the data collected (Figure 6-8 shows that the distribution of MtBE in groundwater is larger than benzene as shown in Figure 6-7).

Mass discharge can provide information about source strength, natural attenuation rates, and preferential migration pathways. It can also be used to estimate changes in plume discharge conditions over time as well as before and after source zone remediation. Mass discharge will be calculated for MtBE and used at Site 1738 to monitor plume changes over time and provide indications of source zone remediation performance.

The terms "mass flux" and "mass discharge" have been used interchangeably. For the purposes of this report mass flux (M_{dj}) is the mass of a contaminant that passes through a specific point over a period of time (i.e., the contaminant concentration and the groundwater flux). Mass discharge (M_d) represents the total mass of a contaminant moving in the groundwater across a given area.

Baseline mass discharge was calculated using the transects based on iso-contours method as described in Use and Measurement of Mass Flux and Mass Discharge (ITRC, 2010). Figure 6-13 shows three transects across the MtBE plume that are approximately perpendicular to groundwater flow. Figure 6-13 also shows the MtBE distribution above the PREQB Target Level superimposed over the K estimate distribution from the shallow wells. The transects were located as follows: the first located was placed near the source area; the second was placed immediately downgradient of the source area, and the third was placed farther downgradient of the source area to provide an indication of natural attenuation.

Mass discharge was calculated for polygons constructed along each transect. The polygons were bounded horizontally by the MtBE iso-concentration lines, and vertically be the well thickness of well along or near each transect (15 feet at Transect 1 and 10 feet at Transects 2 and 3). Each polygon is labeled on Figure 6-13. A concentration was assigned to each polygon by calculating a geometric mean of the value for each bounding iso-concentration line. A K value was assigned to each polygon by calculating a geometric mean of the value of iso-K lines that cross each transect. Mass Discharge was calculated as follows:

$M_d = A \times q \times C$ where:

A is the area of a polygon

q (Darcy flow) = K x i (i = 0.002 in the upgradient area and i = 0.006 in the downgradient area as shown on Figure 5-10)

Table 6-10 presents the mass discharge for each polygon and transect, and the mass discharge for each transect. It should be noted that since units are metric for concentration (mg/L) and mass discharge (g/d), lengths, areas, and K values were converted to metric to perform the calculation. The mass discharge at Transect 1 ranges from 6.28×10^{-7} g/d to 8.69×10^{-4} g/d, with a total mass discharge of 0.001 g/d. The mass discharge at Transect 2 ranges from 1.93×10^{-6} g/d to 3.41×10^{-4} g/d, with a total mass discharge of 0.001 g/d. The mass discharge at Transect 3 ranges from 5.08×10^{-6} g/d to 6.59×10^{-4} g/d, with a total mass discharge of 0.002 g/d. Despite the elevated MtBE concentrations in groundwater, the mass discharge is low:

- Averaging 5.89×10^{-4} g/d (0.59 mg/d) in the >10,000 ug/L MtBE lobe
- 0.002 g/d (2 mg/d) over the width of the plume downgradient of the source area

The "corridor" of highest mass discharge occurs immediately east of the >10,000 ug/L MtBE lobe as shown on Figure 6-8, with an average mass discharge of 6.23×10^{-4} g/d. There is no apparent decrease in the mass discharge between Transect 2 and 3, indicating that natural attenuation of MtBE is negligible at this time in this portion of the plume.

There is uncertainty in the mass discharge caclucations, primarily associated with interpolation of the MtBE concentrations and K values. This uncertainty can be controlled by examining the interpolation results. For this mass discharge estimate, the interpolation was prepared by a senior geologist using Surfer and reviewed by a different senior geologist. The concentration and K value distribution patterns were judged to be reasonable representations based on the available data. Differences in the interpolation methods can cause differences in mass discharge estimates. Figure 6-13 shows the concentration and K value distribution using the Kriging method. Using the Natural Neighbor methods shows very similar results (not shown); however, the slight differences lead to differences in the mass discharge estimates for the various polygons on the transects. Table 6-11 provides a summary of the mass discharge estimates using Kriging and Natural Neighbor interpolation methods, and the RPD comparison of the two mass discharge estimates. The closer the RPDs is to zero, the better the correlation between the Kriging and Natural Neighbor interpolation methods. An examination of the RPDs shows varying degrees of correlation. The mass discharge estimate for each transect generally shows a good correlation between the two methods, indicating the interpolation uncertainty is low.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The primary objectives of the MtBE investigation at Site 1738 were to:

- Confirm the presence of a potential source area in the soil near the former USTs and pump island,
- Define the lateral extent of MtBE in groundwater, and
- Define the vertical extent of MtBE in groundwater.

The borings and monitoring wells provided additional information regarding the subsurface materials at Site 1738. The former gas station area is built upon a predominately silt and clay fill material with some gravel in the areas were former tanks and piping runs existed. A thin silt and clay residuum is present beneath the fill in the upgradient area. A chemically weathered bedrock or saprolite is present below the residuum.

A zone of soil contamination was identified that may be a continuing source for groundwater contamination. This zone was generally delineated. The exception is the area to the north of boring 1738SB107, which is located near the top of the slope. The elevation difference between the top and bottom of the slope is approximately 16 feet, the depth at which the soil contamination was observed. If the source zone continues to the north it would be in shallow subsurface soil, and could be in groundwater. MtBE exhibits an average concentration of 9,288 ug/kg within the estimated source zone. Benzene, the other significant groundwater contaminant exhibits an average concentration of 4,322 ug/kg. A rough volume estimate of this source zone is approximately 3,280 cubic yards (an area of 9,845 square feet by an average thickness of approximately 9 feet).

The overall extent of MtBE contamination in the groundwater appears to be largely delineated; however, MtBE concentrations in the downgradient wells (1738MW07, 1738MW08, and 1738MW09) were above the PREQB Target Level in the August 2012 groundwater sampling event. The vertical extent of MtBE has not been delineated either. Concentrations of MtBE in wells 1738MW01B, 1738MW02R, 1738MW03, and 1738MW05L are above the PREQB Target Level.

7.2 Conceptual Site Model Conclusions

1. Background Information
    a. The Site was an industrial gas station from the late-1950s to the early/mid-1990s
    b. One 10,000 gallon gasoline UST was in operation beginning in 1959
    c. Two additional 10,000 gallon gasoline USTs became operational in 1973
    d. The age, duration, and quantity of the release are not known
    e. Based on some simple forensics, the release may have occurred in the 1980s

2. Site Topography, Surface Features, and Surface Drainage
    a. Site 1738 consists of two areas:
        i. An upgradient area that contained the gas station and associated facilities
        ii. A downgradient area, which is undeveloped and about 16 feet lower
    b. Both areas are locally flat
    c. Much of the upgradient area is not heavily vegetated, but has become overgrown

d. The downgradient area contains a mix of wooded and grassy areas
e. Surface drainage is controlled by the grasses and wooded areas
  i. Overland sheet flow is likely to be limited by the vegetation
  ii. No engineered surface drainage ways were noted at the Site

3. Hydrogeology
  a. Site 1738 lies in a transition between the Upland and the Inland flat lands
  b. The Upland (upgradient area) is underlain by:
    i. A surficial gravelly silt and clay fill material, then;
    ii. A relatively thin silt and clay residuum, and finally;
    iii. Bedrock exhibiting varying degrees of weathering
  c. The Inland flat lands (downgradient area) is underlain by:
    i. A relatively thick silt and clay residuum, then
    ii. Bedrock exhibiting varying degrees of weathering
  d. Groundwater was encountered approximately 15 to 20 feet bgs in the upgradient area
  e. Groundwater was encountered less than 5 feet bgs in the downgradient area
  f. Groundwater was encountered in the residuum and saprolite
    i. In relatively thin, discontinuous zones
    ii. The groundwater yield appeared to vary
    iii. The relatively thin zones are separated by saturated, but limited/non-yielding zones
    iv. Groundwater occurrence is likely associated with weathered zones and fractures
    v. Groundwater consistently flows the north across the Site
    vi. Small spatial & temporal variations exist, with frequent mounding near the former USTs
    vii. Vertical flow in the upgradient area is weakly downward
    viii. The downgradient area groundwater appears to vary (lateral flow in June 2012, but vertically upward in August 2012
  g. The average K value across the entire Site is approximately 2.5 ft/d
    i. The K in the vicinity of wells 1738MW01 & 1738MW13 is >10 feet/day
    ii. The K zone in the vicinity of wells 1738MW02 & 1738MW07A is <1 ft/d
    iii. A moderate K in the vicinity around some deeper wells is >2 ft/d
    iv. A preferential pathway of relatively higher K is apparent in a corridor in an area including wells 1738MW13, 1738MW01, and trending northward

4. Nature and Extent of Contamination
  a. Contaminants of Concern
    i. Primarily BTEX constituents and MtBE
    ii. To a lesser degree, TPH GRO
  b. Source Characteristics and Contaminant Distribution in Soil
    i. Residual soil contamination is evident in the upgradient area
      1. Near the former UST and fuel island
      2. Thin in the E-W direction
      3. Currently about 16- to 20-feet bgs
      4. BBL noted shallow contamination at 1738MW03
    ii. Light Free-phase NAPL was present, but has not been observed since 2002
    iii. Residual-phase NAPL has been observed in small, discontinuous zones

   iv. BTEX and MtBE in higher concentrations than TPH GRO, indicating significant gasoline decomposition

5. Migration Pathways
   a. Release likely at pump island and USTs near 1738MW02
   b. Fluid pressure drives the NAPL in relatively permeable zones
   c. The NAPL continues to migrate as long as the release continues
   d. Once the release stops, the NAPL could still migrate by continued fluid pressure
   e. As the NAPL migrates the fluid pressure dissipates.
      i. At a certain point the capillary pressure becomes greater than the fluid pressure
      ii. NAPL migration stops
      iii. This typically occurs within weeks or months of the release cessation
   f. Only residual-phase NAPL was observed; no free-phase NAPL
      i. Not as a continuous body, but is probably distributed like ganglia
      ii. NAPL is no longer migrating
   g. Volatilization of released fuel will occur into the air-filled pore spaces of the vadose zone
      i. MtBE will volatilize more readily in the period immediately following the release
      ii. Complete volatilization doesn't occur due to lowering partial pressure
   h. Soil vapor contamination will dissolve into infiltrating moisture
   i. Recharging groundwater will migrate downward to the aquifer
   j. Residual gasoline constituents will continue to act as a source of BTEX and MtBE impact to groundwater until this source is removed through active remediation or these compounds are depleted from residual LNAPL through weathering and other processes
   k. BTEX and MTBE migrate in groundwater through advection
   l. The MtBE plume shape may be partially influenced by the preferential high-K pathway in the vicinity of well 1738MW13 and 1738MW01.
   m. As known processes indicate:
      i. BTEX remains in soil at higher concentrations compared with MtBE
      ii. MtBE is in groundwater at higher concentrations compared with BTEX
      iii. MtBE has migrated farther in groundwater compared with BTEX
         1. Physical properties suggest that MtBE will migrate faster than BTEX
         2. Preferential biodegradation of BTEX might also explain larger MtBE plume in groundwater
   n. Calculations estimate that:
      i. The velocity of MtBE is 0.39 ft/d (143 ft/y)
      ii. The velocity of benzene is 0.17 ft/d (64 ft/y)
      iii. Adsorption alone is likely to overestimate contaminant velocity
   o. Mass discharge of MtBE across the site varies
      i. It is relatively low, at 0.002 g/d across the width of the plume and downgradient of the source area
      ii. Is highest between the >10,000 ug/L lobe and the relatively high K preferential pathway (averaging 6.23×10^{-4} g/d)

7.3 Recommendations

A re-evaluation of remedial alternatives should be initiated, and can be despite that some additional delineation needs to be performed. Because the impacted soil and groundwater areas have been mainly delineated, the additional delineation is not expected to significantly change the size. A re-evaluation is appropriate considering that a relatively large soil source zone has been identified. A screening of the 17 common and appropriate NAPL remedial technologies should be evaluated using the Interstate Technology and Regulatory Council "Evaluating LNAPL Remedial Technologies for Achieving Project Goals." The short list of NAPL remedial technologies as well as groundwater remedial technologies should be evaluated in a Corrective Measures Study (CMS).

There are two overall NAPL remediation strategies; NAPL mass reduction or NAPL composition reduction. Mass reduction will decrease NAPL saturation, which will be evident in a decrease of fuel constituent concentrations in soil. NAPL composition reduction will preferentially reduce contaminant concentration of those fuel constituents impacting groundwater (i.e., MtBE and benzene). At Site 1738, a NAPL composition reduction appears to be the preferred strategy. Focusing on selectively reducing the mass of BTEX constituents and MtBE in soil will have the greatest impact on improving groundwater quality by reducing BTEX and MtBE concentrations in soil. Thus, soil and groundwater cleanup of BTEX constituents and MtBE will be achieved; however, residual TPH DRO and GRO soil contamination may remain. A treatment train that includes subsequent TPH DRO and GRO can be implemented. Because TPH DRO and GRO contamination was observed to be relatively limited and many of these hydrocarbons are less toxic, the remnant soil contamination may not pose a risk, and further soil remediation may not be warranted.

A limited soil sampling program is recommended. Additional soil borings (a maximum of ten) should be placed north of boring 1738SB107 in the downgradient area, and also to the east and west of boring 1738SB107 in the upgradient area to more fully delineate the soil source zone.

Additional groundwater monitoring is also recommended. The groundwater monitoring should consist of the following elements:

1. Additional monitoring wells to provide further delineation:

    - Five additional deep monitoring wells should be installed to provide vertical delineation of MtBE contamination in groundwater. Two nested wells should be placed near wells 1738MW02R and 1738MW03 (one at each). The nested wells should include two wells installed to depths of 60 and 100 feet. Two other deep wells should be placed near well 1738MW05L (at a depth of approximately 65 feet) and well 1738MW01B (at a depth of approximately 100 feet). A fifth deep well should be installed at cluster 1738MW08 at a depth of approximately 60 feet. Two additional deep wells (approximately 60 feet deep) should conditionally be installed at well clusters 1738MW07 and 1738MW09 to provide vertical delineation if continued groundwater monitoring at deep wells shows consistently elevated MtBE concentrations.

    - Four additional mid-depth wells should conditionally be installed to provide horizontal delineation if continued groundwater monitoring shows consistently elevated MtBE concentrations. These wells should be located north of 1738MW07, 1738MW08, 1738MW09, and northeast of 1738MW16.

2. Long-term groundwater monitoring should resume at the Site while the above recommendations are being implemented, and until full-scale remediation is initiated. It is recommended that the following wells be monitored;

- 1738MW02R
- 1738MW03
- 1738MW05R
- 1738MW05L
- 1738MW06
- 1738MW07 and 1738MW07A
- 1738MW08 and 1738MW08B
- 1738MW09 and 1738MW09B
- 1738MW16
- Any additionally installed wells

3. Groundwater monitoring should be performed quarterly until remediation is initiated. Analytical parameters will include:

    - Appendix IX VOCs
    - TPH GRO
    - BTEX and MtBE
    - Tert butyl alcohol (MtBE daughter product)
    - Select natural attenuation parameters including carbon dioxide, methane, nitrate, ferrous iron, and sulfate in at least the initial sampling event
    - Lead in at least the initial sampling event to confirm the BBL SCR findings

4. A groundwater concentration trend analysis should be performed after several rounds of groundwater sampling (e.g., two years of quarterly monitoring). An examination of the concentration trends in downgradient wells (1738MW07, 1738MW08, 1738MW09) may provide evidence of plume stability. Seasonal trends will need to be evaluated. If no seasonal effects are evident, the Mann-Kendall trend analysis will be used to detect a trend. If seasonal effects are evident, the Seasonal-Kendall trend analysis can be used to detect a trend.

5. Perform slug testing at newly installed wells and wells 1738MW09 and 1738MW16, which are two downgradient wells that were not tested during the Site Investigation.

6. Perform mass flux/mass discharge calculations to support plume migration and remediation analysis.

7. Provide recommendations for additional wells to provide lateral plume delineation if the trend analysis indicates plume expansion.

8.0 REFERENCES

ASTM, 1995. ASTM. Standard Guide for Developing Conceptual Site Model for Contaminated Sites – E1689-95. American Society for Testing and Materials, West Conshocken, Pennsylvania. 1995.

Michael Baker Jr., Inc. (Baker), 2011. Draft MtBE Treatability Study Work Plan, AOC F Site 1738. January, 2011.

Baker, 2010. Draft MtBE Investigation Work Plan, AOC F Site 1738. April, 29, 2010.

Baker, 2008. Revised Final II Monitored Natural Attenuation Work Plan for AOC F. November 21, 2008.

Blasland, Bouck, & Lee, Inc. (BBL), 1999. Site Characterization Report Site 1738. February 1999.

Bouwer, H., 1989. The Bouwer and Rice Slug Test--An Update, Ground Water, vol. 27, no. 3, pp. 304-309.

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.

Buchman, M.F., 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Office of Response and Restoration, Seattle, WA. 34 pp.

Canadian Council of Ministers of the Environment (CCME), 2007. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health: Summary Tables. Updated September 2007. In: Canadian Environmental Quality Guidelines, 1999, CCME, Winnipeg. http://www.ccme.ca/assets/pdf/rev_soil_summary_tbl_7.0_e.pdf.

Carpenter, 2000 Carpenter, Peggy. Remediation of Overlapping Benzene/MTBE and MTBE-Only Plumes: A Case Study. Pittsburgh Geological Society Presentation. 2000.

Efroymson, R.A., Will, M.E., and Suter II, G.W., 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. (ES/ER/TM-126/R2).

Efroymson, R.A., Will, M.E., Suter II, G.W., and Wooten, A.C., 1997b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory. Oak Ridge, TN. (ES/ER/TM-85/R3).

FDEP, 2007. Florida Department of Environmental Protection web site; http://www.dep.state.fl.us/water/drinkingwater/MtBEbe.htm; accessed on March 7, 2007

GeoInsight, 2000. GeoInsight Environmental Strategy & Engineering, 2000. The Rise and Fall of MTBE. GeoInsighter Fall/Winter 2000 Newsletter, Volume 5 Number 3.

Interstate Technology and Regulatory Counsel, August 2010. Use and Measurement of Mass Flux and Mass Discharge, ITRC Integrated DNAPL Site Strategy Team, Washington, DC.

Lyman, Warren, Reehl, William, and Rosenblatt, David, 1982. Handbook of Chemical Property Estimation Methods. McGraw-Hill Book Company, New York.

Mac, M.J., P.A. Opler, C.E. Puckett Haecker, and P.D. Doran, 1998. Status and Trends of the Nation's Biological Resources. 2 Vols. U.S. Department of the Interior, U.S. Geological Survey, Reston, Va. http://www.nwrc.usgs.gov/sandt/index.html.

Ministry of Housing, Spatial Planning and Environment (MHSPE), 2000. Intervention Values. Directorate-General for Environmental Protection, Department of Soil Protection, The Hague, Netherlands.

Naval Facilities Engineering Command, Atlantic Division (LANTDIV). 2004. Draft Phase I Environmental Condition of Property, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. March 31, 2004. Norfolk, Virginia.

Naval Energy and Environmental Support Activity (NEESA), 1984. Initial Assessment Study of Naval Station Roosevelt Roads, Puerto Rico. NEESA 13-051.

Puerto Rico Environmental Quality Board (PREQB), 2010. Puerto Rico Water Quality Standards Regulation. Regulation No. 7837. March 31, 2010.

Stephen, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman and W.A. Brungs, 1985. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. PB85-227049. National Technical Information Service, Springfield, VA.

United States Environmental Protection Agency (USEPA), 2012. Regional Screening Levels Table. http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. November 2012.

USEPA, 2011. Great Lakes Initiative Toxicity Data Clearinghouse. Available at: http://www.epa.gov/gliclearinghouse/.

USEPA 2010. On-Line Tools for Site Assessment Calculation, Vertical Gradient Calculator. Ecosystems Research Division. Site Accessed December 13, 2010. http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.html

USEPA. 2009a. Drinking Water Regulations and Health Advisories. Office of Water. Washington, D.C. http://www.epa.gov/safewater/contaminants/index.html#mcls. May 2009.

USEPA, 2009b. National Recommended Water Quality Criteria. Office of Water and Office of Science and Technology, Washington, D.C. Available at: http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm.

USEPA. 2007a. RCRA § 7003 Administrative Order on Consent. In the Matter of: United States The Department of the Navy, Naval Activity Puerto Rico formerly Naval Station Roosevelt Roads, Puerto Rico. Environmental Protection Agency, EPA Docket No. RCRA-02-2007-7301. January 29, 2007.

USEPA. 2007b. ECOTOX User Guide: Ecotoxicology Database System. Version 4.0. Available at: http:/www.epa.gov/ecotox/. Accessed August 28, 2009.

USEPA, 2005. Guidance for Developing Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-55.

USEPA, 2004. Superfund Chemical Data Matrix. Available at: http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

USEPA, 2003. USEPA Region 5 Ecological Screening Levels Table. http://www.epa.gov/reg5rcra/ca/ESL.pdf.

USEPA, 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published November 1995. Website version last updated November 30, 2001. Available at: http://www.epa.gov/region4/waste/ots/ecolbul.htm.

USEPA, 1999. Screening-Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA/530/D-99/001A.

USEPA. 1998. Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling. GW Sampling SOP, Final. March 16, 1998.

USEPA, 1996. Ecotox Thresholds. ECO Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA 540/F-95/038.

United States Fish and Wildlife Service (USFWS), 1996. Recovery Plan for the Yellow-Shouldered Blackbird (Agelaius xanthomus). USFWS, Southeast Region, Atlanta, GA.

USGS, 1998. United States Geological Society web site; http://ca.water.usgs.gov/MtBEbe/fs20396/; accessed on March 7, 2007.

Wentsel, R.S, T.W. Pa Point, M. Simini, R.T. Checkai, and D. Ludwig, 1996. Tri-Service Procedural Guidelines for Ecological Risk Assessments. Edgewood Research Development and Engineering Center, Aberdeen Proving Ground, MD. ADA297968.

Wilson, John, Kaiser, Philip, and Adair , Cherri. Monitored Natural Attenuation of MTBE as a Risk Management Option at Leaking Underground Storage Tank Sites. U.S. Environmental Protection Agency Office of Research and Development, National Risk Management Research Laboratory Ada, Oklahoma (EPA/600/R-04/1790).

TABLES

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Laboratory Analysis						Comment
					MtBE	BTEX	TPH DRO	TPH GRO	FOC	TOD	
Surface Soil	1738MW01B	1738MW01B-00	0.0-1.0	6/13/2012	X	X	X	X			
	1738MW02R	1738MW02R-00	0.0-1.0	6/16/2012	X	X	X	X			
	1738MW07B	1738MW07B-00	0.0-1.0	6/24/2012	X	X	X	X			
		1738MW07B-00D	0.0-1.0	6/24/2012	X	X	X	X			Duplicate
	1738MW08B	1738MW08B-00	0.0-1.0	6/23/2012	X	X	X	X			
	1738MW09B	1738MW09B-00	0.0-1.0	6/17/2012	X	X	X	X			
		1738MW09B-00MS/MSD	0.0-1.0	6/17/2012	X	X	X	X			Matrix Spike/Matrix Spike Duplicate
	1738MW13	1738MW13-00	0.0-1.0	6/15/2012	X	X	X	X			
	1738MW14	1738MW14-00	0.0-1.0	6/16/2012	X	X	X	X			
	1738MW15	1738MW15-00	0.0-1.0	6/16/2012	X	X	X	X			
	1738MW16	1738MW16-00	0.0-1.0	6/21/2012	X	X	X	X			
		1738MW16-00D	0.0-1.0	6/21/2012	X	X	X	X			Duplicate
Shallow Subsurface Soil	1738SB101	1738SB101-01	1.0-3.0	9/20/2010	X	X	X	X			
		1738SB101-01D	1.0-3.0	9/20/2010	X	X	X	X			Duplicate
		1738SB101-01MS/MSD	1.0-3.0	9/20/2010	X	X	X	X			Matrix Spike/Matrix Spike Duplicate
	1738SB102	1738SB102-01	1.0-3.0	9/20/2010	X	X	X	X			
	1738SB103	1738SB103-01	1.0-3.0	9/20/2010	X	X	X	X			
	1738SB104A	1738SB104-01	1.0-3.0	9/20/2010	X	X	X	X			
	1738SB105	1738SB105-01	1.0-3.0	9/20/2010	X	X	X	X			
		1738SB105-01D	1.0-3.0	9/20/2010	X	X	X	X			Duplicate
	1738MW11	1738MW11-01	1.0-3.0	9/13/2010	X	X	X	X			
	1738MW12	1738MW12-01	1.0-3.0	9/14/2010	X	X	X	X			
		1738MW12-01D	1.0-3.0	9/14/2010	X	X	X	X			Duplicate
		1738MW12-01MS/MSD	1.0-3.0	9/14/2010	X	X	X	X			Matrix Spike/Matrix Spike Duplicate
	1738MW01B	1738MW01B-01	1.0-3.0	6/13/2012	X	X	X	X			
	1738MW02R	1738MW02R-01	1.0-3.0	6/16/2012	X	X	X	X			
	1738MW07B	1738MW07B-01	1.0-3.0	6/24/2012	X	X	X	X			
	1738MW08B	1738MW08B-01	1.0-3.0	6/23/2012	X	X	X	X			
	1738MW09B	1738MW09B-01	1.0-3.0	6/17/2012	X	X	X	X			

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Laboratory Analysis						Comment
					MtBE	BTEX	TPH DRO	TPH GRO	FOC	TOD	
Shallow Subsurface Soil (continued)	1738MW13	1738MW13-01	1.0-3.0	6/14/2012	X	X	X	X			
	1738MW14	1738MW14-01	1.0-3.0	6/16/2012	X	X	X	X			
		1738MW14-01D	1.0-3.0	6/16/2012	X	X	X	X			Duplicate
	1738MW15	1738MW15-01	1.0-3.0	6/16/2012	X	X	X	X			
	1738MW16	1738MW16-01	1.0-3.0	6/21/2012	X	X	X	X			
	1738SB106	1738SB106-01	1.0-3.0	6/27/2012	X	X	X	X			
		1738SB106-01MS/MSD	1.0-3.0	6/27/2012	X	X	X	X			Matrix Spike/Matrix Spike Duplicate
	1738SB108	1738SB108-01	1.0-3.0	8/15/2012			X				
	1738SB109	1738SB109-01	1.0-3.0	8/22/2012	X	X	X	X			
Subsurface Soil	1738SB101	1738SB101-04	7-9	9/20/2010	X	X	X	X			
		1738SB101-06	11-13	9/20/2010	X	X	X	X			
		1738SB101-08	15-17	9/20/2010	X	X	X	X			
	1738SB102	1738SB102-04	7-9	9/20/2010	X	X	X	X			
		1738SB102-08	15-17	9/20/2010	X	X	X	X			
	1738SB103	1738SB103-04	7-9	9/20/2010	X	X	X	X			
	1738SB104	1738SB104-04	7-9	9/20/2010	X	X	X	X			
		1738SB104-06	11-13	9/20/2010	X	X	X	X			
		1738SB104-08	15-17	9/20/2010	X	X	X	X			
	1738SB105	1738SB105-04	7-9	9/20/2010	X	X	X	X			
		1738SB105-07	13-15	9/20/2010	X	X	X	X			
	1738MW11	1738MW11-04	7-9	9/13/2010	X	X	X	X			
		1738MW11-08	15-17	9/13/2010	X	X	X	X			
	1738MW12	1738MW12-04	7-9	9/14/2010	X	X	X	X			
		1738MW12-08	15-17	9/14/2010	X	X	X	X			
	1738SB104A	1738SB104-10	19-20	6/27/2012	X	X	X	X			
	1738MW01B	1738MW01B-06	11-13	6/13/2012	X	X	X	X			
		1738MW01B-11	21-23	6/13/2012	X	X	X	X			
	1738MW02R	1738MW02R-07	13-15	6/16/2012	X	X	X	X			
		1738MW02R-10	19-20	6/16/2012	X	X	X	X			

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Laboratory Analysis						Comment
					MtBE	BTEX	TPH DRO	TPH GRO	FOC	TOD	
Subsurface Soil (continued)		1738MW02R-17	33-35	6/16/2012	X	X	X	X			
	1738MW07B	1738MW07B-03	5-7	6/24/2012	X	X	X	X			
	1738MW08B	1738MW08B-03	5-7	6/23/2012	X	X	X	X			
		1738MW08B-03D	5-7	6/23/2012	X	X	X	X			Duplicate
	1738MW09B	1738MW09B-03	5-7	6/17/2012	X	X	X	X			
		1738MW09B-03D	5-7	6/17/2012	X	X	X	X			Duplicate
	1738MW13	1738MW13-03	5-7	6/14/2012	X	X	X	X			
		1738MW13-12	22-24	6/14/2012	X	X	X	X			
	1738MW14	1738MW14-09	17-19	6/16/2012	X	X	X	X			
		1738MW14-11	21-23	6/16/2012	X	X	X	X			
	1738MW15	1738MW15-05	9-11	6/16/2012	X	X	X	X			
		1738MW15-10	19-21	6/16/2012	X	X	X	X			
	1738MW16	1738MW16-03	5-7	6/21/2012	X	X	X	X			
		1738MW16-03MS/MSD	5-7	6/21/2012	X	X	X	X			Matrix Spike/Matrix Spike Duplicate
	1738MW17	1738MW17-10	19-20	8/21/2012	X	X	X	X			
	1738SB107	1738SB107-09	17-18	8/20/2012	X	X	X	X			
		1738SB107-09D	17-18	8/20/2012	X	X	X	X			Duplicate
		1738SB107-11	21-22	8/20/2012	X	X	X	X			
		1738SB107-14	27-28	8/20/2012	X	X	X	X			
	1738SB108	1738SB108-08	15-16	8/15/2012	X	X	X	X			
		1738SB108-09	17-18	8/16/2012	X	X	X	X			
		1738SB108-13	26-27	8/16/2012	X	X		X			
	1738SB109	1738SB109-10	19-20	8/24/2012	X	X		X	X	X	
		1738SB109-12	23-24	8/24/2012	X	X		X	X		

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Laboratory Analysis: MtBE	BTEX	TPH DRO	TPH GRO	FOC	TOD	Comment
Subsurface Soil (continued)	1738SB110	1738SB110-08	16-17	8/24/2012	X	X		X	X	X	
		1738SB110-10	20-21	8/24/2012	X	X		X			
		1738SB110-12	24-25	8/24/2012	X	X		X			
		1738SB110-12D	24-25	8/24/2012	X	X		X			Duplicate
		1738SB110-13	26-27	8/24/2012					X		
	1738SB111	1738SB111-08	17-18	8/17/2012	X	X	X	X			
		1738SB111-11	21-22	8/17/2012	X	X	X	X			
		1738SB111-14	28-29	8/17/2012	X	X	X	X			
Groundwater	1738MW01	1738GW01	NA	9/16/2010	X	X	X	X			
	1738MW02	1738GW02	NA	9/16/2010	X	X	X	X			
		1738GW02D	NA	9/16/2010	X	X	X	X			Duplicate
	1738MW03	1738GW03	NA	9/18/2010	X	X	X	X			
	1738MW04	1738GW04	NA	9/16/2010	X	X	X	X			
		1738GW04D	NA	9/16/2010	X	X	X	X			Duplicate
		1738GW04MS	NA	9/16/2010	X	X	X	X			Matrix Spike
		1738GW04MSD	NA	9/16/2010	X	X	X	X			Matrix Spike Duplicate
	1738MW05	1738GW05	NA	9/18/2010	X	X	X	X			
	1738MW05R	1738GW05R	NA	9/20/2010	X	X	X	X			
	1738MW05L	1738GW05L	NA	9/18/2010	X	X	X	X			
	1738MW06	1738GW06	NA	9/17/2010	X	X	X	X			
	1738MW07	1738GW07	NA	9/21/2010	X	X	X	X			
	1738MW08	1738GW08	NA	9/21/2010	X	X	X	X			
	1738MW09	1738GW09	NA	9/19/2010	X	X	X	X			
	1738MW10	1738GW10	NA	9/19/2010	X	X	X	X			
	1738MW11	1738GW11	NA	9/17/2010	X	X	X	X			
	1738MW12	1738GW12	NA	9/20/2010	X	X	X	X			
	1738MW01	1738MW01-12C	NA	8/18/2012	X	X	X	X			
	1738MW01A	1738MW01A-12C	NA	8/18/2012	X	X	X	X			
	1738MW01B	1738MW01B-12C	NA	8/18/2012	X	X	X	X			

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Laboratory Analysis: MtBE	BTEX	TPH DRO	TPH GRO	FOC	TOD	Comment
Groundwater (continued)	1738MW02	1738MW02-12C	NA	8/18/2012	X	X	X	X			
	1738MW02R	1738MW02R-12C	NA	8/19/2012	X	X	X	X			
		1738MW02R-D-12C	NA	8/19/2012	X	X	X	X			Duplicate
		1738MW02R-MS-12C	NA	8/19/2012	X	X	X	X			Matrix Spike
		1738MW02R-MSD-12C	NA	8/19/2012	X	X	X	X			Matrix Spike Duplicate
	1738MW03	1738MW03-12C	NA	8/18/2012	X	X	X	X			
	1738MW04	1738MW04-12C	NA	8/18/2012	X	X	X	X			
	1738MW05	1738MW05-12C	NA	8/21/2012	X	X	X	X			
	1738MW05L	1738MW05L-12C	NA	8/24/2012	X	X	X	X			
	1738MW05R	1738MW05R-12C	NA	8/24/2012	X	X	X	X			
	1738MW06	1738MW06-12C	NA	8/26/2012	X	X	X	X			
	1738MW07	1738MW07-12C	NA	8/25/2012	X	X	X	X			
		1738MW07D-12C	NA	8/25/2012	X	X	X	X			Duplicate
		1738MW07MS-12C	NA	8/25/2012	X	X	X	X			Matrix Spike
		1738MW07MSD-12C	NA	8/25/2012	X	X	X	X			Matrix Spike Duplicate
	1738MW07A	1738MW07A-12C	NA	8/24/2012	X	X	X	X			
	1738MW07B	1738MW07B-12C	NA	8/25/2012	X	X	X	X			
	1738MW08	1738MW08-12C	NA	8/21/2012	X	X	X	X			
	1738MW08A	1738MW08A-12C	NA	8/22/2012	X	X	X	X			
	1738MW08B	1738MW08B-12C	NA	8/21/2012	X	X	X	X			
	1738MW09	1738MW09-12C	NA	8/20/2012	X	X	X	X			
	1738MW09A	1738MW09A-12C	NA	8/21/2012	X	X	X	X			
	1738MW09B	1738MW09B-12C	NA	8/20/2012	X	X	X	X			
	1738MW10	1738MW10-12C	NA	8/19/2012	X	X	X	X			
	1738MW11	1738MW11-12C	NA	8/19/2012	X	X	X	X			
	1738MW12	1738MW12-12C	NA	8/16/2012	X	X	X	X			
	1738MW13	1738MW13-12C	NA	8/15/2012	X	X	X	X			
	1738MW14	1738MW14-12C	NA	8/17/2012	X	X	X	X			
	1738MW15	1738MW15-12C	NA	8/17/2012	X	X	X	X			

TABLE 4-1

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

					Laboratory Analysis						
Media	**Site ID**	**Sample ID**	**Sample Depth (ft bgs)**	**Sample Date**	**MtBE**	**BTEX**	**TPH DRO**	**TPH GRO**	**FOC**	**TOD**	**Comment**
Groundwater (continued)	1738MW16	1738MW16-12C	NA	8/19/2012	X	X	X	X			
		1738MW16D-12C	NA	8/19/2012	X	X	X	X			Duplicate
	1738MW17	1738MW17-12C	NA	8/27/2012	X	X	X	X			

Notes:

BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
FOC - Fractional Organic Carbon
ft bgs - feet below ground surface
GRO - Gasoline Range Organics
MtBE - Methyl tertiary-Butyl Ether
NA - Not Applicable
TOD - Total Oxidant Demand
TPH - Total Petroleum Hydrocarbons

TABLE 4-2

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - QA/QC AND IDW SAMPLES
AOC F SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

			Aqueous Samples Analysis Requested				Solid Samples Analysis Requested				
Sample Media	Sample ID	Sample Date	MtBE	BTEX	TPH DRO (8015)	TPH GRO (8015)	TCLP Volatiles	TCLP Metals	TPH DRO/GRO	RCI	Comment
Trip Blanks	1738TB01	9/16/2010	X	X		X					
	1738TB02	9/17/2010	X	X		X					
	1738TB03	9/21/2010	X	X		X					
	1738TB04	6/18/2012	X	X		X					
	1738TB05	6/25/2012	X	X		X					
	1738TB06	6/28/2012	X	X		X					
	1738TB07	8/20/2012	X	X		X					
	1738TB08	8/22/2012	X	X		X					
	1738TB09	8/27/2012	X	X		X					
	1738TB10	8/28/2012	X	X		X					
Equipment Rinsates	1738ER01	9/13/2010	X	X	X	X					Acetate Macro Core Liner
	1738ER02	9/14/2010	X	X	X	X					Acetate Macro Core Liner
	1738ER03	9/16/2010	X	X	X	X					Groundwater Sampling Equipment
	1738ER04	9/17/2010	X	X	X	X					Teflon-lined polyethylene tubing & bladder pump
	1738ER05	9/18/2010	X	X	X	X					Teflon-lined polyethylene tubing & bladder pump
	1738ER06	9/19/2010	X	X	X	X					Teflon-lined polyethylene tubing
	1738ER07	9/20/2010	X	X	X	X					Groundwater Sampling Equipment & Teflon bladder
	1738ER08	9/21/2010	X	X	X	X					Groundwater Sampling Equipment & Teflon bladder
	1738ER09	6/15/2012	X	X	X	X					Aluminum pie pan
	1738ER10	6/16/2012	X	X	X	X					Acetate liner
	1738ER11	6/17/2012	X	X	X	X					Stainless Steel Spoon
	1738ER12	6/21/2012	X	X	X	X					Aluminum pie pan
	1738ER13	6/24/2012	X	X	X	X					Stainless Steel Spoon
	1738ER14	6/27/2012	X	X	X	X					Acetate liner
	1738ER15	8/17/2012	X	X	X	X					Bladder pump and Tubing
	1738ER16	8/17/2012	X	X	X	X					Aluminum pie pan
	1738ER17	8/18/2012	X	X	X	X					Bladder pump and Tubing
	1738ER18	8/19/2012	X	X	X	X					Bladder pump and Tubing
	1738ER19	8/21/2012	X	X	X	X					Bladder pump and Tubing
	1738ER20	8/24/2012	X	X	X	X					Bladder pump and Tubing
	1738ER21	8/24/2012	X	X	X	X					Split-Spoon Sample Barrel
	1738ER22	8/26/2012	X	X	X	X					Bladder pump and Tubing
Field Blank Samples	1738FB01	9/14/2010	X	X	X	X					Lab Grade Deionized Water
	1738FB03	6/15/2012	X	X	X	X					Lab Grade Deionized Water
	1738FB04	8/26/2012	X	X	X	X					Lab Grade Deionized Water
IDW	1738IDW01	9/21/2010			X	X					Aqueous
	1738IDW02	9/21/2010					X	X	X	X	Solid
	1738IDW03	8/28/2012	X	X	X	X					Aqueous
	1738IDW04	8/28/2012					X	X	X	X	Solid

Notes:
MtBE - Methyl tertiary-Butyl Ether
QA/QC - Quatliy Assurance/Quality Control
TPH - Total Petroleum Hydrocarbons
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
TCLP - Toxicity Characteristic Leaching Procedure
IDW - Investigation Derived Waste
RCI - Reactivity, Corrosivity, Ignitability

TABLE 4-3a

METHOD PERFORMANCE LIMITS
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL) - 2010
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Volatiles	Quantitation Limits* Water (µg/L)	Quantitation Limits* Low Soil (µg/kg)	Analytical Method	Preparation Methods Water	Preparation Methods Soil	Method Description
Volatiles						
Benzene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Ethyl benzene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Methyl tertiary-butyl ether (MtBE)	10	50	8260B (low level)	5030 B	5035	GC/MS
Toluene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Xylene	2.0	10	8260B (low level)	5030 B	5035	GC/MS
Total Petroleum Hydrocarbons	**Quantitation Limits* Water (µg/L)**	**Quantitation Limits* Low Soil (µg/kg)**	**Analytical Method**	**Preparation Methods Water**	**Preparation Methods Soil**	**Method Description**
TPH DRO	100	3300	8015C	3520C	3550B	GC
TPH GRO	50	250	8015C	5030B	5035	GC
TCLP Metals	**Quantitation Limits* Soil (mg/L)**	**Quantitation Limits* Water (µg/L)**	**Analytical Method**	**Preparation Methods Water**	**Preparation Methods Soil**	**Method Description**
Arsenic	1.0	10	6010C	--	1311/3010A	ICP
Barium	1.0	10	6010C	--	1311/3010A	ICP
Cadmium	0.50	5	6010C	--	1311/3010A	ICP
Chromium	1.0	10	6010C	--	1311/3010A	ICP
Lead	0.50	5.0	6010C	--	1311/3010A	ICP
Mercury	0.020	0.20	7470A/7471A	--	1311/3010A	Cold Vapor AA
Selenium	1.0	10	6010C	--	1311/3010A	ICP
Silver	1.0	10	6010C	--	1311/3010A	ICP

TABLE 4-3a

METHOD PERFORMANCE LIMITS
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL) - 2010
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

TCLP Volatiles	Quantitation Limits* Water (µg/L)	Soil (µg/L)	Analytical Method	Preparation Methods Water	Soil	Method Description
Benzene	--	20	8260B	--	1311/5030A	GC/MS
Carbon tetrachloride	--	20	8260B	--	1311/5030A	GC/MS
Chlorobenzene	--	20	8260B	--	1311/5030A	GC/MS
Chloroform	--	20	8260B	--	1311/5030A	GC/MS
1,2-Dichloroethane	--	20	8260B	--	1311/5030A	GC/MS
1,1-Dichloroethene	--	20	8260B	--	1311/5030A	GC/MS
2-Butanone (MEK)	--	20	8260B	--	1311/5030A	GC/MS
Tetrachloroethene	--	20	8260B	--	1311/5030A	GC/MS
Trichloroethene	--	20	8260B	--	1311/5030A	GC/MS
Vinyl chloride	--	20	8260B	--	1311/5030A	GC/MS
Reactivity, Corrosivity, Ignitability	**Quantitation Limits* Water (mg/L)**	**Low Soil (mg/kg)**	**Analytical Method**	**Preparation Methods Water**	**Soil**	**Method Description**
Reactive Cyanide	1	1	9014	9012A	9012A	Titrimetric
Flashpoint/Ignitability	--	--	1010A	--	--	Pensky-Marten Closed-Cup Tester
pH (s.u.)	--	--	9045D	--	--	Electrometric
Reactive Sulfide	1	10	9034	--	9030B	Titrimetric

Notes:

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

µg/L - micrograms per liter.

µg/kg - micrograms per kilogram.

mg/kg - milligrams per kilogram.

mg/L - milligrams per liter

GC - Gas Chromotography

GC/MS - Gas Chromotography/Mass Spectrometry

ICP - Inductively Coupled Plasma

TABLE 4-3b

METHOD PERFORMANCE LIMITS
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL) - 2012
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Volatiles	Quantitation Limits*		Analytical Method	Preparation Methods		Method Description
	Water (µg/L)	Low Soil (µg/kg)		Water	Soil	
Volatiles						
Benzene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Ethyl benzene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Methyl tertiary-butyl ether (MtBE)	10	60	8260B (low level)	5030 B	5035	GC/MS
Toluene	1.0	5.0	8260B (low level)	5030 B	5035	GC/MS
Xylene	2.0	10	8260B (low level)	5030 B	5035	GC/MS
Total Petroleum Hydrocarbons	**Quantitation Limits***		**Analytical Method**	**Preparation Methods**		**Method Description**
	Water (µg/L)	**Low Soil (µg/kg)**		**Water**	**Soil**	
TPH DRO	100	3300	8015C	3520C	3550B	GC
TPH GRO	50	250	8015C	5030B	5035	GC
TCLP Metals	**Quantitation Limits***		**Analytical Method**	**Preparation Methods**		**Method Description**
	Soil (mg/L)	**Water (µg/L)**		**Water**	**Soil**	
Arsenic	0.2	10	6010C	--	1311/3010A	ICP
Barium	1.0	10	6010C	--	1311/3010A	ICP
Cadmium	0.10	5	6010C	--	1311/3010A	ICP
Chromium	0.2	10	6010C	--	1311/3010A	ICP
Lead	0.20	5.0	6010C	--	1311/3010A	ICP
Mercury	0.020	0.20	7470A/7471A	--	1311/3010A	Cold Vapor AA
Selenium	0.5	10	6010C	--	1311/3010A	ICP
Silver	0.1	10	6010C	--	1311/3010A	ICP

TABLE 4-3b

METHOD PERFORMANCE LIMITS
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL) - 2012
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Quantitation Limits*			Preparation Methods		
TCLP Volatiles	Water (µg/L)	Soil (µg/L)	Analytical Method	Water	Soil	Method Description
Benzene	--	20	8260B	--	1311/5030A	GC/MS
Carbon tetrachloride	--	20	8260B	--	1311/5030A	GC/MS
Chlorobenzene	--	20	8260B	--	1311/5030A	GC/MS
Chloroform	--	20	8260B	--	1311/5030A	GC/MS
1,2-Dichloroethane	--	20	8260B	--	1311/5030A	GC/MS
1,1-Dichloroethene	--	20	8260B	--	1311/5030A	GC/MS
2-Butanone (MEK)	--	200	8260B	--	1311/5030A	GC/MS
Tetrachloroethene	--	20	8260B	--	1311/5030A	GC/MS
Trichloroethene	--	20	8260B	--	1311/5030A	GC/MS
Vinyl chloride	--	20	8260B	--	1311/5030A	GC/MS
	Quantitation Limits*			**Preparation Methods**		
Reactivity, Corrosivity, Ignitability	**Water (mg/L)**	**Low Soil (mg/kg)**	**Analytical Method**	**Water**	**Soil**	**Method Description**
Total Cyanide	0.1	0.5	9014	9012A	9012A	Titrimetric
Flashpoint/Ignitability	--	--	1010A	--	--	Pensky-Marten Closed-Cup Tester
pH (s.u.)	--	--	9045D	--	--	Electrometric
Sulfide	1	60	9034	--	9030B	Titrimetric

Notes:

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

µg/L - micrograms per liter.
µg/kg - micrograms per kilogram.
mg/kg - milligrams per kilogram.
mg/L - milligrams per liter
GC - Gas Chromotography
GC/MS - Gas Chromotography/Mass Spectrometry
ICP - Inductively Coupled Plasma

TABLE 4-4

SUMMARY OF SOIL BORING AND MONITORING WELL SPECIFICATIONS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Soil Boring and Monitoring Well Designation	Date Installed	Coordinates		Ground Elevation (ft. datum)	Top of PVC Elevation (ft. datum)	Borehole Depth		Well Depth		Screened Interval	
		Easting	Northing			Feet (approx. bgs)	Elevation (ft. datum)	Feet (approx. bgs)	Elevation (ft. datum)	Feet (approx. bgs)	Elevation (ft. datum)
1738SB101	9/20/2010	936931.667	804729.042	124.8	NA	20.0	104.8	NA	NA	NA	NA
1738SB102	9/20/2010	936956.067	804728.843	125.4	NA	18.0	107.4	NA	NA	NA	NA
1738SB103	9/20/2010	936946.167	804755.843	124.7	NA	14.0	110.7	NA	NA	NA	NA
1738SB104	9/20/2010	936934.767	804743.642	124.7	NA	19.0	105.7	NA	NA	NA	NA
1738SB105	9/20/2010	936915.466	804760.942	124.2	NA	15.0	109.2	NA	NA	NA	NA
1738MW01	4/15/1998	936962.288	804779.156	124.4	124.00	34.0	90.4	34.0	90.4	19 to 34	105.4 to 90.4
1738MW01A	6/19/2012	936969.453	804778.979	124.1	126.66	60.0	64.1	25.0	99.1	15 to 25	109.1 to 99.1
1738MW01B	6/26/2012	936932.840	804780.269	124.0	126.73	61.8	62.2	61.8	62.2	51.8 to 61.8	72.2 to 62.2
1738MW02	4/16/1998	936906.973	804779.844	123.3	123.07	33.5	89.8	33.0	90.3	18 to 33	105.3 to 90.3
1738MW02R	6/26/2012	936882.282	804782.582	123.1	125.50	41.0	82.1	40.0	83.1	30 to 40	93.1 to 83.1
1738MW03	4/20/1998	936913.588	804745.971	124.4	124.16	30.0	94.4	30.0	94.4	15 to 30	109.4 to 94.4
1738MW04	4/21/1998	937032.561	804708.503	125.1	124.95	28.5	96.6	28.5	96.6	18.5 to 28.5	106.6 to 96.6
1738MW05	4/30/1998	936883.484	804902.036	109.5	112.43	10.5	99.0	10.5	99.0	3.5 to 10.5	106.0 to 99.0
1738MW05R	5/14/2008	936876.230	804908.342	109.6	111.06	24.5	85.1	24.5	85.1	14.5 to 24.5	95.1 to 85.1
1738MW05L	9/15/2010	936882.675	804911.339	109.5	111.96	45.0	64.5	40.0	69.5	30 to 40	79.5 to 69.5
1738MW06	4/30/1998	936697.407	804871.838	112.1	114.95	15.0	97.1	15.0	97.1	5 to 15	107.1 to 97.1
1738MW07	9/17/2010	936748.175	804959.738	107.6	110.11	25.0	82.6	25.0	82.6	15 to 25	92.6 to 82.6
1738MW07A	6/24/2012	936755.482	804954.382	107.6	110.18	10.5	97.1	10.3	97.3	5.5 to 10.5	102.1 to 97.1
1738MW07B	6/27/2012	936759.884	804957.720	107.5	110.13	45.0	62.5	44.8	62.7	30 to 40	77.5 to 67.5
1738MW08	9/17/2010	936882.054	804997.787	107.1	109.55	25.0	82.1	24.0	83.1	14 to 24	93.1 to 83.1
1738MW08A	6/23/2012	936880.031	804992.331	106.9	109.65	11.0	95.9	10.8	96.1	6 to 11	100.9 to 95.9
1738MW08B	6/23/2012	936884.587	804990.880	106.9	109.40	42.5	64.4	31.8	75.1	22 to 32	84.9 to 74.9
1738MW09	9/16/2010	937059.275	804911.926	107.2	110.10	25.0	82.2	24.0	83.2	14 to 24	93.2 to 83.2
1738MW09A	6/20/2012	937066.886	804915.958	106.7	109.41	10.5	96.2	10.3	96.4	5.5 to 10.5	101.2 to 96.2
1738MW09B	6/20/2012	937062.311	804908.255	107.1	109.77	43.0	64.1	40.8	66.3	31 to 41	76.1 to 66.1
1738MW10	9/16/2010	937041.456	804816.652	110.1	112.50	25.0	85.1	25.0	85.1	15 to 25	95.1 to 85.1
1738MW11	9/13/2010	936805.916	804737.100	122.7	122.67	26.0	96.7	26.0	96.7	16 to 26	106.7 to 96.7
1738MW12	9/14/2010	936942.465	804633.108	125.6	128.06	27.5	98.1	27.5	98.1	17.5 to 27.5	108.1 to 98.1
1738MW13	6/20/2012	936893.920	804688.995	124.4	126.77	35.8	88.6	35.8	88.6	25.8 to 35.8	98.6 to 88.6
1738MW14	6/20/2012	936713.968	804712.857	121.4	123.74	42.0	79.4	40.4	81.0	30.4 to 40.4	91 to 81
1738MW15	6/20/2012	936791.850	804834.924	121.5	123.53	26.0	95.5	24.8	96.7	14.8 to 24.8	106.7 to 96.7
1738MW16	6/22/2012	937136.460	804795.269	109.1	111.39	27.0	82.1	24.8	84.3	14.8 to 24.8	94.3 to 84.3
1738MW17	6/22/2012	936847.058	804670.158	124.2	127.12	30.0	94.2	29.8	94.4	19.8 to 29.8	94.4 to 104.4

Notes:

bgs = Below Ground Surface (1) Well not installed NA = Not Applicable

The datum plan used is the Mean Low Water + 100.00 foot as established by the U.S. Navy Survey Section (November 1941).
AOC F Site 1738 field program implemented June 2012.

TABLE 4-5

SUMMARY OF DEPTH TO WATER MEASUREMENTS AND GROUNDWATER ELEVATIONS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Monitoring Well ID	Date Installed	Reference Elevation (ft. datum)	Groundwater Level and Elevation							
			22-Sep-10		2-Nov-10		29-Jun-12		26-Aug-12	
			DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)
1738MW01	4/15/1998	124.00	15.88	108.12	16.45	107.55	19.29	104.71	19.68	104.32
1738MW01A	6/19/2012	126.66	(1)	(1)	(1)	(1)	21.78	104.88	22.26	104.40
1738MW01B	6/26/2012	126.73	(1)	(1)	(1)	(1)	21.92	104.81	22.43	104.30
1738MW02	4/16/1998	123.07	14.13	108.94	14.45	108.62	18.03	105.04	18.69	104.38
1738MW02R	6/26/2012	125.50	(1)	(1)	(1)	(1)	20.73	104.77	21.20	104.30
1738MW03	4/20/1998	124.16	15.91	108.25	16.64	107.52	19.30	104.86	19.79	104.37
1738MW04	4/21/1998	124.95	16.82	108.13	17.54	107.41	20.07	104.88	20.60	104.35
1738MW05	4/30/1998	112.43	4.74	107.69	5.74	106.69	8.35	104.08	8.86	103.57
1738MW05R	5/14/2008	111.06	3.46	107.6	4.51	106.55	7.08	103.98	7.55	103.51
1738MW05L	9/15/2010	111.96	4.41	107.55	5.4	106.56	7.93	104.03	8.38	103.58
1738MW06	4/30/1998	114.95	6.88	108.07	7.5	107.45	10.10	104.85	10.56	104.39
1738MW07	9/17/2010	110.11	2.85	107.26	3.83	106.28	6.27	103.84	6.61	103.50
1738MW07A	6/24/2012	110.18	(1)	(1)	(1)	(1)	6.34	103.84	6.85	103.33
1738MW07B	6/27/2012	110.13	(1)	(1)	(1)	(1)	6.48	103.65	6.58	103.55
1738MW08	9/17/2010	109.55	3.37	106.18	4.37	105.18	6.68	102.87	6.78	102.77
1738MW08A	6/23/2012	109.65	(1)	(1)	(1)	(1)	6.84	102.81	6.92	102.73
1738MW08B	6/23/2012	109.40	(1)	(1)	(1)	(1)	6.55	102.85	6.63	102.77
1738MW09	9/16/2010	110.10	3.14	106.96	4.02	106.08	6.69	103.41	9.93	100.17
1738MW09A	6/20/2012	109.41	(1)	(1)	(1)	(1)	7.70	101.71	6.52	102.89
1738MW09B	6/20/2012	109.77	(1)	(1)	(1)	(1)	6.05	103.72	6.49	103.28
1738MW10	9/16/2010	112.50	4.46	108.04	5.15	107.35	7.77	104.73	8.25	104.25
1738MW11	9/13/2010	122.67	14.47	108.2	14.88	107.79	17.83	104.84	18.30	104.37
1738MW12	9/14/2010	128.06	19.82	108.24	20.4	107.66	23.16	104.90	25.68	102.38
1738MW13	6/20/2012	126.77	(1)	(1)	(1)	(1)	21.98	104.79	22.47	104.30

TABLE 4-5

SUMMARY OF DEPTH TO WATER MEASUREMENTS AND GROUNDWATER ELEVATIONS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Monitoring Well ID	Date Installed	Reference Elevation (ft. datum)	Groundwater Level and Elevation							
			22-Sep-10		2-Nov-10		29-Jun-12		26-Aug-12	
			DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)	DTW (ft-PVC)	Elevation (ft-Datum)
1738MW14	6/20/2012	123.74	(1)	(1)	(1)	(1)	19.08	104.66	19.58	104.16
1738MW15	6/20/2012	123.53	(1)	(1)	(1)	(1)	18.52	105.01	19.03	104.50
1738MW16	6/22/2012	111.39	(1)	(1)	(1)	(1)	7.08	104.31	7.60	103.79
1738MW17	6/22/2012	127.12	(1)	(1)	(1)	(1)	(1)	(1)	22.51	104.61

Notes:
ft = feet
ft-Datum = Feet below datum
DTW = Depth to water
ft-PVC = Feet below the top of PVC casing
datum - The datum plan used is the Mean Low Water + 100.00 foot as established by the U.S. Navy Survey Section (November 1941).
(1) Well not installed

TABLE 5-1

SUMMARY OF VERTICAL GRADIENT CALCULATIONS BETWEEN WELL PAIRS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

		22-Sep-10	2-Nov-10	29-Jun-12	26-Aug-12			22-Sep-10		2-Nov-10		29-Jun-12		26-Aug-12		
Monitoring Well ID	**Screen Midpoint**	**Elevation (ft-Datum)**	**Elevation (ft-Datum)**	**Elevation (ft-Datum)**	**Elevation (ft-Datum)**	**Well Pairs**		**Gradient**	**Direction**	**Gradient**	**Direction**	**Gradient**	**Direction**	**Gradient**	**Direction**	**Comments**
1738MW01A	104.1	(1)	(1)	104.88	104.40	1738MW01A	1738MW01B	NA	NA	NA	NA	0.002	Down	0.003	Down	Overall gradient
1738MW01	97.9	108.12	107.55	104.71	104.32	1738MW01A	1738MW01	NA	NA	NA	NA	0.166	Down	0.076	Down	Shallow gradient
1738MW01B	67.2	(1)	(1)	104.81	104.30	1738MW01	1738MW01B	NA	NA	NA	NA	-0.003	Up	0.001	Down	Deep gradient
1738MW05	102.5	107.69	106.69	104.08	103.57	1738MW05	1738MW05L	0.005	Down	0.005	Down	0.002	Down	0.000	Neutral	Overall gradient
1738MW05R	90.1	107.6	106.55	103.98	103.51	1738MW05	1738MW05R	0.007	Down	0.011	Down	0.007	Down	0.004	Down	Shallow gradient
1738MW05L	74.5	107.55	106.56	104.03	103.58	1738MW05R	1738MW05L	0.003	Down	-0.001	Up	-0.003	Up	-0.004	Up	Deep gradient
1738MW07A	99.6	(1)	(1)	103.84	103.33	1738MW07A	1738MW07B	NA	NA	NA	NA	0.007	Down	-0.008	Up	Overall gradient
1738MW07	87.6	107.26	106.28	103.84	103.50	1738MW07A	1738MW07	NA	NA	NA	NA	0.000	Down	-0.014	Up	Shallow gradient
1738MW07B	72.5	(1)	(1)	103.65	103.55	1738MW07	1738MW07B	NA	NA	NA	NA	0.013	Down	-0.003	Up	Deep gradient
1738MW08	88.1	106.18	105.18	102.87	102.77	1738MW08A	1738MW08B	NA	NA	NA	NA	0.002	Down	0.000	Up	Overall gradient
1738MW08A	98.4	(1)	(1)	102.81	102.73	1738MW08A	1738MW08	NA	NA	NA	NA	-0.005	Up	-0.003	Up	Shallow gradient
1738MW08B	79.9	(1)	(1)	102.85	102.77	1738MW08	1738MW08B	NA	NA	NA	NA	-0.002	Up	-0.002	Up	Deep gradient
1738MW09A	98.7	(1)	(1)	101.71	102.89	1738MW09A	1738MW09B	NA	NA	NA	NA	-0.073	Up	-0.014	Up	Overall gradient
1738MW09	88.2	106.96	106.08	103.41	100.17	1738MW09A	1738MW09	NA	NA	NA	NA	0.361	Down	-1.852	Up	Shallow gradient
1738MW09B	71.1	(1)	(1)	103.72	103.28	1738MW09	1738MW09B	NA	NA	NA	NA	-0.010	Up	-0.107	Up	Deep gradient

Notes:
The phreatic surface rather than the well screen midpoint was used to calculate the gradient in wells 1738MW01 (Jun & Aug 2012 only), 1738MW01A, 1738MW01 (Jun & Aug 2012 only), and 1738MW09 (Aug 2012 only)

TABLE 5-2

SUMMARY OF SLUG TEST RESULTS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Location	Date	Rising Head Test (feet/day)	Falling Head Test (feet/day)	Average Hydraulic Conductivity (feet/day)
1738MW01	9/21/2010	8.866	8.141	8.504
1738MW01B	8/27/2012	0.146	6.208	3.177
1738MW02	9/19/2010	0.597	0.376	0.486
1738MW02R	8/27/2012	1.288	0.885	1.087
1738MW03	9/19/2010	0.533	(4)	0.533
1738MW04(1)	1998	--	0.004	0.004
1738MW05	9/21/2010	0.192	0.778	0.485
1738MW05R(2)	9/21/2010	1.954	--	1.954
1738MW05L	9/21/2010	1.931	2.533	2.232
1738MW06(1)	1998	--	2.600	2.600
1738MW07	9/21/2010	0.316	0.405	--(3)
1738MW07A	8/27/2012	0.320	(4)	0.320
1738MW07B	8/27/2012	0.607	0.994	0.801
1738MW08	9/21/2010	0.481	0.583	--(3)
1738MW08A	8/26/2012	1.689	1.729	1.709
1738MW08B	8/26/2012	1.480	1.253	1.367
1738MW09A	8/26/2012	2.938	0.331	1.634
1738MW09B	8/26/2012	0.589	1.198	0.893
1738MW10	9/21/2010	1.659	1.964	1.812
1738MW11	9/21/2010	0.261	0.286	0.273
1738MW12	9/21/2010	0.227	0.299	0.263
1738MW13	8/26/2012	19.500	20.990	20.245
1738MW15	8/27/2012	0.133	(4)	0.133
Average Hydraulic Conductivity (ft/day)				**2.405**

Notes:
(1) Falling head slug test were conducted on 1738MW04 and 1738MW06 by Blasland, Bouck & Lee, Inc., 1998.
(2) Error in data recorder readings during falling head test, only rising head data recoverable.
(3) Data from 1738MW07 and 1738MW08 were not used in the average calculation. Sample collection and slug test performed on the same day; equilibrium may not have been acheived.

TABLE 6-1

SUMMARY OF SOIL AND GROUNDWATER SCREENING VALUES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Soil				Groundwater			
Analyte	**Regional Screening Levels for Residential Soil (1)(2)**	**Regional Screening Levels for Industral Soil (1)(2)**	**Ecological Soil Screening Values**	**PREQB UST Standards (3)**	**Regional Screening Levels for Tap Water (1)(2)**	**MCL/ PRWQS (4)**	**Ecological Groundwater Screening Values (5)**	**PREQB UST Standards (3)**
Volatile Organics	µg/kg				µg/L			
Benzene	1,100	5,400	101 (6)	5,000	0.39	5	109 (8)	5
Ethylbenzene	5,400	27,000	5,003 (6)	10,000	1.3	530	4.3 (8)	700
Methyl tert-butyl ether	43,000	220,000	NE	20	12	NE	18,050 (9)	20
Toluene	500,000	4,500,000	13,001 (6)	NE	86	1,000	37 (8)	1,000
Xylenes, Total	63,000	270,000	1,000 (7)	10,000	19	10,000	27 (10)	10,000
BTEX	µg/kg				µg/L			
Total BTEX	NE	NE	NE	NE	NE	NE	NE	NE
TPH DRO and GRO	mg/kg				mg/L			
Diesel Range Organics	NE	NE	NE	100	NE	NE	NE	50
Gasoline Range Organics	NE	NE	NE	100	NE	NE	NE	50
Total TPH	NE	NE	NE	100	NE	NE	NE	50

Notes:

BTEX - Benzene, toluene, ethylbenzene, xylene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
MCL - Maximum Contaminant Level
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
µg/L - microgram per liter
mg/L - milligram per liter

MtBE - Methyl tert-butyl ether
NE - Not Established
PREQB - Puerto Rican Environmental Quality Board
PRWQS - Puerto Rico Water Quality Standard
TPH - Total Petroelum Hydrocarbons
USEPA - United States Environmental Protection Agency
UST - Underground Storage Tank

(1) November 2012 Regional Screening Levels (USEPA 2012).

(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.

TABLE 6-1

SUMMARY OF SOIL AND GROUNDWATER SCREENING VALUES
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes (continued):

(3) The values shown are PREQB UST Control Regulations Corrective Action Requirements (November 7, 1990).

(4) The more stringent of the USEPA MCL (USEPA, 2009) or Class SG PRWQS (PREQB, 2010) is listed.

(5) The values shown are marine/estuarine screening values unless otherwise noted.

(6) The soil screening value shown is an average of the target and intervention soil standards for soil remediation developed by the Ministry of Housing Spatial Planning and Environment (MHSPE, 2000). The value is based on a default organic carbonn organic carbon content of 2.0 percent (minumum value within the adjustment range [2.0 percent to 30 percent]).

(7) The value is a USEPA Region 5 ecological screening level based on exposures to plants (USEPA, 2003).

(8) The value is a USEPA Region 4 chronic screening value for saltwater (USEPA, 2001)

(9) The value is a literature-based Criteria Continuous Concentration derived in accordance with USEPA guidence (Mancini, 2002).

(10) The chemical lacks a marine/estuarine screening value. The value shown is a USEPA Region 5 ecological screening level for freshwater (USEPA, 2003).

Table References:

Mancini, E.R., A. Steen, G.A. Rausiina, D.C.L. Wong, W.R. Arnold, F.E. Gostomski, T. Davies, J.R. Hockett, W.A. Stubblefield, K.R. Drottar, T.A. Springer, and P. Errico. 2002. MTBE Ambient Water Quality Criteria Develomnet: A Public/Private Partnership. Environ. Sci. Technol. 36:125-129.

Ministry of Housing, Spatial Planning and Environment (MHSPE). 2000. Circular on Target Values and Intervention Values for Soil Remediation. Directorate-General for Environmental Protection, Department of Soil Protection, The Hague, Netherlands. February 4, 2000.

Puerto Rico Environmental Quality Board (PREQB). 2010. Puerto Rico Water Quality Standards Regulation. Regulation No. 7837. March 31, 2010.

USEPA. 2012. Regional Screening Levels Table. http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. November 2012.

USEPA. 2009. Drinking Water Regulations and Health Advisories. Office of Water. Washington, D.C. http://www.epa.gov/safewater/contaminants/index.html#mcls. May 2009.

USEPA. 2003. USEPA Region 5 Ecological Screening Levels Table. http://epa.gov/region05/waste/cars/pdfs/ecological-screening-levels-200308.pdf.

USEPA. 2001. Region 4 Ecological Risk Assessment Bulletins - Supplement to RQGS. Waste Management Division, Atlanta, GA. http://www.epa.gov/region4/superfund/programs/riskassess/ecolbul.html

TABLE 6-2

SUMMARY OF DETECTED ANALYTICAL RESULTS - SURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values [2]	PREQB UST Standards [3]	1738MW01B 1738MW01B-00 6/13/2012 0.0 - 1.0		1738MW02R 1738MW02R-00 6/16/2012 0.0 - 1.0		1738MW07B 1738MW07B-00 6/24/2012 0.0 - 1.0		1738MW07B 1738MW07B-00D 6/24/2012 0.0 - 1.0	
Volatile Organics (µg/kg)												
Benzene	1100	5400	101	5000	1.3	U	0.99	U	0.96	U	0.93	U
BTEX (µg/kg)												
Total BTEX	NE	NE	NE	NE	1.7	U	1.3	U	1.2	U	1.2	U
TPH DRO and GRO (mg/kg)												
Diesel Range Organics	NE	NE	NE	100	36		20		13		9.6	
Gasoline Range Organics	NE	NE	NE	100	0.077	J	0.06	U	0.049	UJ	0.066	J
Total TPH	NE	NE	NE	100	36.077	J	20		13		9.666	J

TABLE 6-2

SUMMARY OF DETECTED ANALYTICAL RESULTS - SURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [(1)]**	*Regional Screening Levels Industrial Soil [(1)]*	Selected Ecological Screening Values [(2)]	PREQB UST Standards [(3)]	1738MW08B 1738MW08B-00 6/23/2012 0.0 - 1.0	1738MW09B 1738MW09B-00 6/17/2012 0.0 - 1.0	1738MW13 1738MW13-00 6/15/2012 0.0 - 1.0	1738MW14 1738MW14-00 6/16/2012 0.0 - 1.0
Volatile Organics (µg/kg)								
Benzene	1100	5400	101	5000	1 U	1 U	1.3 J	0.93 U
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	1.3 U	1.3 U	1.3 J	1.2 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	24	28	25	56
Gasoline Range Organics	NE	NE	NE	100	0.056 U	0.053 U	0.048 U	0.054 U
Total TPH	NE	NE	NE	100	24	28	25	56

TABLE 6-2

SUMMARY OF DETECTED ANALYTICAL RESULTS - SURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** [1]	*Regional Screening Levels Industrial Soil* [1]	Selected Ecological Screening Values [2]	PREQB UST Standards [3]	1738MW15 1738MW15-00 6/16/2012 0.0 - 1.0	1738MW16 1738MW16-00 6/21/2012 0.0 - 1.0	1738MW16 1738MW16-00D 6/21/2012 0.0 - 1.0
Volatile Organics (μg/kg)							
Benzene	1100	5400	101	5000	1 U	1.1 U	1.1 U
BTEX (μg/kg)							
Total BTEX	NE	NE	NE	NE	1.2 U	1.5 U	1.4 U
TPH DRO and GRO (mg/kg)							
Diesel Range Organics	NE	NE	NE	100	14	17	16
Gasoline Range Organics	NE	NE	NE	100	0.24 J	0.12 J	0.14 J
Total TPH	NE	NE	NE	100	14.24 J	17.12 J	16.14 J

TABLE 6-2

SUMMARY OF DETECTED ANALYTICAL RESULTS - SURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Note/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.

U - Non detected at the Limit of Detection.
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
ft bgs - feet below ground surface
GRO - Gasoline Range Organics
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
MtBE - Methyl tert-butyl ether
NE - Not Established
PREQB - Puerto Rico Environmental Quality Board
TPH - Total Petroleum Hydrocarbons
UST - Underground Storage Tank

(1) November 2012 USEPA Regional Screening Levels.

(2) The screening value shown is an average of the target and intervention soil standards for soil remediation. The value is based on a default organic carbon content of 0.02 (2 percent), which represents a minimum value (adjustment range is 2 to 30 percent).

(3) The values shown are PREQB UST Control Regulations Corrective Action Requirements (November 7, 1990).

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil** [(1)]	*Regional Screening Levels Industrial Soil* [(1)]	Selected Ecological Screening Values	PREQB UST Standards [(2)]	1738SB101 1738SB101-01 9/20/2010 1.0 - 3.0	1738SB101 1738SB101-01D 9/20/2010 1.0 - 3.0	1738SB101 1738SB101-04 9/20/2010 7.0 - 9.0	1738SB101 1738SB101-06 9/20/2010 11.0 - 13.0
Volatiles (µg/kg)								
Xylene, m/p-	63, 000 [(3)]	270,000	1,000 [(3)]	NE	8.8 U	7.1 U	10 U	8.6 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	4.4 U	3.6 U	5 U	2.1 J
Benzene	1,100	5,400	101	5,000	4.4 U	3.6 U	5 U	4.3 U
Ethylbenzene	5,400	27,000	5,003	10,000	4.4 U	3.6 U	5 U	9.6
Xylenes, total	63,000	270,000	1,000	10,000	4.4 U	3.6 U	5 U	4.3 U
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	4.4 U	3.6 U	5 U	9.6
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	11 U	11 U	13 U	12 U
Gasoline Range Organics	NE	NE	NE	100	0.56 R	0.57 R	0.63 R	0.6 R
Total TPH	NE	NE	NE	100	11 U	11 U	13 U	12 U

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738SB101 1738SB101-08 9/20/2010 15.0 - 17.0	1738SB102 1738SB102-01 9/20/2010 1.0 - 3.0	1738SB102 1738SB102-04 9/20/2010 7.0 - 9.0	1738SB102 1738SB102-08 9/20/2010 15.0 - 17.0
Volatiles (µg/kg)								
Xylene, m/p-	63, 000 [3]	270,000	1,000 [3]	NE	9.3 U	9.8 U	9.2 U	8.6 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	37	4.9 U	4.6 U	130
Benzene	1,100	5,400	101	5,000	4.6 U	4.9 U	4.6 U	4.3 U
Ethylbenzene	5,400	27,000	5,003	10,000	4.6 U	4.9 U	4.6 U	4.3 U
Xylenes, total	63,000	270,000	1,000	10,000	4.6 U	4.9 U	4.6 U	4.3 U
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	4.6 U	4.9 U	4.6 U	4.3 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	12 U	12 U	13 U	12 U
Gasoline Range Organics	NE	NE	NE	100	0.62 R	0.6 R	0.64 R	0.58 R
Total TPH	NE	NE	NE	100	12 U	12 U	13 U	12 U

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738SB103 1738SB103-01 9/20/2010 1.0 - 3.0	1738SB103 1738SB103-04 9/20/2010 7.0 - 9.0	1738SB104 1738SB104-01 9/20/2010 1.0 - 3.0	1738SB104 1738SB104-04 9/20/2010 7.0 - 9.0
Volatiles (µg/kg)								
Xylene, m/p-	63, 000 [3]	270,000	1,000 [3]	NE	8.2 U	7.4 U	0.58 J	9.1 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	4.1 U	3.7 U	4.5 U	13
Benzene	1,100	5,400	101	5,000	4.1 U	3.7 U	4.5 U	4.6 U
Ethylbenzene	5,400	27,000	5,003	10,000	4.1 U	3.7 U	4.5 U	4.6 U
Xylenes, total	63,000	270,000	1,000	10,000	4.1 U	3.7 U	0.58 J	4.6 U
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	4.1 U	3.7 U	1.16 J	4.6 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	12 U	11 U	11 U	17
Gasoline Range Organics	NE	NE	NE	100	0.59 R	0.56 R	0.55 R	0.64 R
Total TPH	NE	NE	NE	100	12 U	11 U	11 U	17

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738SB104 1738SB104-06 9/20/2010 11.0 - 13.0	1738SB104 1738SB104-08 9/20/2010 15.0 - 17.0	1738SB105 1738SB105-01 9/20/2010 1.0 - 3.0	1738SB105 1738SB105-01D 9/20/2010 1.0 - 3.0
Volatiles (μg/kg)								
Xylene, m/p-	63, 000 [3]	270,000	1,000 [3]	NE	8.8 U	8.6 U	8.8 U	9.4 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	4.4 U	4.9	4.4 U	4.7 U
Benzene	1,100	5,400	101	5,000	4.4 U	4.3 U	4.4 U	4.7 U
Ethylbenzene	5,400	27,000	5,003	10,000	4.4 U	4.3 U	4.4 U	4.7 U
Xylenes, total	63,000	270,000	1,000	10,000	4.4 U	4.3 U	4.4 U	4.7 U
BTEX (μg/kg)								
Total BTEX	NE	NE	NE	NE	4.4 U	4.9	4.4 U	4.7 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	12 U	11 U	12 U	12 U
Gasoline Range Organics	NE	NE	NE	100	0.6 R	0.57 R	0.61 R	0.6 R
Total TPH	NE	NE	NE	100	12 U	11 U	12 U	12 U

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil [(1)]**	*Regional Screening Levels Industrial Soil [(1)]*	Selected Ecological Screening Values	PREQB UST Standards [(2)]	1738SB105 1738SB105-04 9/20/2010 7.0 - 9.0	1738SB105 1738SB105-07 9/20/2010 13.0 - 15.0	1738MW11 1738MW11-01 9/13/2010 1.0 - 3.0	1738MW11 1738MW11-04 9/13/2010 7.0 - 9.0
Volatiles (µg/kg)								
Xylene, m/p-	63, 000 [(3)]	270,000	1,000 [(3)]	NE	7.6 U	10 U	7.5 U	9.8 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	3.8 U	5.1 U	3.8 U	4.9 U
Benzene	1,100	5,400	101	5,000	3.8 U	5.1 U	0.61 J	4.9 U
Ethylbenzene	5,400	27,000	5,003	10,000	3.8 U	5.1 U	3.8 U	4.9 U
Xylenes, total	63,000	270,000	1,000	10,000	3.8 U	5.1 U	3.8 U	4.9 U
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	3.8 U	5.1 U	0.61 J	4.9 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	11 U	11 U	12 UJ	13 UJ
Gasoline Range Organics	NE	NE	NE	100	0.53 R	0.54 R	0.6 R	0.63 R
Total TPH	NE	NE	NE	100	11 U	11 U	12 U	13 U

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Resdiential Soil (1)**	*Regional Screening Levels Industrial Soil (1)*	Selected Ecological Screening Values	PREQB UST Standards (2)	1738MW11 1738MW11-08 9/13/2010 15.0 - 17.0	1738MW12 1738MW12-01 9/14/2010 1.0 - 3.0	1738MW12 1738MW12-01D 9/14/2010 1.0 - 3.0	1738MW12 1738MW12-04 9/14/2010 7.0 - 9.0	1738MW12 1738MW12-08 9/14/2010 15.0 - 17.0
Volatiles (µg/kg)									
Xylene, m/p-	63, 000 (3)	270,000	1,000 (3)	NE	9.4 U	8.9 U	9 U	9.8 U	8.5 U
Methyl tert-Butyl Ether (MtBE)	43,000	220,000	NE	20.0	3.6 J	4.4 U	4.5 U	4.9 U	4.2 U
Benzene	1,100	5,400	101	5,000	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
Ethylbenzene	5,400	27,000	5,003	10,000	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
Xylenes, total	63,000	270,000	1,000	10,000	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	12 UJ	12 U	12 U	11 U	11 U
Gasoline Range Organics	NE	NE	NE	100	0.6 R	0.61 R	0.59 R	0.57 R	0.54 R
Total TPH	NE	NE	NE	100	12 U	12 U	12 U	11 U	11 U

TABLE 6-3a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
BTEX - benzene, toluene, ethylbenzene and xylenes
DRO - Diesel Range Organics
GRO - Gasoline Range Organics

NA - Not Analyzed
NAPR - Naval Activity Puerto Rico
NE - Not Established
PREQB - Puerto Rico Environmental Quality Board
TPH - Total Petroleum Hydrocarbons
USEPA - United States Environmental Protection Agency

(1) November 2012 USEPA Regional Screening Levels; noncarcinogenic Regional Screening Levels based on target hazard quotient of 0.1 for conservative screening purposes.
(2) The values shown are PREQB Underground Storage Tank Control Regulations Corrective Action Requirements (November 7, 1990)
(3) Value for total xylene used as a surrogate.

Table References:

Baker Environmental, Inc, (2010). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Ministry of Housing, Spatial Planning and Environment (MHSPE). 2000. Circular on Target Values and Intervention Values for Soil Remediation Directorate-General for Environmental Protection, Department of Soil Protection, The Hague, Netherlands. February 4, 2000.

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** [1]	*Regional Screening Levels Industrial Soil* [1]	Selected Ecological Screening Values	PREQB UST Standards [2]	1738MW01B 1738MW01B-01 6/13/2012 1.0 - 3.0	1738MW01B 1738MW01B-06 6/13/2012 11.0 - 13.0	1738MW01B 1738MW01B-11 6/13/2012 21.0 - 23.0	1738MW02R 1738MW02R-01 6/16/2012 1.0 - 3.0	1738MW02R 1738MW02R-07 6/16/2012 13.0 - 15.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	1 U	0.98 U	100 U	1.2 U	1.1 U
Ethylbenzene	5,400	27,000	5,003	10,000	1.4 U	1.3 U	4500	1.5 U	1.4 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	2.1 U	2 U	200 U	2.3 U	2.2 U
Toluene	500,000	4,500,000	13,001	NE	1 U	0.98 U	100 U	1.2 U	1.1 U
Xylenes, Total	63,000	270,000	1,000	10,000	1.1 U	1.1 U	110 U	1.3 U	1.2 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	1.4 U	1.3 U	4500	1.5 U	1.4 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	22 U	33	42	14	5.9
Gasoline Range Organics	NE	NE	NE	100	0.056 U	0.11 J	11	0.049 U	1.3
Total TPH	NE	NE	NE	100	22	33.11 J	53	14	7.2
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738MW02R 1738MW02R-10 6/16/2012 19.0 - 20.0	1738MW02R 1738MW02R-17 6/16/2012 33.0 - 35.0	1738MW07B 1738MW07B-01 6/24/2012 1.0 - 3.0	1738MW07B 1738MW07B-03 6/24/2012 5.0 - 7.0	1738MW08B 1738MW08B-01 6/23/2012 1.0 - 3.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	***12000***	4.8	0.96 U	1 U	0.93 U
Ethylbenzene	5,400	27,000	5,003	10,000	**19000**	1.2 U	1.2 U	1.3 U	1.2 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	12000	120	1.9 U	29	1.9 U
Toluene	500,000	4,500,000	13,001	NE	3400	4.9	0.96 U	1 U	0.93 U
Xylenes, Total	63,000	270,000	1,000	10,000	**91000**	5.6 J	1.1 U	1.1 U	1 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	125400	15.3	1.2 U	1.3 U	1.2 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	210	4.4 U	6.2 U	4.5 U	6.9 U
Gasoline Range Organics	NE	NE	NE	100	1000 J	0.05 U	0.063 J	0.057 U	0.048 U
Total TPH	NE	NE	NE	100	1210	4.4	6.263 J	4.5	6.9
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** (1)	*Regional Screening Levels Industrial Soil* (1)	Selected Ecological Screening Values	PREQB UST Standards (2)	1738MW08B 1738MW08B-03 6/23/2012 5.0 - 7.0	1738MW08B 1738MW08B-03D 6/23/2012 5.0 - 7.0	1738MW09B 1738MW09B-01 6/17/2012 1.0 - 3.0	1738MW09B 1738MW09B-03 6/17/2012 5.0 - 7.0	1738MW09B 1738MW09B-03D 6/17/2012 5.0 - 7.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	0.98 U	1 U	0.93 U	0.98 U	0.99 U
Ethylbenzene	5,400	27,000	5,003	10,000	1.3 U	1.3 U	1.2 U	1.3 U	1.3 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	8.3 J	17 J	1.9 U	<u>46</u>	<u>32</u>
Toluene	500,000	4,500,000	13,001	NE	0.98 U	1 U	0.93 U	0.98 U	0.99 U
Xylenes, Total	63,000	270,000	1,000	10,000	1.1 U	1.1 U	1 U	1.1 U	1.1 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	1.3 U	1.3 U	1.2 U	1.3 U	1.3 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	5.3 U	2.8 U	4.8 U	1.3 U	5.6 U
Gasoline Range Organics	NE	NE	NE	100	0.047 U	0.053 U	0.046 U	0.047 U	0.047 U
Total TPH	NE	NE	NE	100	5.3	2.8 U	4.8	13 J	5.6 J
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** (1)	*Regional Screening Levels Industrial Soil* (1)	Selected Ecological Screening Values	PREQB UST Standards (2)	1738MW13 1738MW13-01 6/14/2012 1.0 - 3.0	1738MW13 1738MW13-03 6/14/2012 5.0 - 7.0	1738MW13 1738MW13-12 6/14/2012 23.0 - 24.0	1738MW14 1738MW14-01 6/16/2012 1.0 - 3.0	1738MW14 1738MW14-01D 6/16/2012 1.0 - 3.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	0.89 U	0.98 U	140 U	0.86 U	0.82 U
Ethylbenzene	5,400	27,000	5,003	10,000	1.2 U	1.3 U	2900	1.1 U	1.1 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	1.8 U	2 U	280 U	1.7 U	1.6 U
Toluene	500,000	4,500,000	13,001	NE	0.89 U	0.98 U	140 U	0.86 U	0.82 U
Xylenes, Total	63,000	270,000	1,000	10,000	0.98 U	1.1 U	3200	0.95 U	0.91 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	1.2 U	1.3 U	6100	1.1 U	1.1 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	9 U	6.5 U	31	12	8.4
Gasoline Range Organics	NE	NE	NE	100	0.054 U	0.053 U	260	0.04 U	0.041 U
Total TPH	NE	NE	NE	100	9	6.5	291	12	8.4
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [(1)]**	*Regional Screening Levels Industrial Soil [(1)]*	Selected Ecological Screening Values	PREQB UST Standards [(2)]	1738MW14 1738MW14-09 6/16/2012 17-19	1738MW14 1738MW14-11 6/16/2012 21.0 - 23.0	1738MW15 1738MW15-01 6/16/2012 1.0 - 3.0	1738MW15 1738MW15-05 6/16/2012 9.0 - 11.0	1738MW15 1738MW15-10 6/16/2012 19.0 - 21.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	0.96 U	0.92 U	0.88 U	0.81 U	0.92 U
Ethylbenzene	5,400	27,000	5,003	10,000	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	1.9 U	1.8 U	1.8 U	1.6 U	1.8 U
Toluene	500,000	4,500,000	13,001	NE	0.96 U	0.92 U	0.88 U	0.81 U	0.92 U
Xylenes, Total	63,000	270,000	1,000	10,000	1.1 U	1 U	0.96 U	0.89 U	1 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	6.9	5.1 U	7	10	4.1 U
Gasoline Range Organics	NE	NE	NE	100	0.038 U	0.042 U	0.046 U	0.073 J	0.043 U
Total TPH	NE	NE	NE	100	6.9	5.1	7	10.073	4.1
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** [1]	*Regional Screening Levels Industrial Soil* [1]	Selected Ecological Screening Values	PREQB UST Standards [2]	1738MW16 1738MW16-01 6/21/2012 1.0 - 3.0	1738MW16 1738MW16-03 6/21/2012 5.0 - 7.0	1738MW17 1738MW17-10 8/21/2012 19.0 - 20.2	1738SB104A 1738SB104-10 6/27/2012 19.0 - 20.0	1738SB106 1738SB106-01 6/27/2012 1.0 - 3.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	1 U	1.1 U	1.1 U	35 U	0.89 U
Ethylbenzene	5,400	27,000	5,003	10,000	1.3 U	1.4 U	1.4 U	2200	1.2 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	2 U	2.2 U	3.3 J	70 U	1.8 U
Toluene	500,000	4,500,000	13,001	NE	1 U	1.1 U	1.1 U	35 U	0.89 U
Xylenes, Total	63,000	270,000	1,000	10,000	1.1 U	1.2 U	1.2 U	2900	0.98 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	1.3 U	1.4 U	1.4 U	5100	1.2 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	10	7.8 U	2.5 U	27 J	5.7 U
Gasoline Range Organics	NE	NE	NE	100	0.048 U	0.056 U	0.047 U	63	0.042 U
Total TPH	NE	NE	NE	100	10	7.8	2.5 U	90 J	5.7
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738SB107 1738SB107-09 8/20/2012 17.0 - 18.0	1738SB107 1738SB107-09D 8/20/2012 17.0 - 18.0	1738SB107 1738SB107-11 8/20/2012 21.0 - 22.0	1738SB107 1738SB107-14 8/20/2012 27.0 - 28.0	17386B108 1738SB108-01 8/15/2012 1.0 - 3.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	**4100** J	**5100** J	***17000***	150 J	NA
Ethylbenzene	5,400	27,000	5,003	10,000	**24000** J	***47000*** J	***46000***	51 U	NA
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	3600 J	3700 J	32000	8100	NA
Toluene	500,000	4,500,000	13,001	NE	950 J	2900 U	970 U	40 U	NA
Xylenes, Total	63,000	270,000	1,000	10,000	**120000** J	**240000** J	49000	43 U	NA
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	149050	292100	112000	150 J	NA
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	100	77	48	2.5 U	63
Gasoline Range Organics	NE	NE	NE	100	780	560	330	0.47	NA
Total TPH	NE	NE	NE	100	880	637	378	0.47	NA
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil** [1]	*Regional Screening Levels Industrial Soil* [1]	Selected Ecological Screening Values	<u>PREQB UST Standards</u> [2]	1738SB108 1738SB108-08 8/15/2012 15.0 - 16.0	1738SB108 1738SB108-09 8/16/2012 17.0 - 18.0	1738SB108 1738SB108-13 8/16/2012 26.0 - 27.0	1738SB109 1738SB109-01 8/22/2012 1.0 - 3.0	1738SB109 1738SB109-10 8/24/2012 19.0 - 20.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	530	**1600**	32 U	1.1 U	0.9 U
Ethylbenzene	5,400	27,000	5,003	10,000	110 J	**7800**	41 U	1.5 U	1.2 U
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	<u>3400</u>	<u>3400</u>	<u>490</u>	1.2 J	2.9 J
Toluene	500,000	4,500,000	13,001	NE	35 U	190 J	32 U	1.1 U	0.9 U
Xylenes, Total	63,000	270,000	1,000	10,000	39 U	<u>32000</u>	35 U	1.2 U	0.99 U
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	640 J	41590 J	41 U	1.5 U	1.2 U
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	4 U	46	NA	10	NA
Gasoline Range Organics	NE	NE	NE	100	0.57	<u>580</u>	0.038 U	0.058 U	0.05 U
Total TPH	NE	NE	NE	100	4.57	<u>626</u>	NA	10	NA
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	NA	NA	NA	0.51
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	3.6

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil [1]**	*Regional Screening Levels Industrial Soil [1]*	Selected Ecological Screening Values	PREQB UST Standards [2]	1738SB109 1738SB109-12 8/24/2012 23.0 - 25.0	1738SB110 1738SB110-08 8/24/2012 16.0 - 17.0	1738SB110 1738SB110-10 8/24/2012 20.0 - 21.0	1738SB110 1738SB110-12 8/24/2012 24.0 - 25.0
Volatil Organics (µg/kg)								
Benzene	1,100	5,400	101	5,000	0.84 U	190 J	***7600***	40 J
Ethylbenzene	5,400	27,000	5,003	10,000	1.1 U	510	**18000**	67 J
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	8 J	3000	5700 J	1800
Toluene	500,000	4,500,000	13,001	NE	0.84 U	41 U	59000	190 J
Xylenes, Total	63,000	270,000	1,000	10,000	0.92 U	2400	**110000**	410 J
BTEX (µg/kg)								
Total BTEX	NE	NE	NE	NE	1.1 U	3100 J	194600	707 J
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	100	NA	NA	NA	NA
Gasoline Range Organics	NE	NE	NE	100	0.048 U	220	1900	0.18 J
Total TPH	NE	NE	NE	100	NA	NA	NA	NA
General Chemistry								
FOC (%)	NE	NE	NE	NE	0.93	0.63	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	1.3	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date Depth Range (ft bgs)	**Regional Screening Levels Residential Soil (1)**	*Regional Screening Levels Industrial Soil (1)*	Selected Ecological Screening Values	PREQB UST Standards (2)	1738SB110 1738SB110-12D 8/24/2012 24.0 - 25.0	1738SB110 1738SB110-13 8/24/2012 26.0 - 27.0	1738SB111 1738SB111-08 8/17/2012 17.0 - 18.0	1738SB111 1738SB111-11 8/17/2012 21.0 - 22.0	1738SB111 1738SB111-14 8/17/2012 28.0 - 29.0
Volatil Organics (µg/kg)									
Benzene	1,100	5,400	101	5,000	38 J	NA	***7000***	***9200***	280
Ethylbenzene	5,400	27,000	5,003	10,000	50 UJ	NA	**26000**	4900	72 J
Methyl tert-butyl ether (MtBE)	43,000	220,000	NE	20	1900	NA	15000	**48000**	6400
Toluene	500,000	4,500,000	13,001	NE	65 J	NA	8000	2000	140 J
Xylenes, Total	63,000	270,000	1,000	10,000	43 UJ	NA	**120000**	19000	270 J
BTEX (µg/kg)									
Total BTEX	NE	NE	NE	NE	103 J	NA	161000	35100	762 J
TPH DRO and GRO (mg/kg)									
Diesel Range Organics	NE	NE	NE	100	NA	NA	170	8.8 U	2.4 U
Gasoline Range Organics	NE	NE	NE	100	0.1 J	NA	790	39	0.33
Total TPH	NE	NE	NE	100	NA	NA	960	47.8	0.33
General Chemistry									
FOC (%)	NE	NE	NE	NE	NA	1	NA	NA	NA
TOD (g/kg)	NE	NE	NE	NE	NA	NA	NA	NA	NA

TABLE 6-3b

SUMMARY OF ANALYTICAL LABORATORY RESULTS - SUBSURFACE SOIL (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated: The analyte was postiviely identified; the quantitation is an estimation.
U - Non detected at the Limit of Detection.
UJ - Reported quantitation limit is qualified as estimated.
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
FOC - Fractional Organics Carbon
ft bgs - feet below ground surface
g/kg - gram per kilogram
GRO - Gasoline Range Organics
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
MtBE - Methyl tert-butyl ether
NA - Not Analyzed
NE - Not Established
% - Percent
PREQB - Puerto Rico Environmental Quality Board
TOD - Total Oxidant Demand
TPH - Total Petroleum Hydrocarbons
UST - Underground Storage Tank

(1) November 2012 USEPA Regional Screening Levels; noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.

(2) The values shown are PREQB UST Control Regulations Corrective Action Requirements (November 7, 1990).

TABLE 6-4a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2010)
AOC F - SITE 1738
MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Screening Levels Tapwater** [1][2]	*USEPA MCLs* [1]	Selected Ecological Screening	PREQB UST Standards [4]	1738MW01 1738GW01 9/16/2010	1738MW02 1738GW02 9/16/2010	1738MW02 1738GW02D 9/16/2010	1738MW03 1738GW03 9/18/2010	1738MW04 1738GW04 9/16/2010
Volatiles (µg/L)									
Benzene	0.39	5	109	5.0	*190*	0.5 U	0.5 U	***17,000***	0.5 U
Ethylbenzene	1.3	530	4.3	530	100	0.5 U	0.5 U	***1,700***	0.5 U
Methyl tert-Butyl Ether (MtBE)	12	NE	18,050	20.0	**1,100**	10	11	**44,000**	0.5 U
Toluene	83	1,000	37	1,000	0.5 U	0.5 U	0.5 U	***1,100***	0.5 U
Xylene, m/p-	19 [5]	10,000 [5]	25 [5][6]	NE	1 U	1 U	1 U J	**1,000** J	1 U
Xylene, o-	19	NE	25 [5][6]	NE	0.5 U	0.5 U	0.5 U J	**200**	0.5 U
Xylenes, total	19	10,000	25 [6]	10,000	0.5 U	0.5 U	0.5 U	1,200	0.5 U
BTEX (µg/L)									
Total BTEX	NE	NE	NE	NE	290	0.5 U	0.5 U	21,000	0.5 U
TPH DRO and GRO (mg/L)									
Diesel Range Organics	NE	NE	NE	50.0	0.5 U	0.54 U	0.53 U	3.7	0.5 U
Gasoline Range Organics	NE	NE	NE	50.0	1.7	0.5 U	0.5 U	36	0.5 U
Total TPH	NE	NE	NE	50.0	1.7	0.54 U	1.03 U	39.7	0.5 U

TABLE 6-4a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2010)
AOC F - SITE 1738
MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Screening Levels Tapwater (1)(2)**	*USEPA MCLs (1)*	Selected Ecological Screening	PREQB UST Standards (4)	1738MW04 1738GW04D 9/16/2010	1738MW05 1738GW05 9/18/2010	1738MW05L 1738GW05L 9/18/2010	1738MW05R 1738GW05R 9/20/2010	1738MW06 1738GW06 9/17/2010
Volatiles (µg/L)									
Benzene	0.39	5	109	5.0	0.5 U	0.5 U	2.5	130 U	0.5 U
Ethylbenzene	1.3	530	4.3	530	0.5 U	0.5 U	0.57	130 U	0.5 U
Methyl tert-Butyl Ether (MtBE)	12	NE	18,050	20.0	0.5 U	**5,100**	**3,400**	**9,700**	0.5 U
Toluene	83	1,000	37	1,000	0.5 U	0.5 U	0.5 U	130 U	0.5 U
Xylene, m/p-	19 (5)	10,000 (5)	25 (5)(6)	NE	1 U	1 U	0.43 J	250 U	1 U
Xylene, o-	19	NE	25 (5)(6)	NE	0.5 U	0.5 U	0.078 J	130 U	0.5 U
Xylenes, total	19	10,000	25 (6)	10,000	0.5 U	0.5 U	0.51	130 U	0.5 U
BTEX (µg/L)									
Total BTEX	NE	NE	NE	NE	0.5 U	0.5 U	3.58	130 U	0.5 U
TPH DRO and GRO (mg/L)									
Diesel Range Organics	NE	NE	NE	50.0	0.5 U	0.5 U	0.54 U	0.54 U	0.51 U
Gasoline Range Organics	NE	NE	NE	50.0	0.5 U	1.5	1.1	2.5	0.5 U
Total TPH	NE	NE	NE	50.0	1 U	1.5	1.1	2.5	0.51 U

TABLE 6-4a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2010)
AOC F - SITE 1738
MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Screening Levels Tapwater** [1][2]	*USEPA MCLs* [1]	Selected Ecological Screening	PREQB UST Standards [4]	1738MW07 1738GW07 9/21/2010	1738MW08 1738GW08 9/21/2010	1738MW09 1738GW09 9/19/2010	1738MW10 1738GW10 9/19/2010	1738MW11 1738GW11 9/17/2010	1738MW12 1738GW12 9/20/2010
Volatiles (µg/L)										
Benzene	0.39	5	109	5.0	0.5 U	0.5 U	0.5 U	0.66	71	0.5 U
Ethylbenzene	1.3	530	4.3	530	0.5 U	0.5 U	0.5 U	0.5 U	3.1	0.5 U
Methyl tert-Butyl Ether (MtBE)	12	NE	18,050	20.0	25	3	6.3	**1,600**	**9,800**	0.5 U
Toluene	83	1,000	37	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	19 [5]	10,000 [5]	25 [5][6]	NE	1 U	1 U	1 U	0.15 J	32	1 U
Xylene, o-	19	NE	25 [5][6]	NE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	19	10,000	25 [6]	10,000	0.5 U	0.5 U	0.5 U	0.15 J	32	0.5 U
BTEX (µg/L)										
Total BTEX	NE	NE	NE	NE	0.5 U	0.5 U	0.5 U	0.81	106.1	0.5 U
TPH DRO and GRO (mg/L)										
Diesel Range Organics	NE	NE	NE	50.0	0.5 U	0.51 U	0.5 U	0.56 U	1.1	0.56 U
Gasoline Range Organics	NE	NE	NE	50.0	0.5 U	0.5 U	0.5 U	0.8	2.8	0.5 U
Total TPH	NE	NE	NE	50.0	0.5 U	0.51 U	0.5 U	0.8	3.9	0.56 U

TABLE 6-4a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2010)
AOC F - SITE 1738
MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation
BTEX - benzene, toluene, ethylbenzene, and xylenes
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
MtBE - methyl tertiary-butyl ether
MCL - Maximum Contaminant Level
µg/L - micrograms per liter
mg/L - milligrams per liter
NA - Not Analyzed
NAPR - Naval Activity Puerto Rico
NE - Not Esablished
PREQB - Puerto Rico Environmental Quality Board
TPH - Total Petroleum Hydrocarbon
USEPA - United States Environmental Protection Agency
UST - Underground Storage Tank

(1) November 2012 USEPA Regional Screening Levels.
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) The values shown are marine/estuarine screening values unless otherwise noted.
(4) The values shown are PREQB Underground Storage Tank Control Regulations Corrective Action Requirements (November 7, 1990)
(5) Value for total xylene used as a surrogate.
(6) The chemical lacks a marine/estuarine surface water screening value/literature-based toxicity value. The value shown is a freshwater screening value/toxicity value.

Table References:

USEPA. 2003. USEPA Region 5 Ecological Screening Levels Table. http://www.epa.gov/reg5rcra/ca/ESL.pdf.

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** (1)(2)	*USEPA MCLs* (1)	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW01-12C 1738MW01-12C 8/18/2012	1738MW01A-12C 1738MW01A-12C 8/18/2012	1738MW01B-12C 1738MW01B-12C 8/18/2012	1738MW02-12C 1738MW02-12C 8/18/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	**1.2**	**2.4**	0.25 U	**2.5**
Ethylbenzene	1.3	530	4.3		**1.9**	**9.5**	0.25 U	0.66 J
Methyl tert-butyl ether	12	NE	18,050	20	**210**	**170**	**5600**	3.2 J
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	9.6	0.75 U	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	3.1	21.5	0.75 U	3.16 J
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.65	2.5	0.19 U	0.35
Gasoline Range Organics	NE	NE	NE	50	0.071	0.29	0.44	0.3
Total TPH	NE	NE	NE	50	0.721	2.79	0.44	0.65

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water (1)(2)**	*USEPA MCLs (1)*	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW02R-12C 1738MW02R-12C 8/18/2012	1738MW02R-D-12C 1738MW02R-D-12C 8/18/2012	1738MW03-12C 1738MW03-12C 8/18/2012	1738MW04-12C 1738MW04-12C 8/18/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	***4200***	***3900***	***19000***	0.25 U
Ethylbenzene	1.3	530	4.3		***570***	***540***	***1700***	0.25 U
Methyl tert-butyl ether	12	NE	18,050	20	**39000**	**39000**	**43000**	0.5 U
Toluene	86	1,000	37	1,000	**610**	**550**	***1500***	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	**2500**	**2600**	**2100**	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	7880	7590	24300	0.75 U
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	4.4 J	3.9	4.9	0.07 U
Gasoline Range Organics	NE	NE	NE	50	17	19	40	0.025 U
Total TPH	NE	NE	NE	50	21.4 J	22.9	44.9	0.07 U

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** (1)(2)	*USEPA MCLs* (1)	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW05-12C 1738MW05-12C 8/22/2012	1738MW05L-12C 1738MW05L-12C 8/24/2012	1738MW05R-12C 1738MW05R-12C 8/24/2012	1738MW06-12C 1738MW06-12C 8/26/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	0.25 U	0.25 U	0.25 U	0.25 U
Ethylbenzene	1.3	530	4.3		0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	12	NE	18,050	20	**6700**	**2400**	**14000**	0.5 U
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	0.75 U	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.077 U	0.05 U	0.05 U	0.049 U
Gasoline Range Organics	NE	NE	NE	50	0.12	0.2	0.62	0.038 J
Total TPH	NE	NE	NE	50	0.12	0.2	0.62	0.038 J

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** [(1)(2)]	*USEPA MCLs* [(1)]	Selected Ecological Screening Values [(3)]	PREQB UST Standards [(4)]	1738MW07-12C 1738MW07-12C 8/25/2012	1738MW07D-12C 1738MW07D-12C 8/25/2012	1738MW07A-12C 1738MW07A-12C 8/24/2012	1738MW07B-12C 1738MW07B-12C 8/25/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	0.25 U	0.25 U	0.25 U	0.25 U
Ethylbenzene	1.3	530	4.3		0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	12	NE	18,050	20	**69**	**69**	**130**	**93**
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	19	10,000	27 [(5)]	10,000	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	0.75 U	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.05 U	0.051 U	0.24	0.1
Gasoline Range Organics	NE	NE	NE	50	0.025 U	0.025 U	0.025 U	0.025 U
Total TPH	NE	NE	NE	50	0.05 U	0.051 U	0.24	0.1

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** (1)(2)	*USEPA MCLs* (1)	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW08-12C 1738MW08-12C 8/21/2012	1738MW08A-12C 1738MW08A-12C 8/22/2012	1738MW08B-12C 1738MW08B-12C 8/21/2012	1738MW09-12C 1738MW09-12C 8/20/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	0.25 U	0.25 U	0.25 U	0.25 U
Ethylbenzene	1.3	530	4.3		0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	12	NE	18,050	20	**130**	0.5 U	**590**	**31**
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	0.75 U	75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.061 U	0.06 U	0.087 U	0.073 U
Gasoline Range Organics	NE	NE	NE	50	0.014 J	0.025 U	0.061	0.025 U
Total TPH	NE	NE	NE	50	0.014 J	0.06 U	0.061	0.073 U

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** (1)(2)	*USEPA MCLs* (1)	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW09A-12C 1738MW09A-12C 8/21/2012	1738MW09B-12C 1738MW09B-12C 8/20/2012	1738MW10-12C 1738MW10-12C 8/18/2012	1738MW11-12C 1738MW11-12C 8/18/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	0.25 U	0.25 U	**0.51** J	***16*** J
Ethylbenzene	1.3	530	4.3		0.25 U	0.25 U	0.19 J	13 U
Methyl tert-butyl ether	12	NE	18,050	20	**28**	**260**	**1300**	**6900**
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	20 J
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	0.75 U	0.87 J	38 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	0.75 U	0.75 U	1.57 J	36 J
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.28	0.066 U	0.074 U	1.2
Gasoline Range Organics	NE	NE	NE	50	0.025 U	0.019 J	0.12	0.62
Total TPH	NE	NE	NE	50	0.28	0.019 J	0.12	1.82

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water** (1)(2)	*USEPA MCLs* (1)	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW12-12C 1738MW12-12C 8/16/2012	1738MW13-12C 1738MW13-12C 8/15/2012	1738MW14-12C 1738MW14-12C 8/17/2012	1738MW15-12C 1738MW15-12C 8/17/2012
Volatile Organics (µg/L)								
Benzene	0.39	5	109	5	0.25 U	**0.48** J	0.25 U	0.25 U
Ethylbenzene	1.3	530	4.3		0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	12	NE	18,050	20	0.5 U	**<u>44</u>**	0.38 J	**<u>160</u>**
Toluene	86	1,000	37	1,000	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)								
Total BTEX	NE	NE	NE	NE	0.75 U	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)								
Diesel Range Organics	NE	NE	NE	50	0.055 U	0.2 U	0.067 U	0.43
Gasoline Range Organics	NE	NE	NE	50	0.025 U	0.024 J	0.025 U	0.011 J
Total TPH	NE	NE	NE	50	0.055 U	0.024 J	0.067 U	0.441 J

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Date	**Regional Screening Values Tap Water (1)(2)**	*USEPA MCLs (1)*	Selected Ecological Screening Values (3)	PREQB UST Standards (4)	1738MW16-12C 1738MW16-12C 8/18/2012	1738MW16D-12C 1738MW16D-12C 8/18/2012	1738MW17-12C 1738MW17-12C 8/27/2012
Volatile Organics (µg/L)							
Benzene	0.39	5	109	5	0.25 UJ	**1.1** J	0.25 U
Ethylbenzene	1.3	530	4.3		0.25 U	0.5 U	0.11 J
Methyl tert-butyl ether	12	NE	18,050	20	**180**	**200**	1.1 J
Toluene	86	1,000	37	1,000	0.33 UJ	1.4 J	0.33 U
Xylenes, Total	19	10,000	27 (5)	10,000	0.75 U	1.5 U	0.22 J
BTEX (µg/L)							
Total BTEX	NE	NE	NE	NE	0.75 U	2.5 J	0.33 J
TPH DRO and GRO (mg/L)							
Diesel Range Organics	NE	NE	NE	50	0.17 U	0.19 U	0.25 J
Gasoline Range Organics	NE	NE	NE	50	0.015 J	0.013 J	0.025 U
Total TPH	NE	NE	NE	50	0.015 J	0.013 J	0.25 J

TABLE 6-4b

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - GROUNDWATER (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.
U - Non detected at the Limit of Detection.
UJ - Reported quantitation limit is qualified as estimated.
BTEX - Benzene, toluene, ethylbenzene, xyelene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
MCLs - Maximum Contaminant Levels
µg/L - microgram per liter
mg/L - milligram per liter
MtBE - Methyl tert-butyl ether
NE - Not Established
PREQB - Puerto Rico Environmental Quality Board
TPH - Total Petroleum Hydrocarbons
USEPA - United States Environmental Protection Agency
UST - Underground Storage Tank

(1) November 2012 USEPA Regional Screeing Values.
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) The values shown are marine/estuarine screening values unless otherwise noted.
(4) The values shown are PREQB UST Control Regulations Corrective Action Requirements (November 7, 1990).
(5) The chemical lacks a marine/estuarine surface water screening value/literature-based tocicity value. The value shown is a freshwater screening value/toxicity value.

TABLE 6-5a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - QA/QC (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	**Equipment Rinsates**							
Sample ID	1738ER01	1738ER02	1738ER03	1738ER04	1738ER05	1738ER06	1738ER07	1738ER08
Sample Date	9/13/2010	9/14/2010	9/16/2010	9/17/2010	9/18/2010	9/19/2010	9/20/2010	9/21/2010
Volatiles (µg/L)								
Benzene	0.5 U	0.5 U	0.5 U	0.27 J	0.2 J	0.17 J	0.13 J	0.071 J
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.065 J	0.046 J	0.041 J	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	0.5 U	0.5 U	0.5 U	0.12 J	0.059 J	0.042 J	0.042 J	0.5 U
Toluene	0.13 J	0.13 J	0.11 J	0.11 J	0.1 J	0.13 J	0.089 J	0.088 J
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TPH (mg/L)								
Diesel Range Organics (DRO)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U	0.5 U
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 6-5a

SUMMARY OF DETECTED ANALYTICAL LABORATORY RESULTS - QA/QC (2010)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	**Field Blank**	**Trip Blanks**		
Sample ID	1738FB01	1738TB01	1738TB02	1738TB03
Sample Date	9/14/2010	9/16/2010	9/17/2010	9/21/2010
Volatiles (µg/L)				
Benzene	0.5 U	0.5 U	0.11 J	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.11 J	0.093 J	0.091 J	0.1 J
Xylene, m/p-	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U
TPH (mg/L)				
Diesel Range Organics (DRO)	0.091 J	NA	NA	NA
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 6-5b

SUMMARY OF DETECTED ANALTYICAL LABORATORY RESULTS - QA/QC (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates									
Sample ID	1738ER09	1738ER10	1738ER11	1738ER12	1738ER13	1738ER14	1738ER15	1738ER16	1738ER17	1738ER18
Date	6/15/2012	6/16/2012	6/17/2012	6/21/2012	6/24/2012	6/27/2012	8/17/2012	8/17/2012	8/18/2012	8/19/2012
Volatile Organics (µg/L)										
Toluene	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.34 J	0.33 U
BTEX (µg/L)										
Total BTEX	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.72 U	0.34 J	0.75 U
TPH DRO and GRO (mg/L)										
Diesel Range Organics	0.66	0.14	0.21	0.12	0.16	0.29	0.29	0.42	0.31	0.25
Gasoline Range Organics	Not detected									

TABLE 6-5b

SUMMARY OF DETECTED ANALTYICAL LABORATORY RESULTS - QA/QC (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				Field Blanks	
Sample ID	1738ER19	1738ER20	1738ER21	1738ER22	1738FB03	1738FB04
Date	8/21/2012	8/24/2012	8/24/2012	8/26/2012	6/15/2012	8/26/2012
Volatile Organics (µg/L)						
Toluene	0.33 U	0.33 U	0.33 U	0.36 J	0.33 U	0.33 U
BTEX (µg/L)						
Total BTEX	0.75 U	0.75 U	0.75 U	0.36 J	0.75 U	0.75 U
TPH DRO and GRO (mg/L)						
Diesel Range Organics	0.19	0.15	0.14	0.081 J	0.18	0.057 J
Gasoline Range Organics						

TABLE 6-5b

SUMMARY OF DETECTED ANALTYICAL LABORATORY RESULTS - QA/QC (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks						
Sample ID	1738TB04	1738TB05	1738TB06	1738TB07	1738TB08	1738TB09	1738TB10
Date	6/18/2012	6/24/2012	6/28/2012	8/20/2012	8/22/2012	8/27/2012	8/28/2012
Volatile Organics (µg/L)							
Toluene	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
BTEX (µg/L)							
Total BTEX	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)							
Diesel Range Organics	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	Not detected						

TABLE 6-5b

SUMMARY OF DETECTED ANALTYICAL LABORATORY RESULTS - QA/QC (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.
U - Non detected at the limit of detection.
BTEX - Benzene, toluene, ethylbenzene, xylene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
µg/L - microgram per liter
mg/L - milligram per liter
MtBE - Methyl tert-butyl ether
QA/QC - Quality Assurance/Quality Control
TPH - Total Petroleum Hydrocarbons

TABLE 6-6

SOURCE ZONE AVERAGE CONCENTRATION CALCULATIONS (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW02R	1738MW02R	1738MW13	1738SB104	1738SB107	1738SB107
Sample ID	1738MW02R-10	1738MW02R-17	1738MW13-12	1738SB104-10	1738SB107-09	1738SB107-09D
Date	6/16/2012	6/16/2012	6/14/2012	6/27/2012	8/20/2012	8/20/2012
Depth Range (ft bgs)	19.0 - 20.0	33.0 - 35.0	23.0 - 24.0	19.0 - 20.0	17.0 - 18.0	17.0 - 18.0
Volatil Organics (µg/kg)						
Benzene	***12000***	4.8	ND	ND	**4100** J	**5100** J
Ethylbenzene	**19000**	ND	2900	2200	**24000** J	***47000*** J
Methyl tert-butyl ether	12000	120	ND	ND	3600 J	3700 J
Toluene	3400	4.9	ND	ND	950 J	ND
Xylenes, Total	**91000**	5.6 J	3200	2900	**120000** J	**240000** J
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	210	4.4	31	27 J	100	77
Gasoline Range Organics	1000 J	ND	260	63	780	560

TABLE 6-6

SOURCE ZONE AVERAGE CONCENTRATION CALCULATIONS (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB107	1738SB107	1738SB108	1738SB108	1738SB108	1738SB110	1738SB110
Sample ID	1738SB107-11	1738SB107-14	1738SB108-08	1738SB108-09	1738SB108-13	1738SB110-08	1738SB110-10
Date	8/20/2012	8/20/2012	8/15/2012	8/16/2012	8/16/2012	8/24/2012	8/24/2012
Depth Range (ft bgs)	21.0 - 22.0	27.0 - 28.0	15.0 - 16.0	17.0 - 18.0	26.0 - 27.0	16.0 - 17.0	20.0 - 21.0
Volatil Organics (µg/kg)							
Benzene	***17000***	150 J	530	**1600**	ND	190 J	***7600***
Ethylbenzene	***46000***	ND	110 J	**7800**	ND	510	**18000**
Methyl tert-butyl ether	32000	8100	3400	3400	490	3000	5700 J
Toluene	970 U	ND	35 U	190 J	ND	ND	59000
Xylenes, Total	49000	ND	39 U	32000	ND	2400	**110000**
TPH DRO and GRO (mg/kg)							
Diesel Range Organics	48	ND	4	46	NA	NA	NA
Gasoline Range Organics	330	0.47	0.57	580	ND	220	1900

TABLE 6-6

SOURCE ZONE AVERAGE CONCENTRATION CALCULATIONS (2012)
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB110	1738SB110	1738SB111	1738SB111	1738SB111			
Sample ID	1738SB110-12	1738SB110-12D	1738SB111-08	1738SB111-11	1738SB111-14			
Date	8/24/2012	8/24/2012	8/17/2012	8/17/2012	8/17/2012		Minimum	Maximum
Depth Range (ft bgs)	24.0 - 25.0	24.0 - 25.0	17.0 - 18.0	21.0 - 22.0	28.0 - 29.0	Average	Concentration	Concentration
Volatil Organics (µg/kg)								
Benzene	40 J	38 J	***7000***	***9200***	280	4,322.19	ND	17,000
Ethylbenzene	67 J	ND	**26000**	4900	72 J	14,182.79	ND	47,000
Methyl tert-butyl ether	1800	1900	15000	**48000**	6400	9,288.13	ND	48,000
Toluene	190 J	65 J	8000	2000	140 J	6,245.41	ND	59,000
Xylenes, Total	410 J	ND	**120000**	19000	270 J	52,681.64	ND	240,000
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NA	NA	170	8.8	ND	66.02	ND	210
Gasoline Range Organics	0.18 J	0.1 J	790	39	0.33	407.73	ND	1900

TABLE 6-7

PERCENT COMPLETENESS BY METHOD AND MATRIX
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA PUERTO RICO

Matrix	Parameter Class	Analaytical Method	Total Unique Results	Fully Rejected Results	Difference	Perecent Complete
2010 Investigaion						
Subsurface Soil	VOCs	8260	175	0	175	100%
	TPH DRO and GRO	8015/8015C	50	25	25	50%
Groundwater	VOCs	8260	112	0	112	100%
	TPH DRO and GRO	8015/8015C	32	0	32	100%
2010 Investigation Total			369	25	344	93.2%
2012 Investigation						
Surface Soil	VOCs	8260	55	0	55	100%
	TPH Dro and GRO	8015/8015C	22	0	22	100%
Subsurface Soil	VOCs	8260	235	0	235	100%
	TPH DRO and GRO	8015/8015C	88	0	88	100%
Groundwater	VOCs	8260	155	0	155	100%
	TPH DRO and GRO	8015/8015C	62	0	62	100%
2012 Investigation Total			617	0	617	100%
Total			**986**	**25**	**961**	**97.5%**

Notes:

DRO - Diesel Range Organics
GRO - Gasoline Range Organics
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds

TABLE 6-8

GROUNDWATER VELOCITY CALCULATIONS
AOC F - SITE 1738
MtBE CHARACTERIZATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Equation: V = Ki/ne	Where: V = groundwater velocity (feet per day) K = hydraulic conductivity (feet per day) i = hydraulic gradient (feet per foot) n_e = Effective porosity

Area	K	i	n_e [1]	V
Upgradient (Sep 2010)	3.199	0.005	0.105	0.15
Upgradient (Aug 2012)	3.199	0.002	0.105	0.06
Upgradient (higher gradient)	3.199	0.006	0.105	0.18
Downgradient (Sep 2010)	1.437	0.016	0.105	0.22
Downgradient (Aug 2012)	1.437	0.008	0.105	0.11
			Average Groundwater Velocity:	0.14

Notes:
Upgradient (Sep 2010) - Average K value from all Upgradient Area Wells /Gradient calc "B" on Figure 5-7
Upgradient (Aug 2012) - Average K value from all Upgradient Area Wells/Gradient calc "B" on Figure 5-10
Upgradient (higher gradient) - Average K value from all Upgradient Area Wells/Gradient calc "B" on Figure 5-9
Downgradient (Sep 2010) - Average K value from all Downgradient Area Wells (excluding MW07 and MW08)/ Gradient calc "A" on Figure 5-7
Downgradient (Aug 2012) - Average K value from all Downgradient Area Wells (excluding MW07 and MW08)/ Gradient calc "A" on Figure 5-10

[1] Median from Techincal Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater (Wiedemeier, 1995)

TABLE 6-9

RETARDATION FACTOR CALCULATIONS
AOC F - SITE 1738
MtBE CHARACTERIZATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Equation: R = 1 + (Pb/n)(Kd)	Where: P_b = bulk density (dry) n = porosity K_d = distribution coefficient (k_{oc} x FOC)

Distribution Coefficient Estimates

Solute	K_{oc} [1] (L/kg)	FOC [2] (%)	K_d
Benzene	66	0.81	0.5346
Toluene	145	0.81	1.1745
Ethylbenzene	207	0.81	1.6767
Total Xylenes (used m-Xylene)	204	0.81	1.6524
Methyl tertiary-Butyl Ether	11	0.81	0.0891

Retardation Factor Estimates

Solute	P_b [3] (g/mL)	n [4] (%)	K_d	R
Benzene	1.7	47	0.5346	2.93
Toluene	1.7	47	1.1745	5.25
Ethylbenzene	1.7	47	1.6767	7.06
Xylenes	1.7	47	1.6767	7.06
Methyl tertiary-Butyl Ether	1.7	47	0.0891	1.32

Notes:

[1]Koc values from http://www.epa.gov/superfund/health/conmedia/soil/pdfs/part_5.pdf
Koc for MtBE from Overview of Groundwater Remediation - Technologies for MTBE and TBA (IRTC, 2005)

[2]Average of Site measurements

[3] and [4]Median from Techincal Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater (Wiedemeier, 1995)

TABLE 6-10

MASS DISCHARGE CALCULATIONS
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Transect 1

Polygon	T1-1	T1-2	T1-3	T1-4	T1-5	T1-6	T1-7	feet		
A	390	375	450	1560	255	345	375	sq ft		
q	0.0014	0.0010	0.0010	0.0017	0.0052	0.0095	0.0095	ft/d		
C	0.03	0.32	3.16	10.00	3.16	0.32	0.03	mg/L		
M_{di}	6.28E-07	3.89E-06	4.66E-05	8.69E-04	1.37E-04	3.39E-05	4.03E-06	g/d	0.001	M_d (g/d)

Transect 2

Polygon	T2-1	T2-2	T2-3	T2-4	T2-5	T2-6	T2-7	feet		
A	300	260	380	260	300	1510	950	sq ft		
q	0.0057	0.0040	0.0040	0.0040	0.0070	0.0183	0.0007	ft/d		
C	0.03	0.32	3.16	10.00	3.16	0.32	0.03	mg/L		
M_{di}	1.93E-06	1.08E-05	1.58E-04	3.41E-04	2.16E-04	2.87E-04	1.29E-05	g/d	0.001	M_d (g/d)

Transect 3

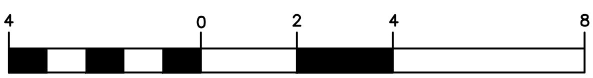
Polygon	T3-1	T3-2	T3-3	T3-4	T3-5	T3-6	T3-7	feet		
A	430	500	480	300	710	1780	560	sq ft		
q	0.0057	0.0040	0.0040	0.0057	0.0090	0.0080	0.0007	ft/d		
C	0.03	0.32	3.16	10.00	3.16	0.32	0.03	mg/L		
M_{di}	2.77E-06	2.07E-05	1.99E-04	5.58E-04	6.59E-04	1.48E-04	5.08E-06	g/d	0.002	M_d (g/d)

Conversions
1 foot = 0.3048 meters
1 foot per day = 3.53E-4 centimeters per second

Notes:
A = Area (distance between iso-contours x screen length [15-ft Transect 1 / 10-ft Transects 2 & 3])
q = K x i   K = Hydraulic Conductivity
i = Hydraulic gradient: 0.002 Transect 1 / 0.006 Transects 2 & 3
C = Concentration
M_{di} = Mass discharge at each polygon
M_d = Mass discharge

FIGURES

K:_SOUTHNAVFAC\125201 JM07\Site 1738\cad\125201_MTBE_28.dwg



1 inch = 4 miles

FIGURE 2–1
REGIONAL LOCATION MAP
AOC F–SITE 1738
MtBE INVESTIGATION REPORT

SOURCE: METRODATA, INC., 1999.

NAVAL ACTIVITY PUERTO RICO

LEGEND

SWMUs

1738 – AOC F SITE 1738

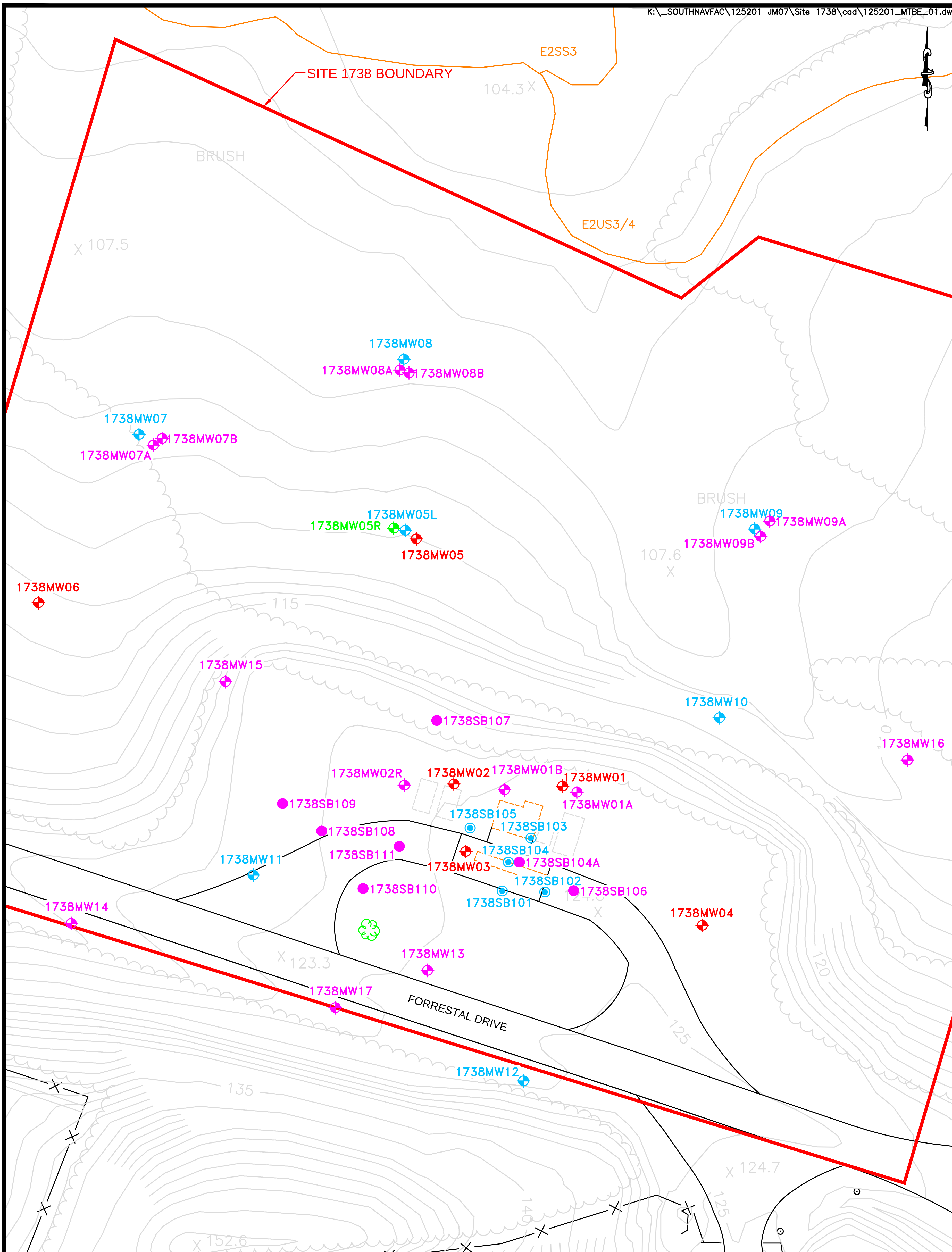
AOC D – AOCs

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

3000 0 1500 3000

1 inch = 3000 ft.

FIGURE 2-2
SWMU/AOC LOCATION MAP
AOC F-SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

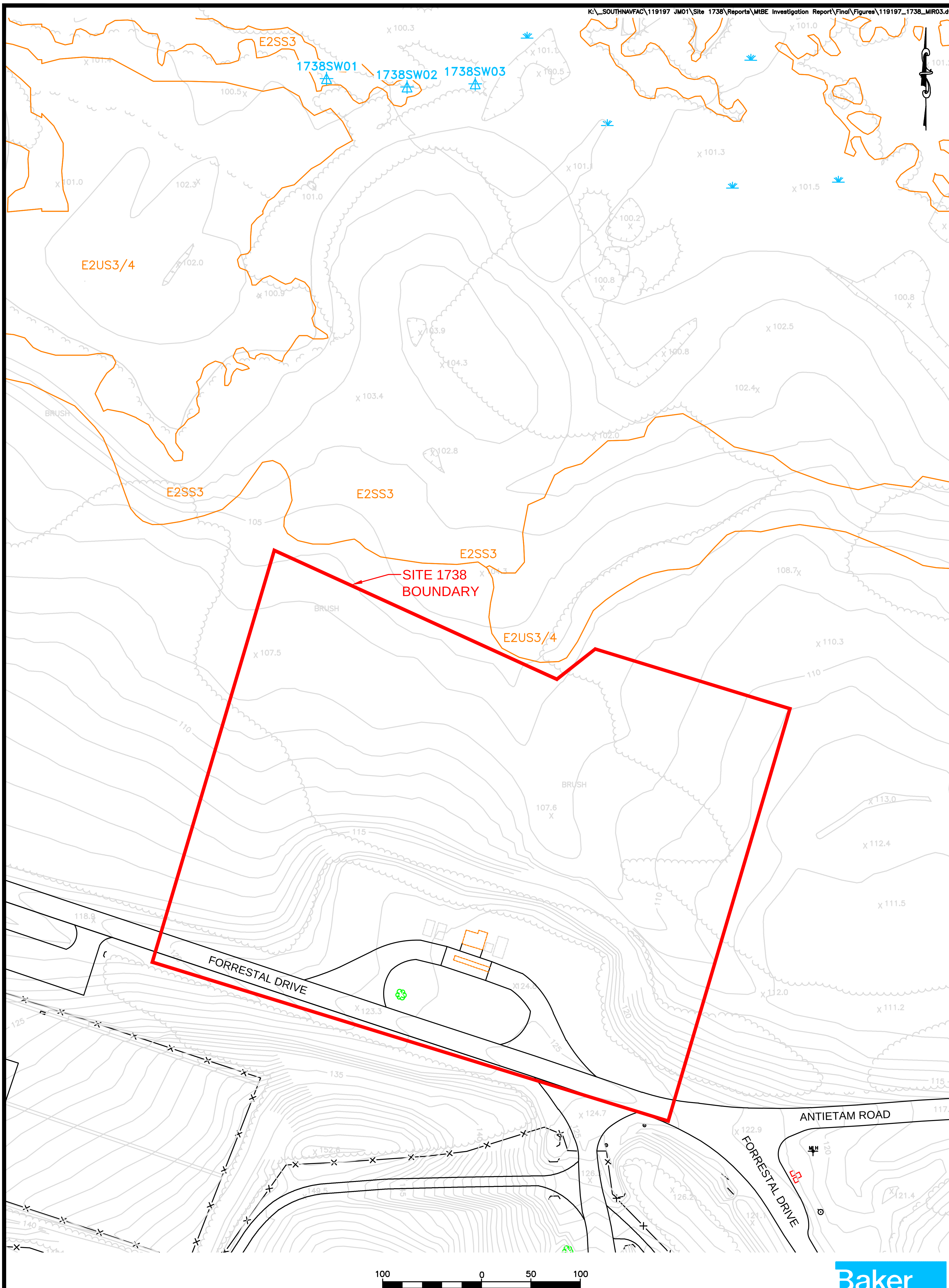
50 0 25 50
1 inch = 50 ft.

Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE
- E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 –ESTUARINE INTERTIDAL SCRUB–SHRUB BROAD–LEAVED EVERGREEN

FIGURE 4–1
MONITORING WELL AND SOIL SAMPLE LOCATION MAP
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



LEGEND

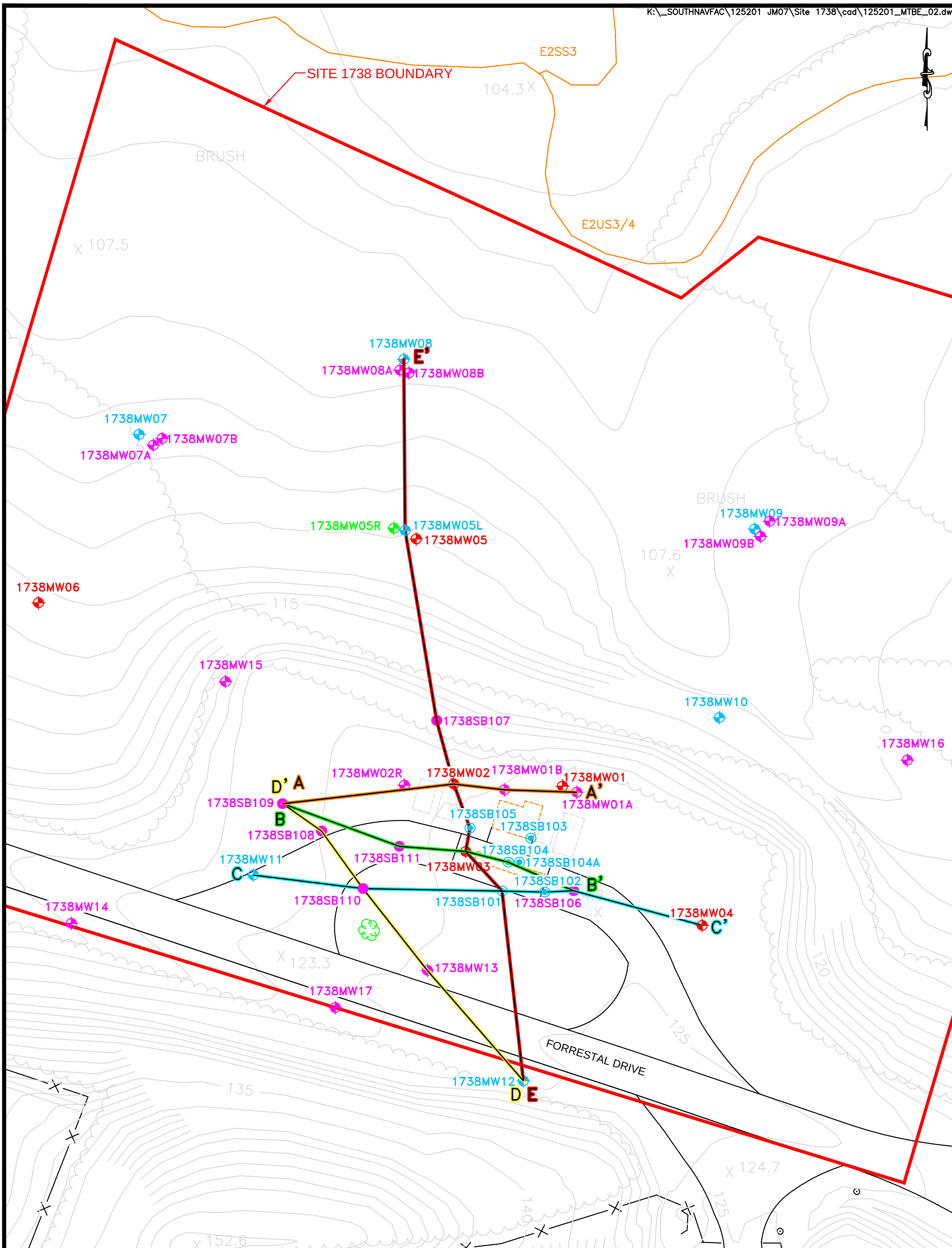
- SURFACE WATER SAMPLE LOCATION (AUG. 2008)
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- WETLAND BOUNDARY

E2US3/4 – ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC

E2SS3 – ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 4-2
SURFACE WATER LOCATION MAP
AOC F-SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

50 0 25 50

1 inch = 50 ft.

Baker

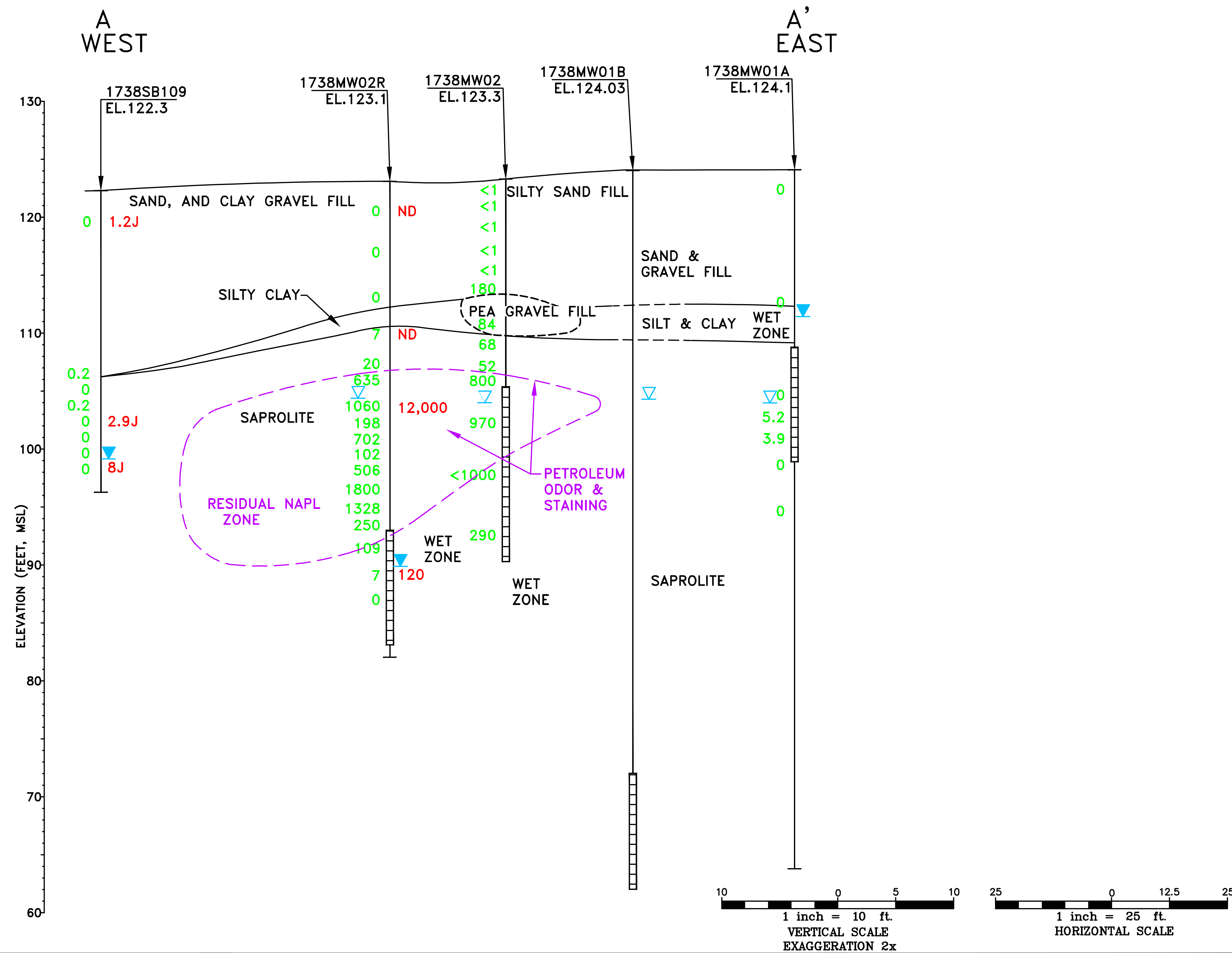
LEGEND

- MONITORING WELL (APRIL 1998)
- MONITORING WELL (MAY 2008)
- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- SOIL BORING SAMPLE LOCATION (SEP 2010)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- SOIL BORING LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- A–A' – CROSS SECTION LOCATION
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 – ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 – ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 5-1
CROSS SECTION LOCATION MAP
AOC F-SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\125201 JM07\Site 1738\cad\125201_MTBE_08.dwg



Baker

LEGEND

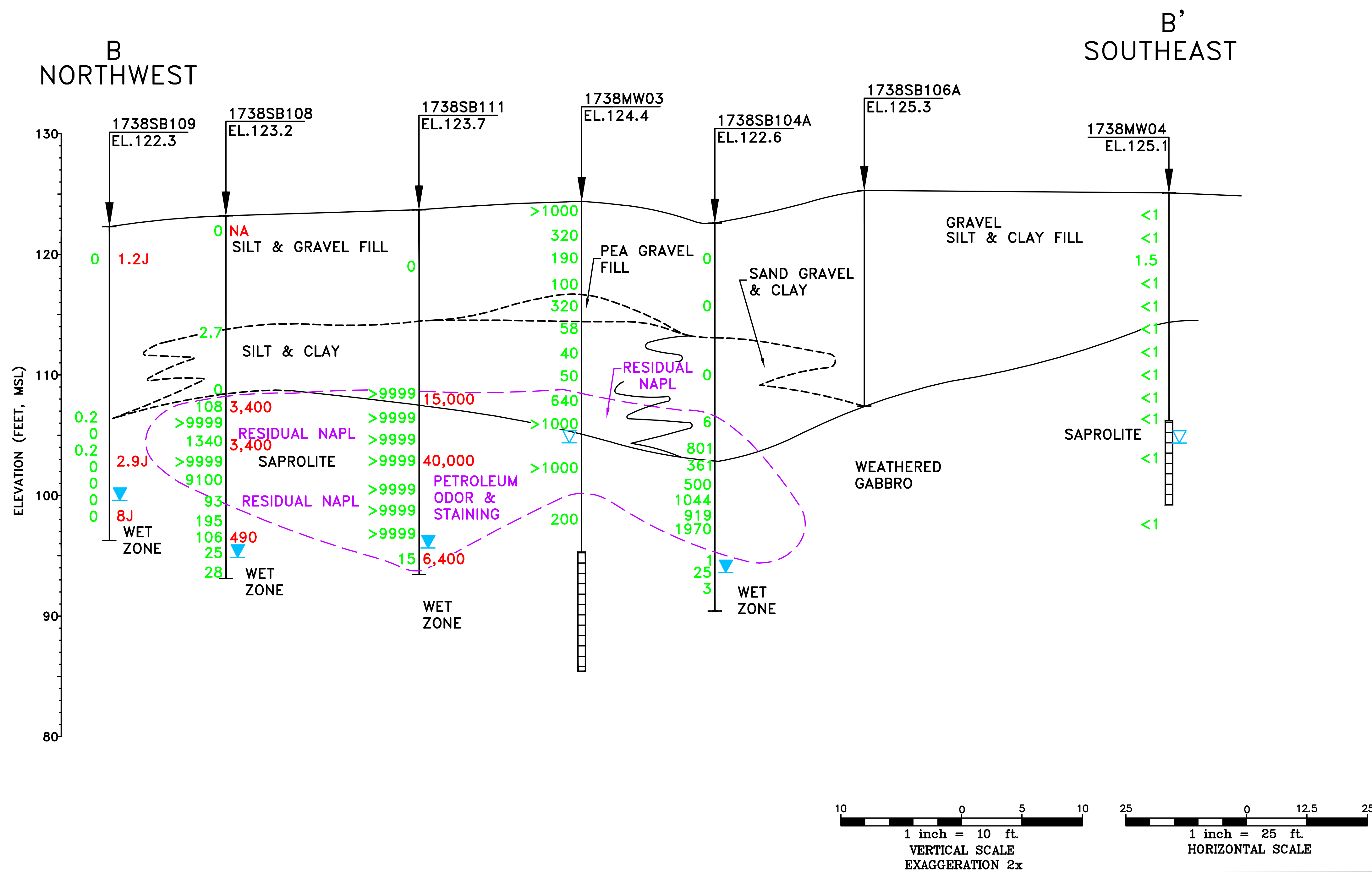
- —ESTIMATED
- —WELL RISER
- —WELL SCREEN INTERVAL
- —PROJECTED
- —ESTIMATED EXTENT OF SOURCE
- 0 —PID READING RESULTS (ppm)
- 0 —ANALYTICAL RESULTS (MtBE)(ug/L)
- —STATIC WATER ELEVATION (8/26/2012)
- —GROUNDWATER ENCOUNTERED DURING DRILLING ACTIVITIES

ND —NOT DETECTED
NA —NOT ANALYZED
J —RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 5–2
GEOLOGIC CROSS–SECTION A–A'
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



Baker

LEGEND

- ——— –ESTIMATED
- –WELL RISER
- –WELL SCREEN INTERVAL
- — — –PROJECTED
- – – –ESTIMATED EXTENT OF SOURCE
- 0 –PID READING RESULTS (ppm)
- 0 –ANALYTICAL RESULTS (MtBE)(ug/L)
- –STATIC WATER ELEVATION (8/26/2012)
- –GROUNDWATER ENCOUNTERED DURING DRILLING ACTIVITIES

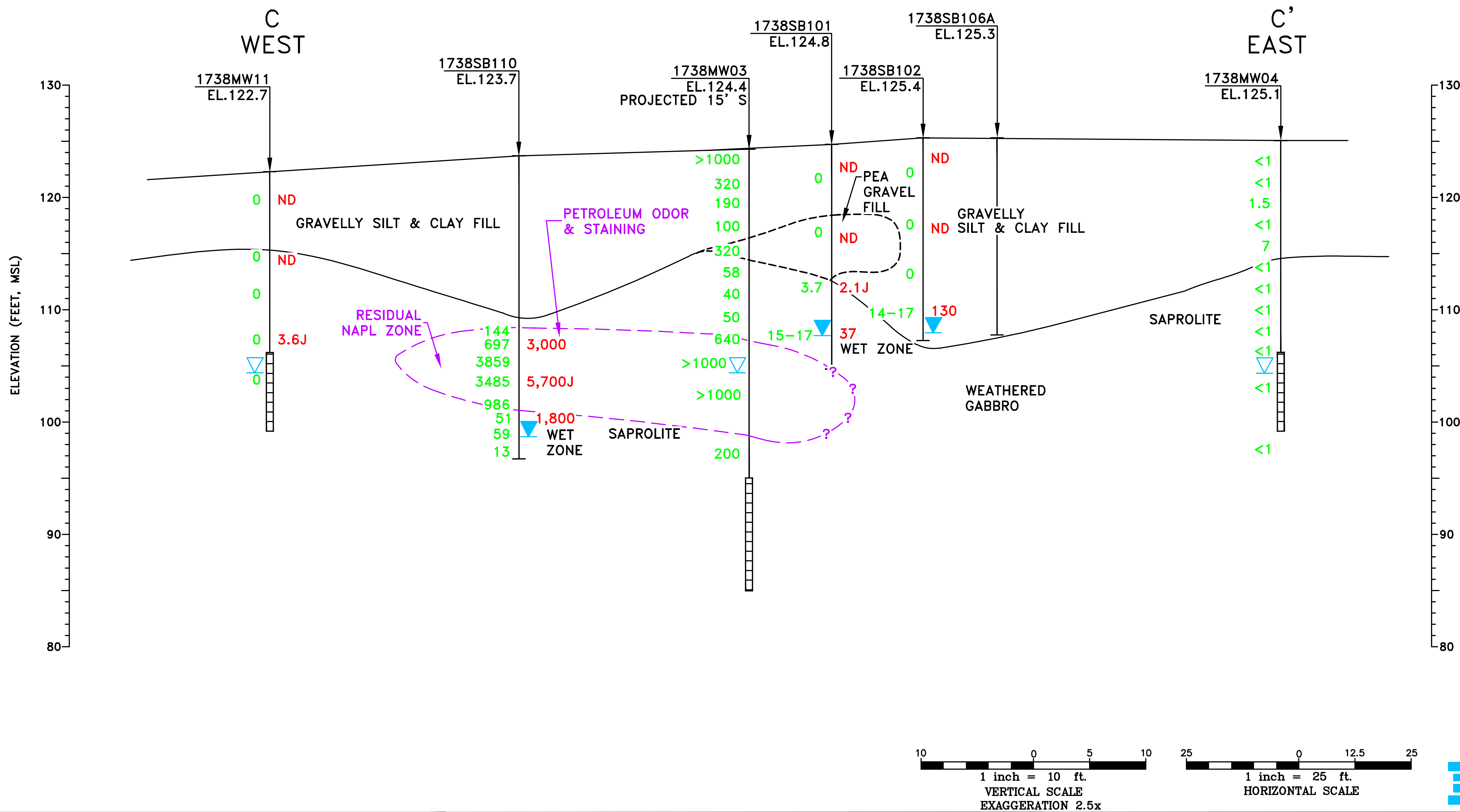
ND –NOT DETECTED
NA –NOT ANALYZED
J –RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 5–3
GEOLOGIC CROSS–SECTION B–B'
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\125201 JM07\Site 1738\cad\125201_MTBE_05.dwg



Baker

LEGEND

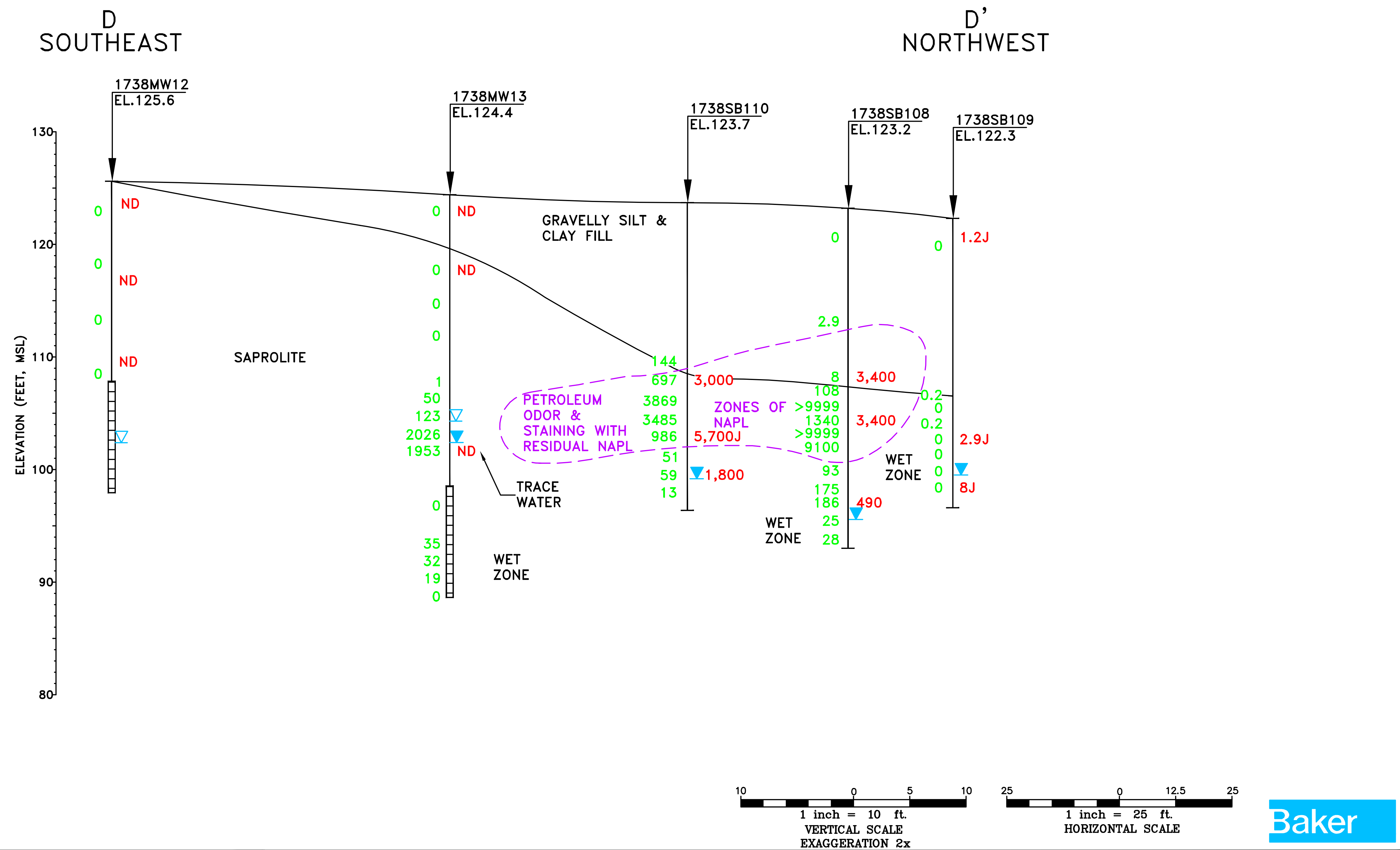
- ESTIMATED
- WELL RISER
- WELL SCREEN INTERVAL
- PROJECTED
- ESTIMATED EXTENT OF SOURCE
- PROJECTED EXTENT OF SOURCE ZONE
- STATIC WATER ELEVATION (8/26/2012)
- GROUNDWATER ENCOUNTERED DURING DRILLING ACTIVITIES

0 – PID READING RESULTS (ppm)
0 – ANALYTICAL RESULTS (MtBE)(ug/L)
ND – NOT DETECTED
NA – NOT ANALYZED
J – RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 5–4
GEOLOGIC CROSS–SECTION C–C'
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



Baker

LEGEND

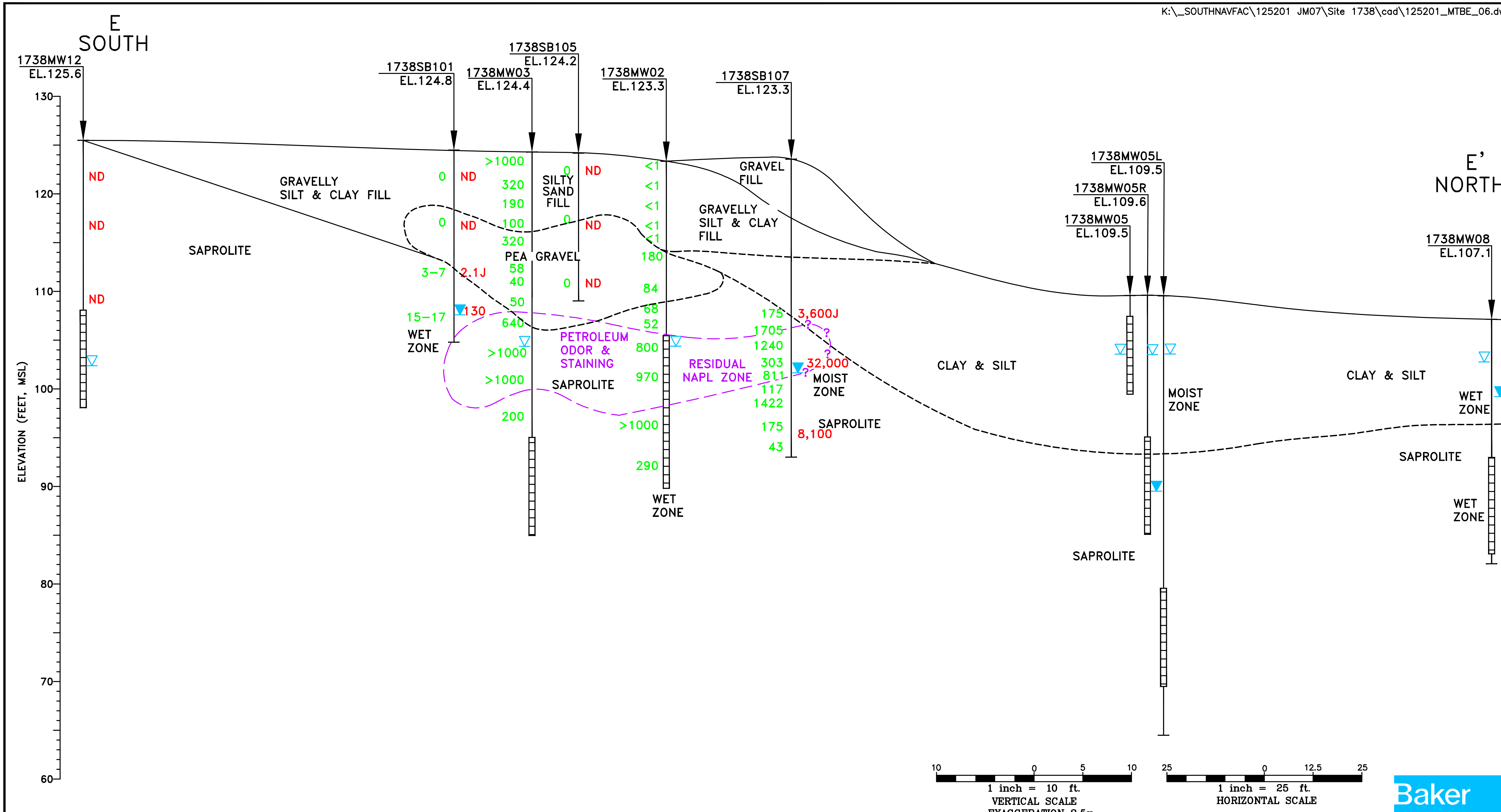
- ——— –ESTIMATED
- I –WELL RISER
- –WELL SCREEN INTERVAL
- — — — –PROJECTED
- — — — –ESTIMATED EXTENT OF SOURCE
- 0 –PID READING RESULTS (ppm)
- 0 –ANALYTICAL RESULTS (MtBE)(ug/L)
- ▽ –STATIC WATER ELEVATION (8/26/2012)
- ▼ –GROUNDWATER ENCOUNTERED DURING DRILLING ACTIVITIES

ND –NOT DETECTED
NA –NOT ANALYZED
J –RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 5–5
GEOLOGIC CROSS–SECTION D–D'
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



LEGEND

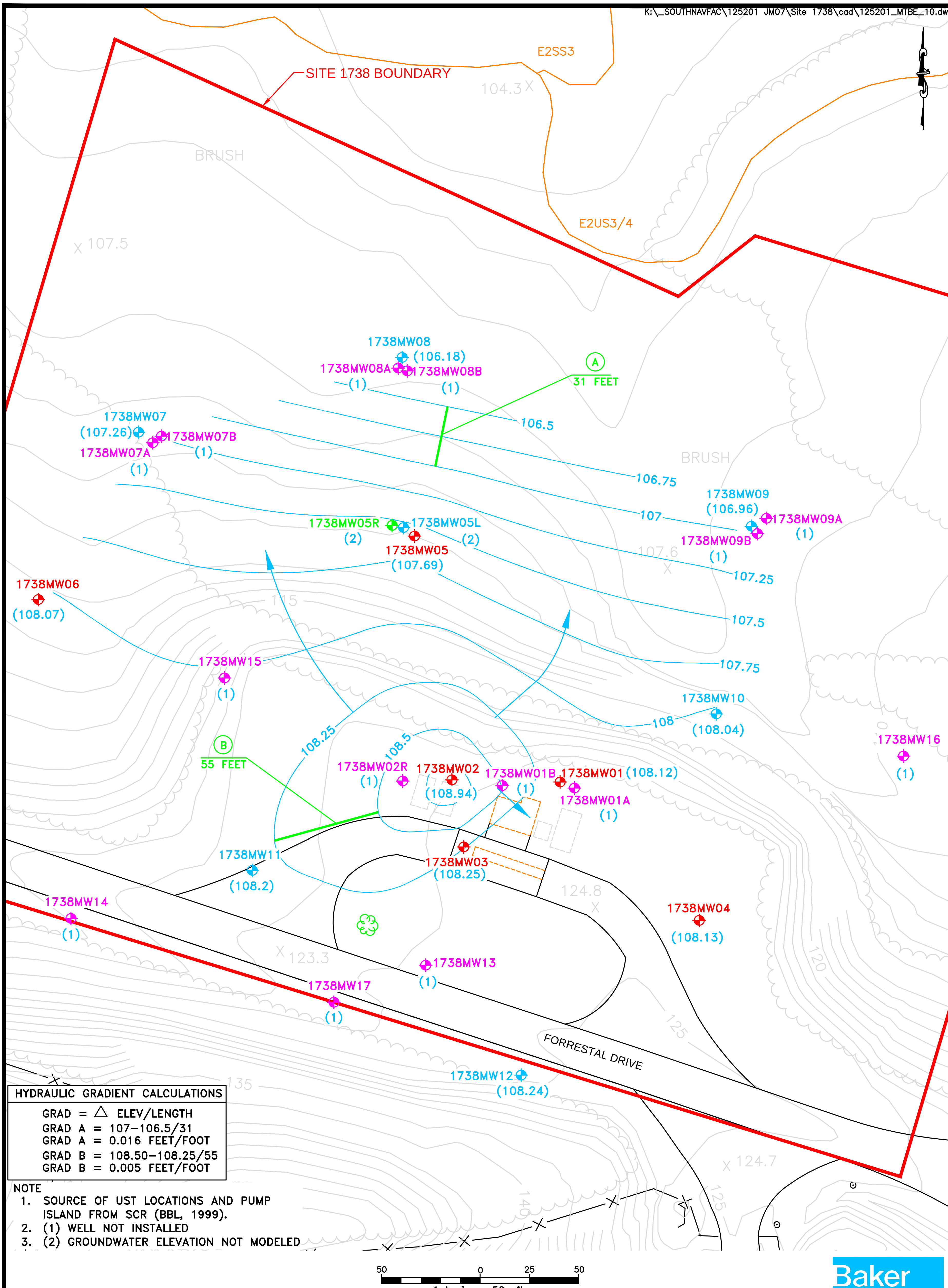
—— –ESTIMATED
–WELL RISER
–WELL SCREEN INTERVAL
— — — –PROJECTED
— — — –ESTIMATED EXTENT OF SOURCE
–?—?– –PROJECTED EXTENT OF SOURCE ZONE
–STATIC WATER ELEVATION (8/26/2012)
–GROUNDWATER ENCOUNTERED DURING DRILLING ACTIVITIES

0 –PID READING RESULTS (ppm)
0 –ANALYTICAL RESULTS (MtBE)(ug/L)
ND –NOT DETECTED
NA –NOT ANALYZED
J –RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 5–6
GEOLOGIC CROSS–SECTION E–E'
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO

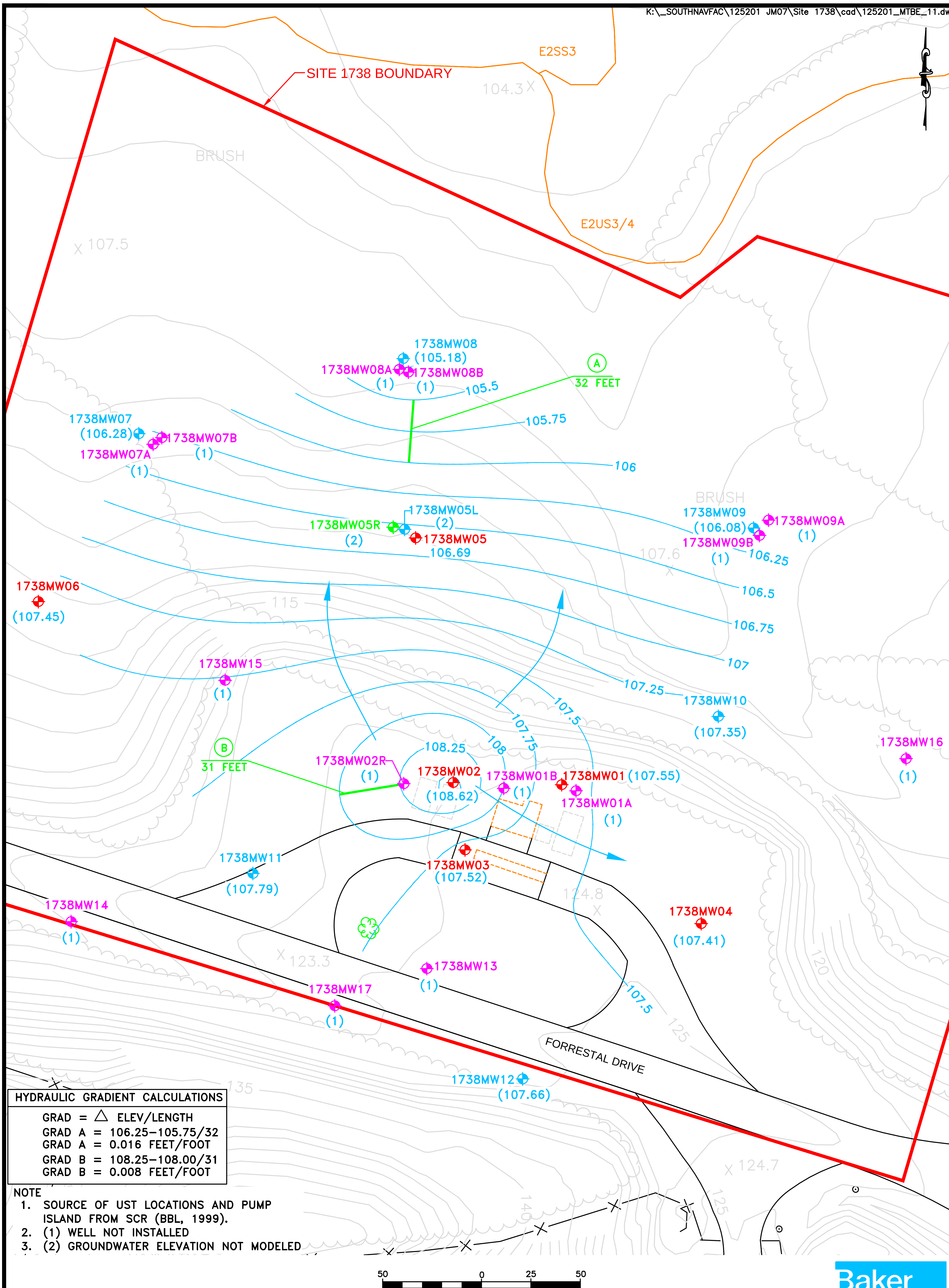


LEGEND

- MONITORING WELL (APRIL 1998)
- MONITORING WELL (MAY 2008)
- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- 108 GROUNDWATER CONTOUR LINE AND ELEVATION
- GROUNDWATER FLOW DIRECTION
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 – ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 – ESTUARINE INTERTIDAL SCRUB–SHRUB BROAD–LEAVED EVERGREEN

FIGURE 5–7
GROUNDWATER CONTOUR MAP
SEPTEMBER 22, 2010
AOC F–SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO



HYDRAULIC GRADIENT CALCULATIONS
GRAD = △ ELEV/LENGTH
GRAD A = 106.25–105.75/32
GRAD A = 0.016 FEET/FOOT
GRAD B = 108.25–108.00/31
GRAD B = 0.008 FEET/FOOT

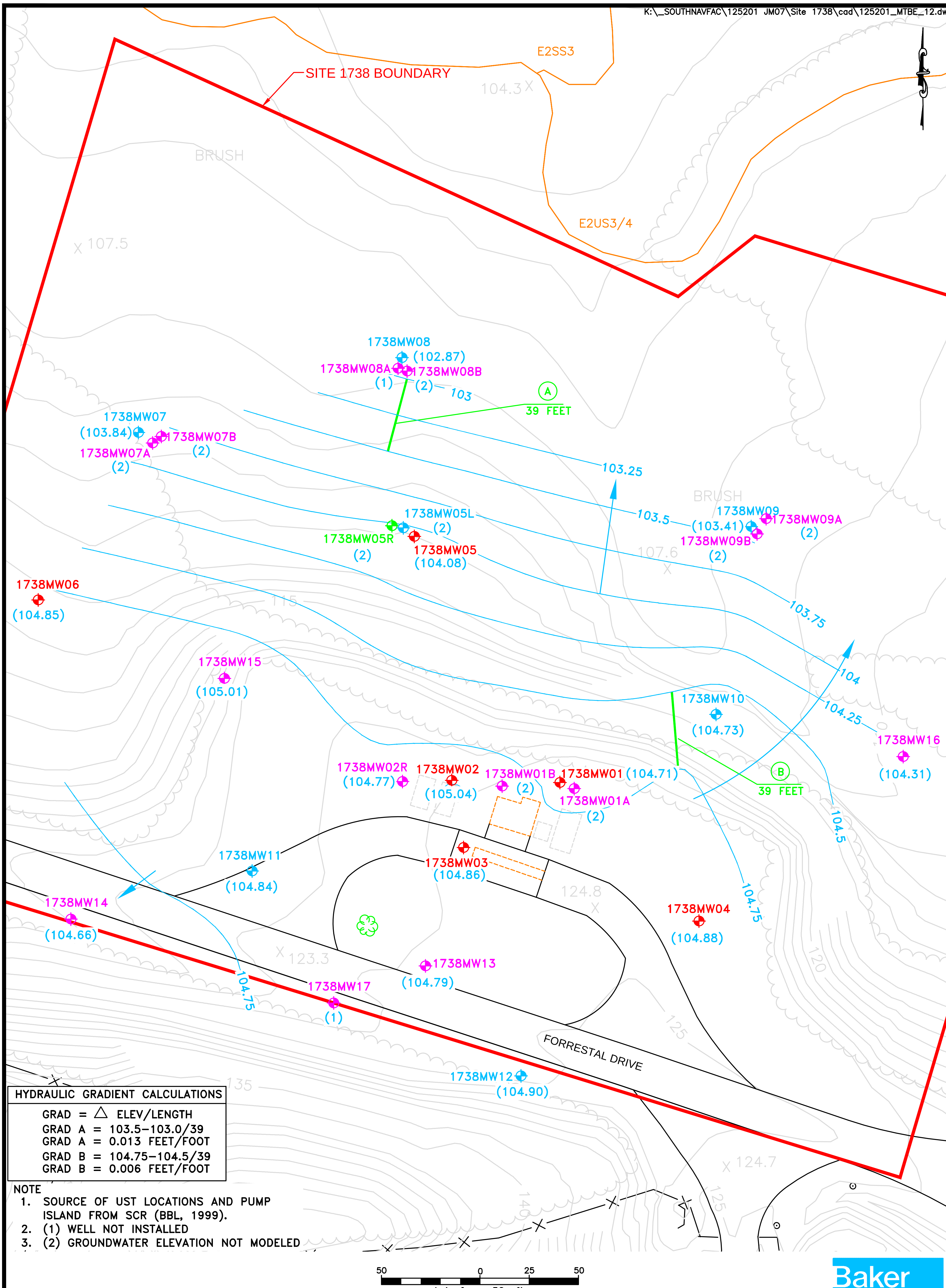
NOTE
1. SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).
2. (1) WELL NOT INSTALLED
3. (2) GROUNDWATER ELEVATION NOT MODELED

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 108 –GROUNDWATER CONTOUR LINE AND ELEVATION
- –GROUNDWATER FLOW DIRECTION
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE
- E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 –ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 5–8
GROUNDWATER CONTOUR MAP
NOVEMBER 2, 2010
AOC F–SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO



HYDRAULIC GRADIENT CALCULATIONS
GRAD = △ ELEV/LENGTH
GRAD A = 103.5−103.0/39
GRAD A = 0.013 FEET/FOOT
GRAD B = 104.75−104.5/39
GRAD B = 0.006 FEET/FOOT

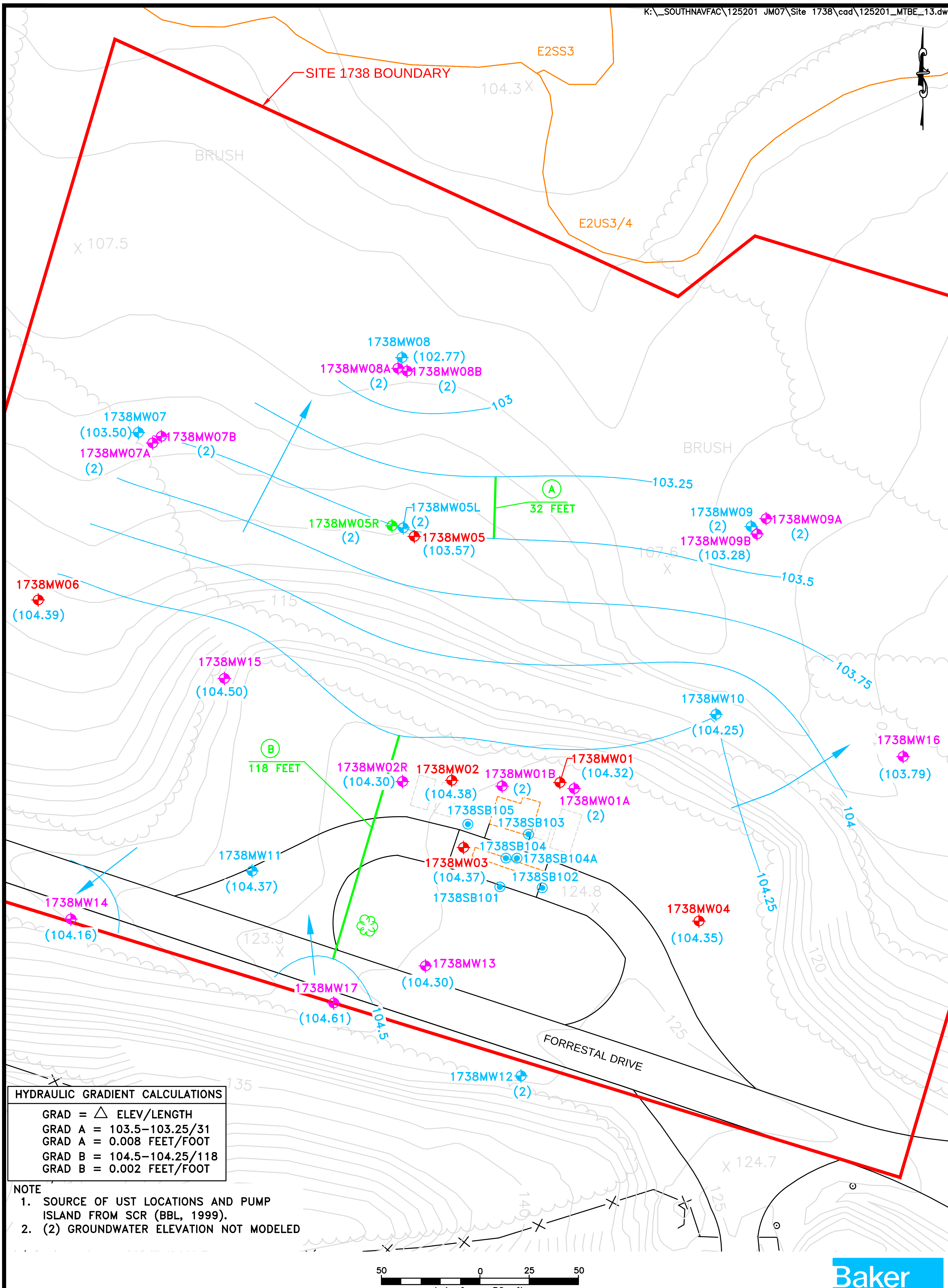
NOTE
1. SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).
2. (1) WELL NOT INSTALLED
3. (2) GROUNDWATER ELEVATION NOT MODELED

LEGEND

- MONITORING WELL (APRIL 1998)
- MONITORING WELL (MAY 2008)
- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- 108 GROUNDWATER CONTOUR LINE AND ELEVATION
- GROUNDWATER FLOW DIRECTION
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 5-9
GROUNDWATER CONTOUR MAP
JUNE 29, 2012
AOC F-SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO

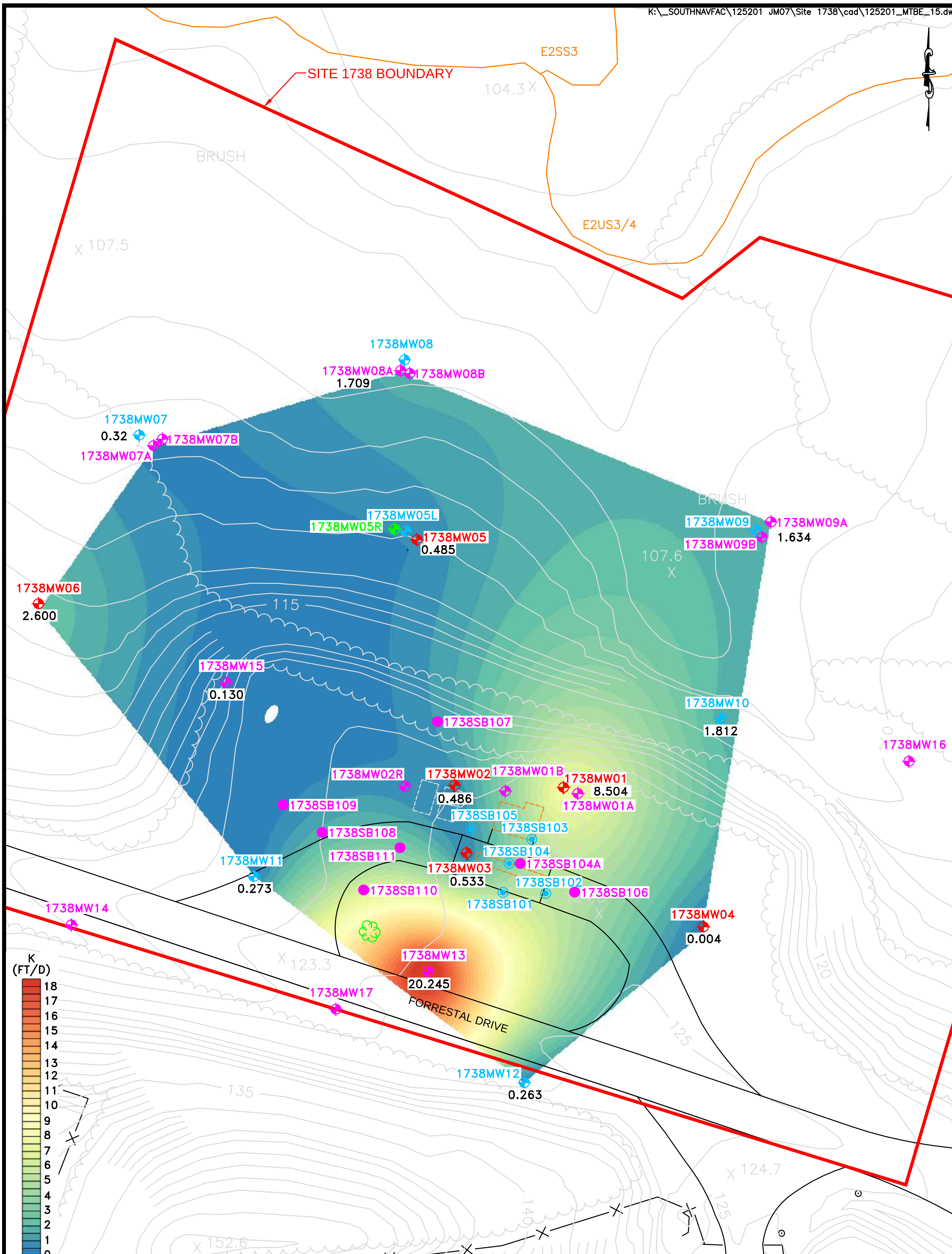


LEGEND

- −MONITORING WELL (APRIL 1998)
- −MONITORING WELL (MAY 2008)
- −SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- −MONITORING WELL LOCATION (JUN/AUG 2012)
- −WETLAND BOUNDARY
- 108 −GROUNDWATER CONTOUR LINE AND ELEVATION
- −GROUNDWATER FLOW DIRECTION
- −FORMER UNDERGROUND STORAGE TANK (UST)
- −FORMER STRUCTURE
- E2US3/4 −ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 −ESTUARINE INTERTIDAL SCRUB−SHRUB BROAD−LEAVED EVERGREEN

FIGURE 5−10
GROUNDWATER CONTOUR MAP
AUGUST 26, 2012
AOC F−SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO



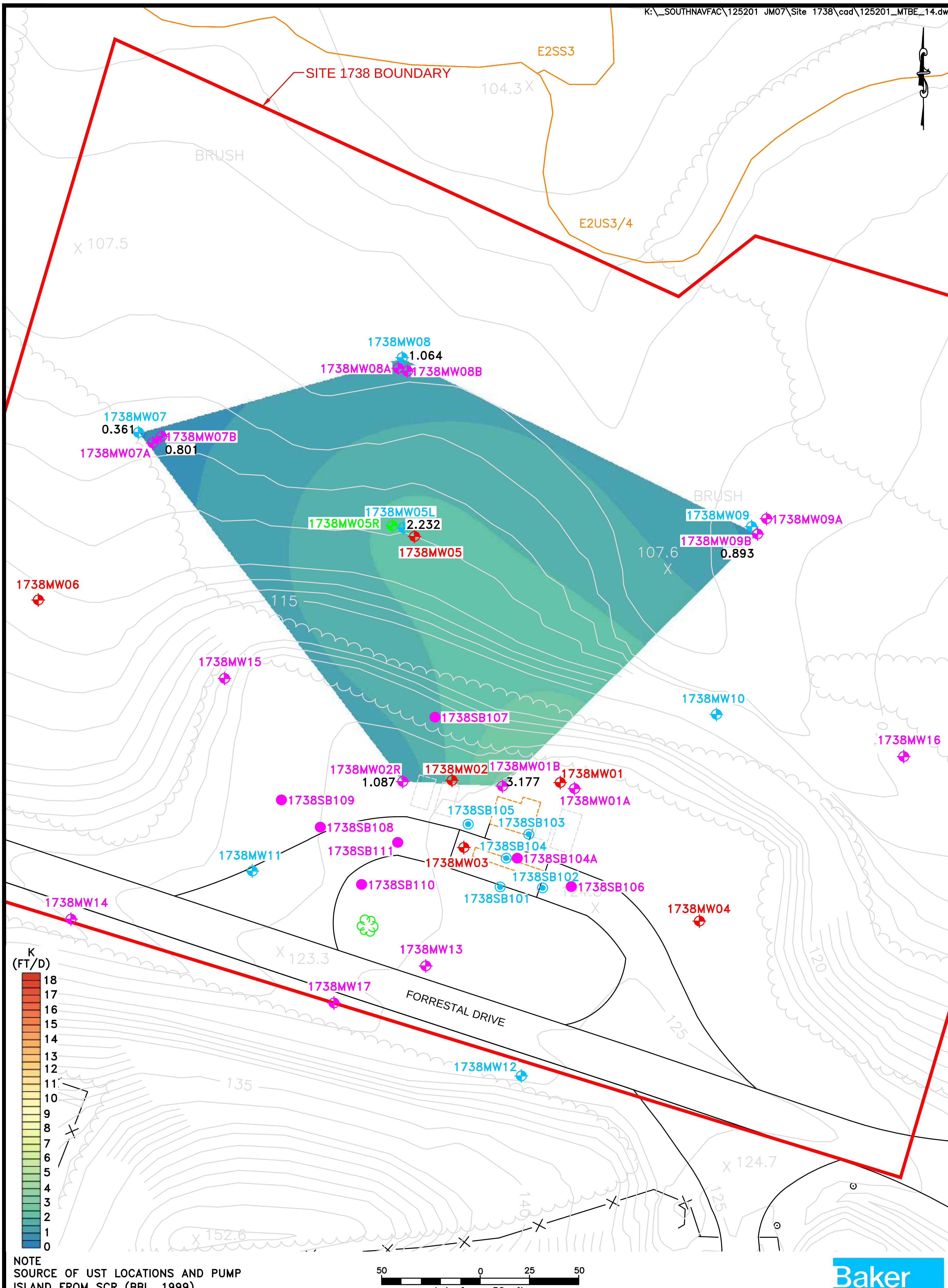
NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 0.004 –HYDRAULIC CONDUCTIVITY RESULTS
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE
- E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 –ESTUARINE INTERTIDAL SCRUB–SHRUB BROAD–LEAVED EVERGREEN

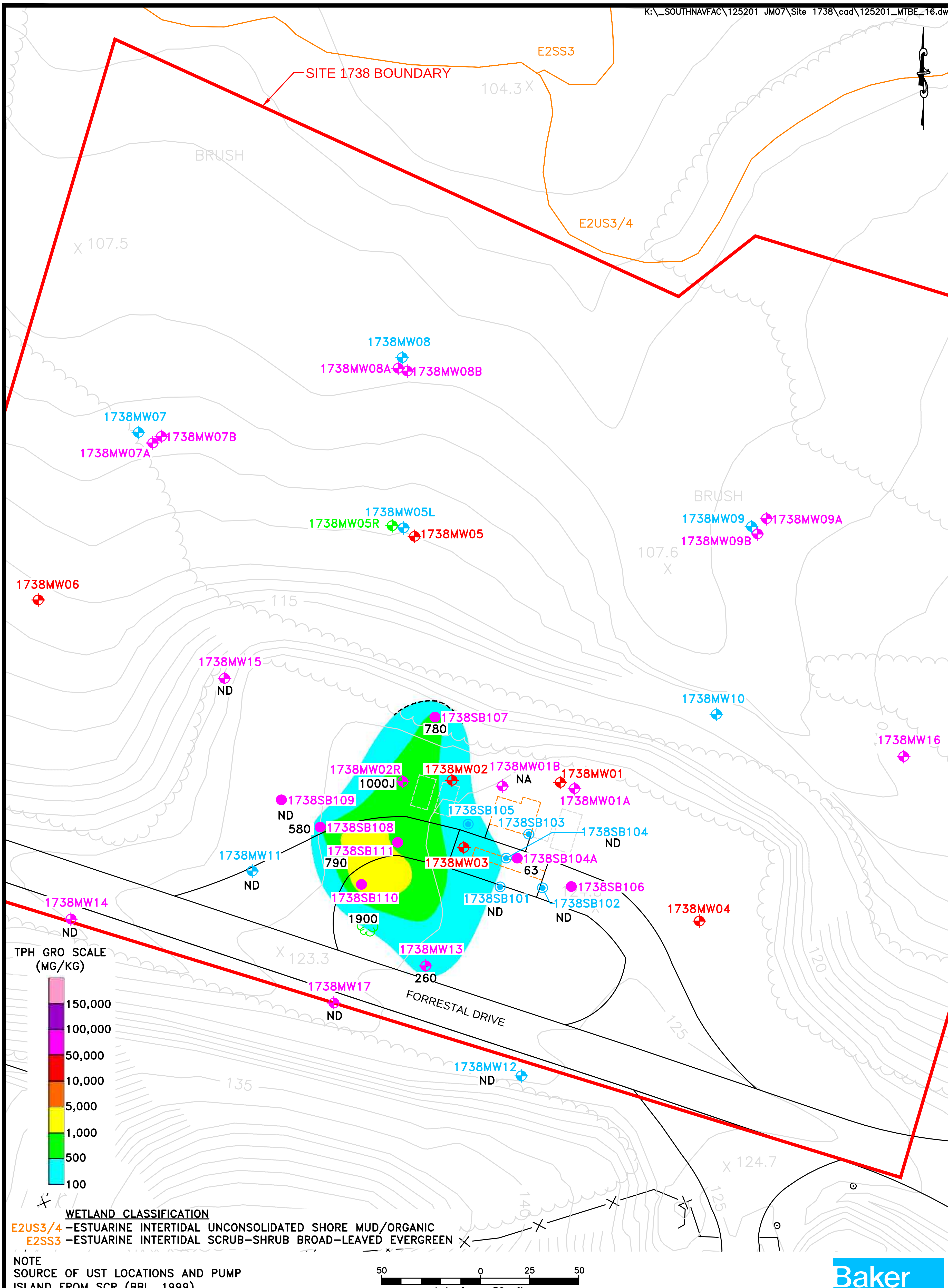
FIGURE 5–11
DISTRIBUTION OF HYDRAULIC CONDUCTIVITY (K) SHALLOW PORTION OF THE AQUIFER
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 2.02 –HYDRAULIC CONDUCTIVITY RESULTS
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE
- E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 –ESTUARINE INTERTIDAL SCRUB–SHRUB BROAD–LEAVED EVERGREEN

FIGURE 5–12
DISTRIBUTION OF HYDRAULIC CONDUCTIVITY (K) DEEP PORTION OF THE AQUIFER
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO

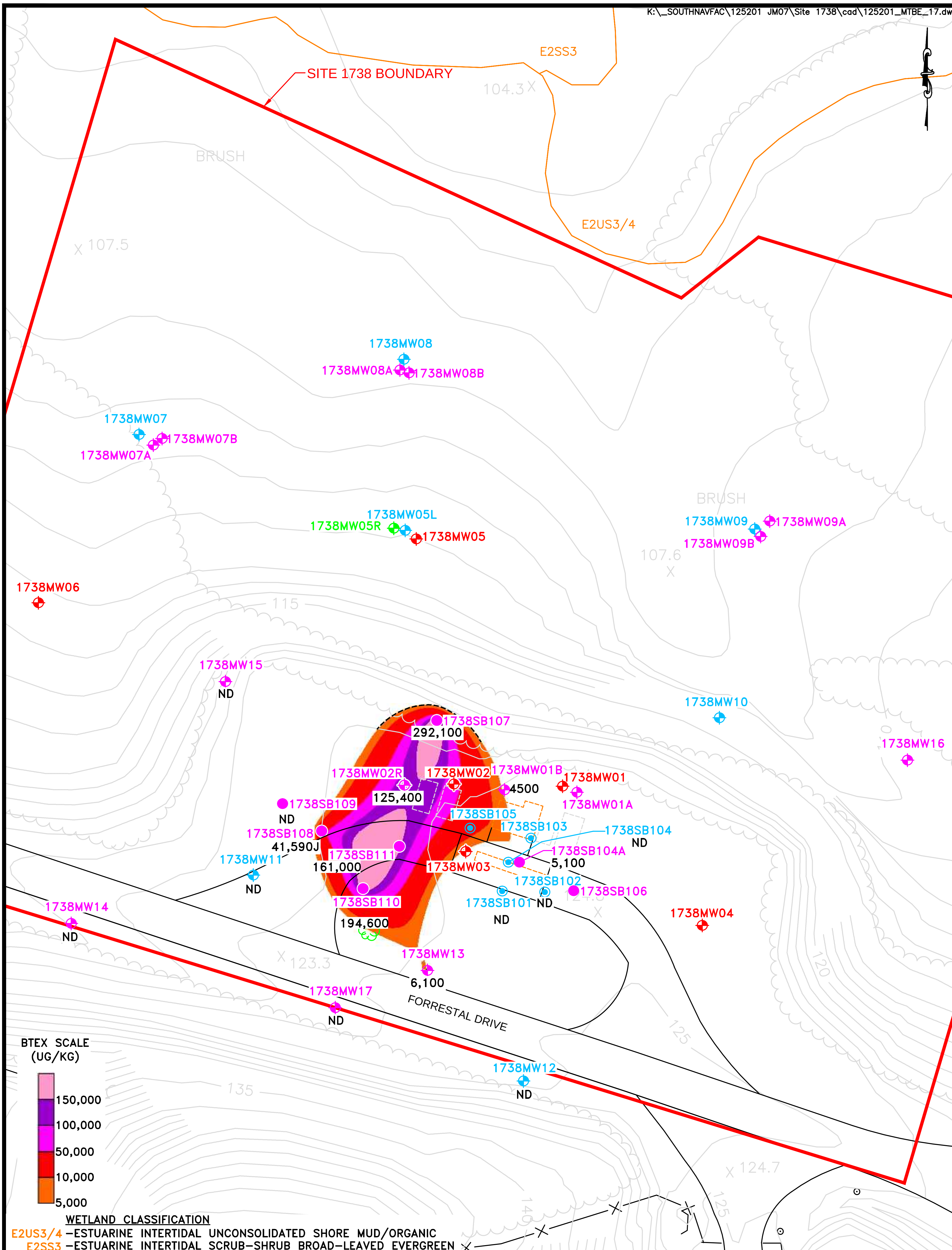


LEGEND

–MONITORING WELL (APRIL 1998)
–MONITORING WELL (MAY 2008)
–SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
–SOIL BORING SAMPLE LOCATION (SEP 2010)
–MONITORING WELL LOCATION (JUN/AUG 2012)
–SOIL BORING LOCATION (JUN/AUG 2012)
–WETLAND BOUNDARY
1,900 –TPH GRO RESULTS
--- –EXTRAPOLATED BOUNDARY

J –ESTIMATED
ND –NOT DETECTED
NA –NOT ANALYZED
–FORMER UNDERGROUND STORAGE TANK (UST)
–FORMER STRUCTURE

FIGURE 6–1
DISTRIBUTION OF TPH GRO IN SUBSURFACE SOIL ABOVE THE PREQB TARGET LEVEL (100 MG/KG) – 16 TO 22 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

50 0 25 50
1 inch = 50 ft.

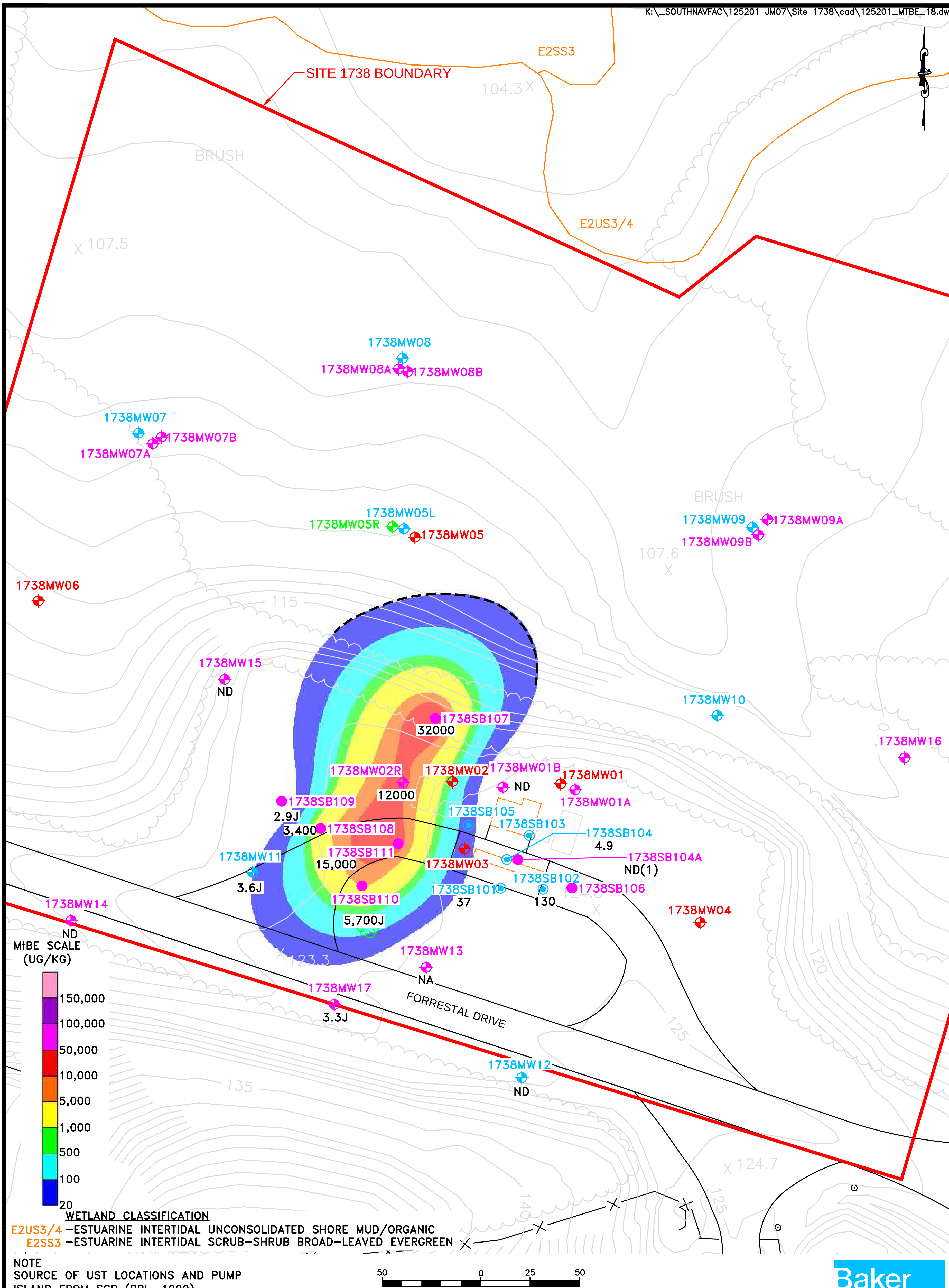
Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 112,000–BTEX RESULTS
- --- –EXTRAPOLATED BOUNDARY

J –ESTIMATED
ND –NOT DETECTED
NA –NOT ANALYZED
–FORMER UNDERGROUND STORAGE TANK (UST)
–FORMER STRUCTURE

FIGURE 6–2
DISTRIBUTION OF BTEX IN SUBSURFACE SOIL ABOVE 5,000 ug/kg
16 TO 20 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO

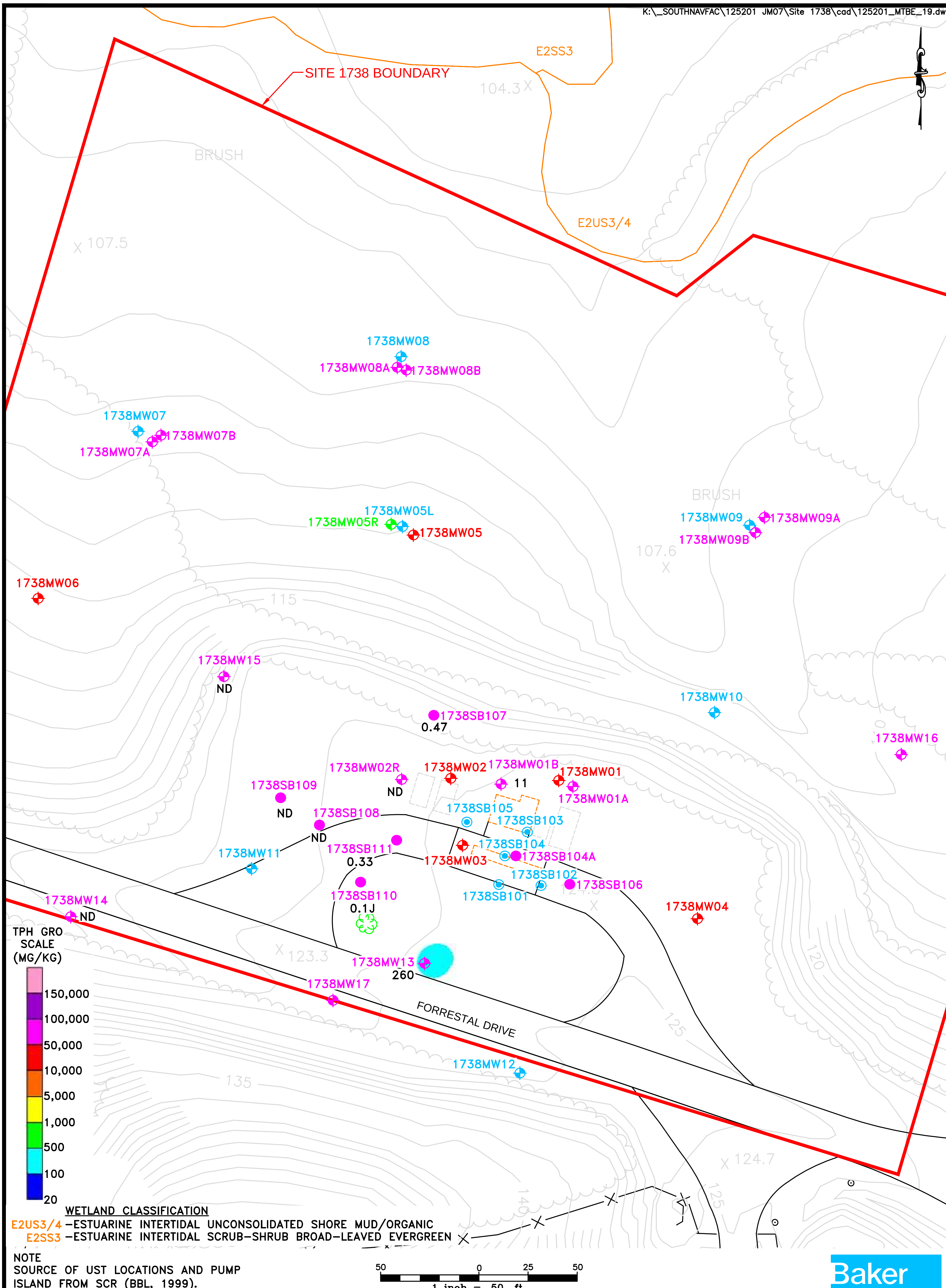


LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 3.3J –MtBE RESULTS
- --- –EXTRAPOLATED BOUNDARY

J –ESTIMATED
ND –NOT DETECTED
NA –NOT ANALYZED
ND(1) –NOT DETECTED; HOWEVER, QUANTITATION LIMIT WAS GREATER THAN THE PREQB TARGET LEVEL
–FORMER UNDERGROUND STORAGE TANK (UST)
–FORMER STRUCTURE

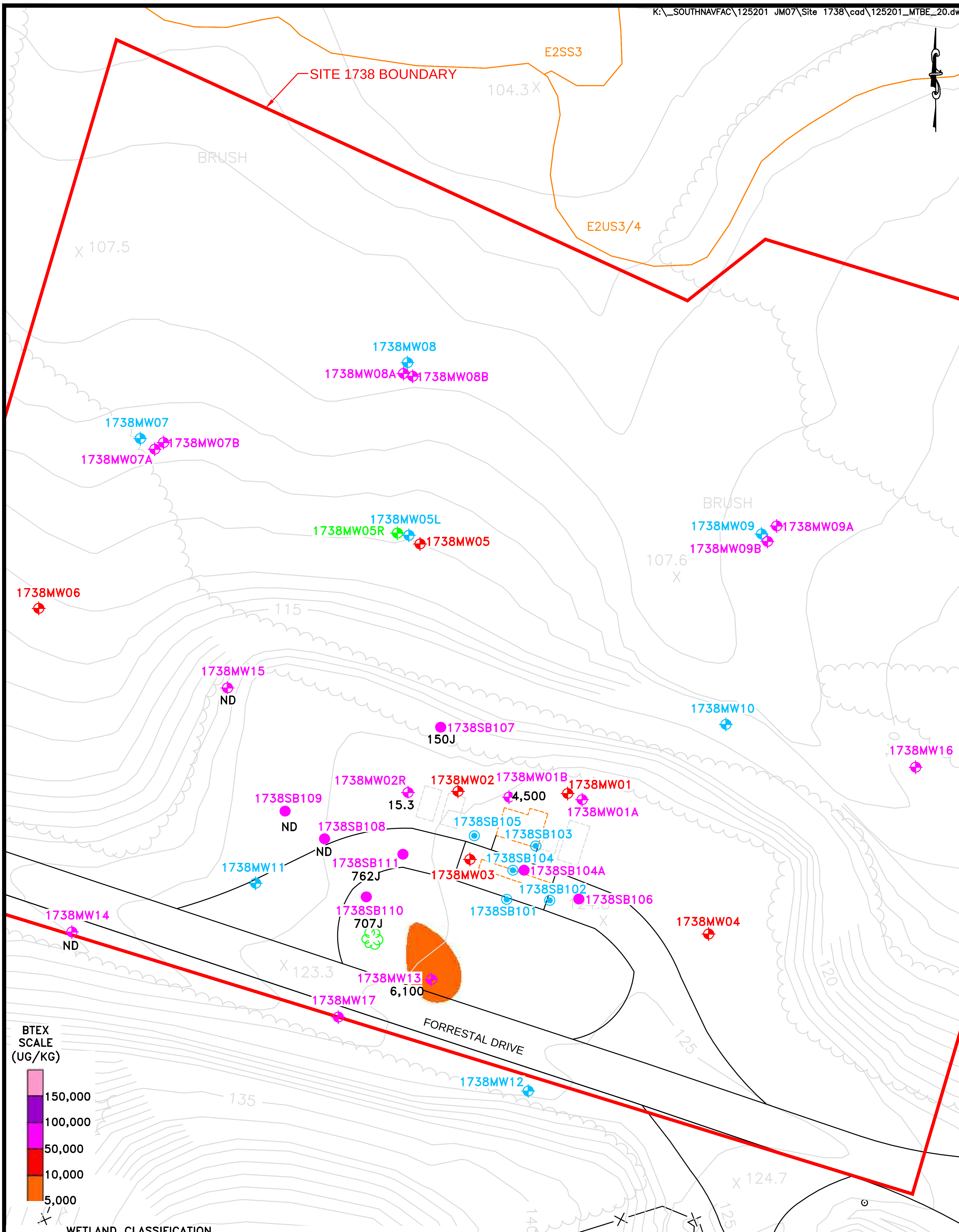
FIGURE 6–3
DISTRIBUTION OF MtBE IN SUBSURFACE SOIL ABOVE THE PREQB TARGET LEVEL (20 UG/KG) – 16 TO 22 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 0.47 –TPH GRO RESULTS
- J –ESTIMATED
- ND –NOT DETECTED
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE

FIGURE 6–4
DISTRIBUTION OF TPH GRO IN SUBSURFACE SOIL ABOVE THE PREQB TARGET LEVEL (100 MG/KG) – BELOW 22 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



WETLAND CLASSIFICATION

E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC

E2SS3 –ESTUARINE INTERTIDAL SCRUB–SHRUB BROAD–LEAVED EVERGREEN

NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

50 0 25 50

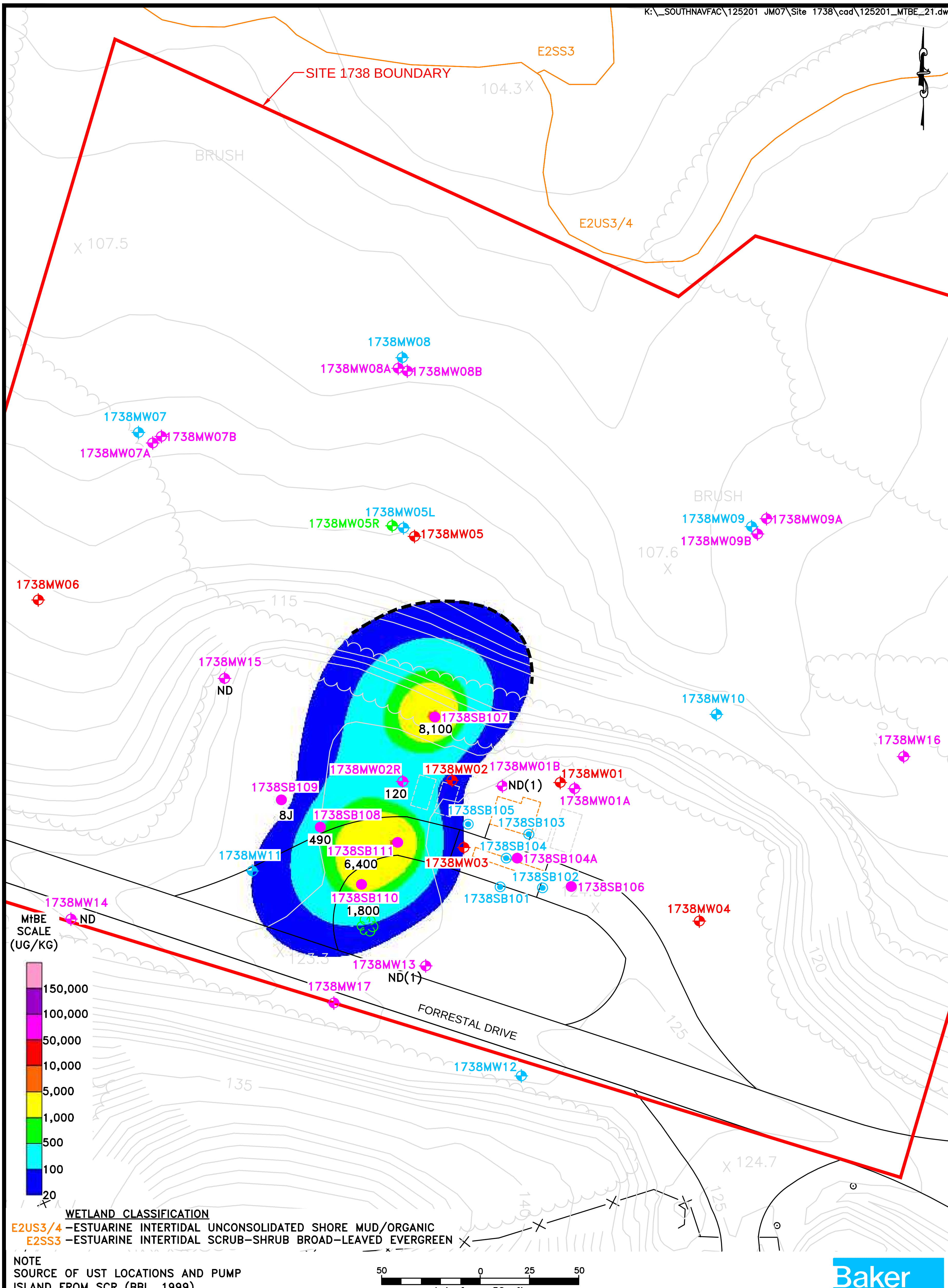
1 inch = 50 ft.

Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 150J –BTEX RESULTS
- J –ESTIMATED
- ND –NOT DETECTED
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE

FIGURE 6–5
DISTRIBUTION OF BTEX IN SUBSURFACE SOIL ABOVE 5,000 UG/KG BELOW 22 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO

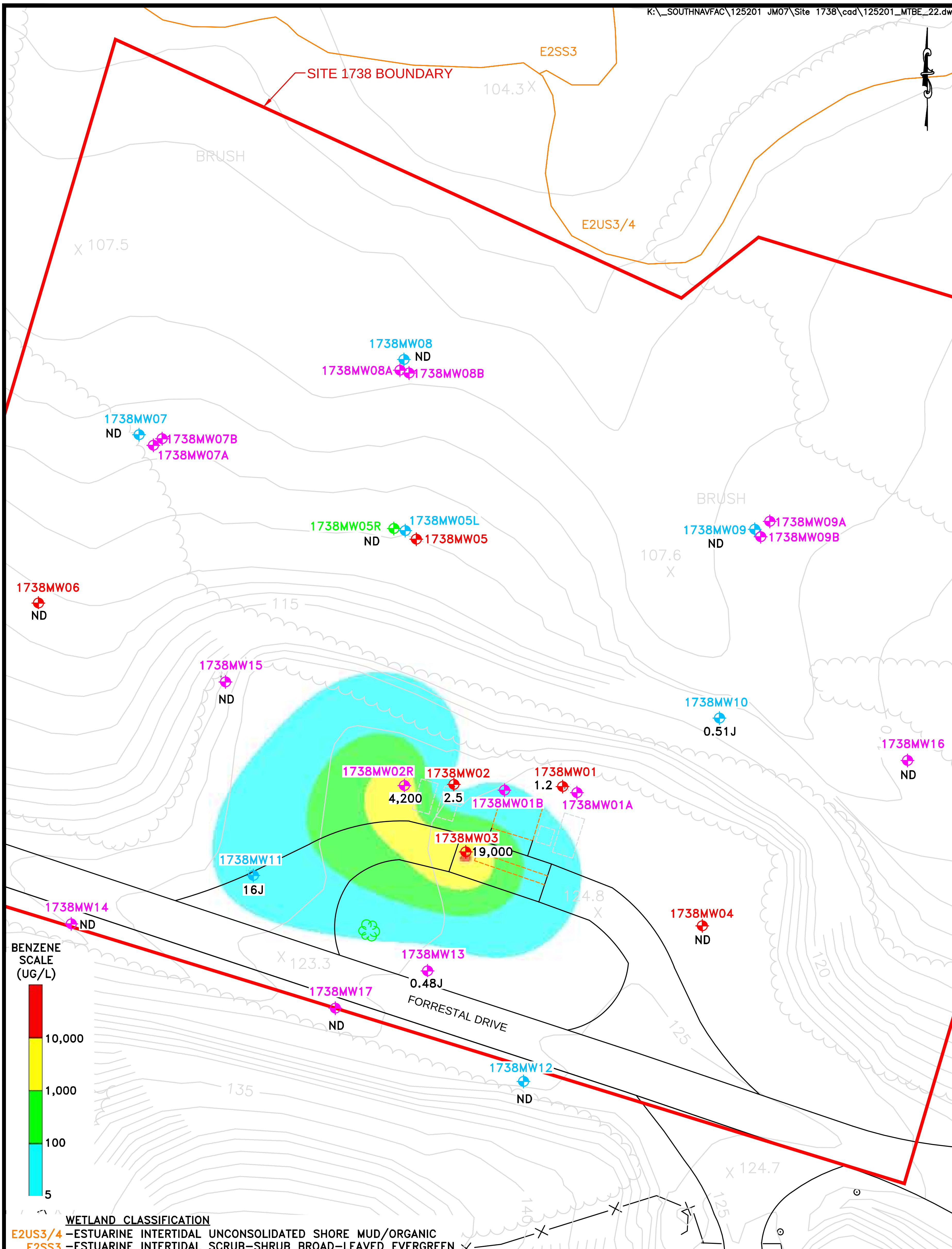


NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –SOIL BORING SAMPLE LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –SOIL BORING LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 490 –MtBE RESULTS
- –EXTRAPOLATED BOUNDARY
- J –ESTIMATED
- ND –NOT DETECTED
- (1) –NOT DETECTED; HOWEVER, QUANTITATION LIMIT WAS GREATER THAN THE PREQB TARGET LEVEL
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE

FIGURE 6–6
DISTRIBUTION OF MtBE IN SUBSURFACE SOIL ABOVE THE PREQB TARGET LEVEL (20 UG/KG) – BELOW 22 FT BGS
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

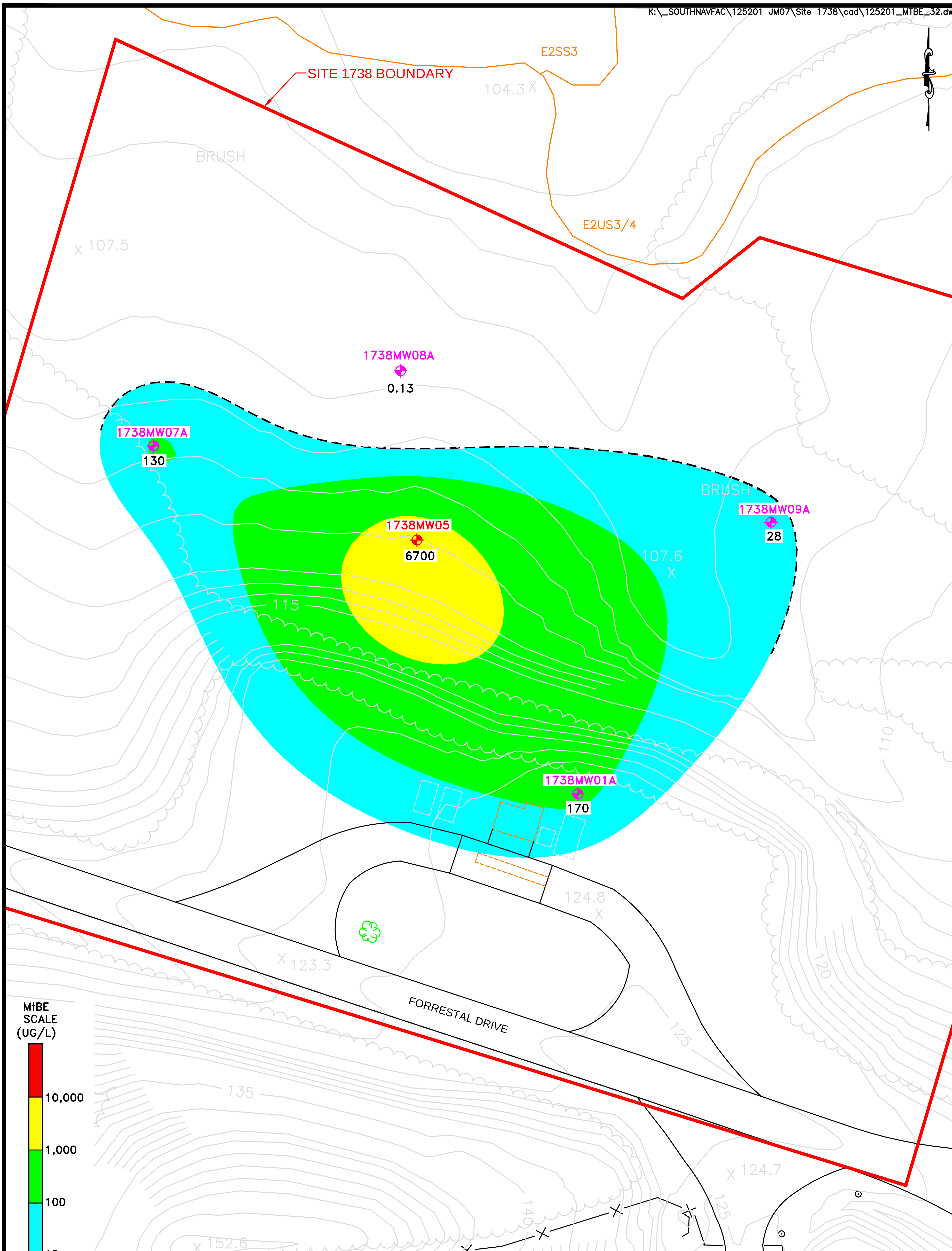
50 0 25 50
1 inch = 50 ft.

Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 4,200 –BENZENE RESULTS
- J –ESTIMATED
- ND –NOT DETECTED
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE

FIGURE 6–7
HORIZONTAL DISTRIBUTION OF BENZENE DISSOLVED IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (5 UG/L) IN AUGUST 2012
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

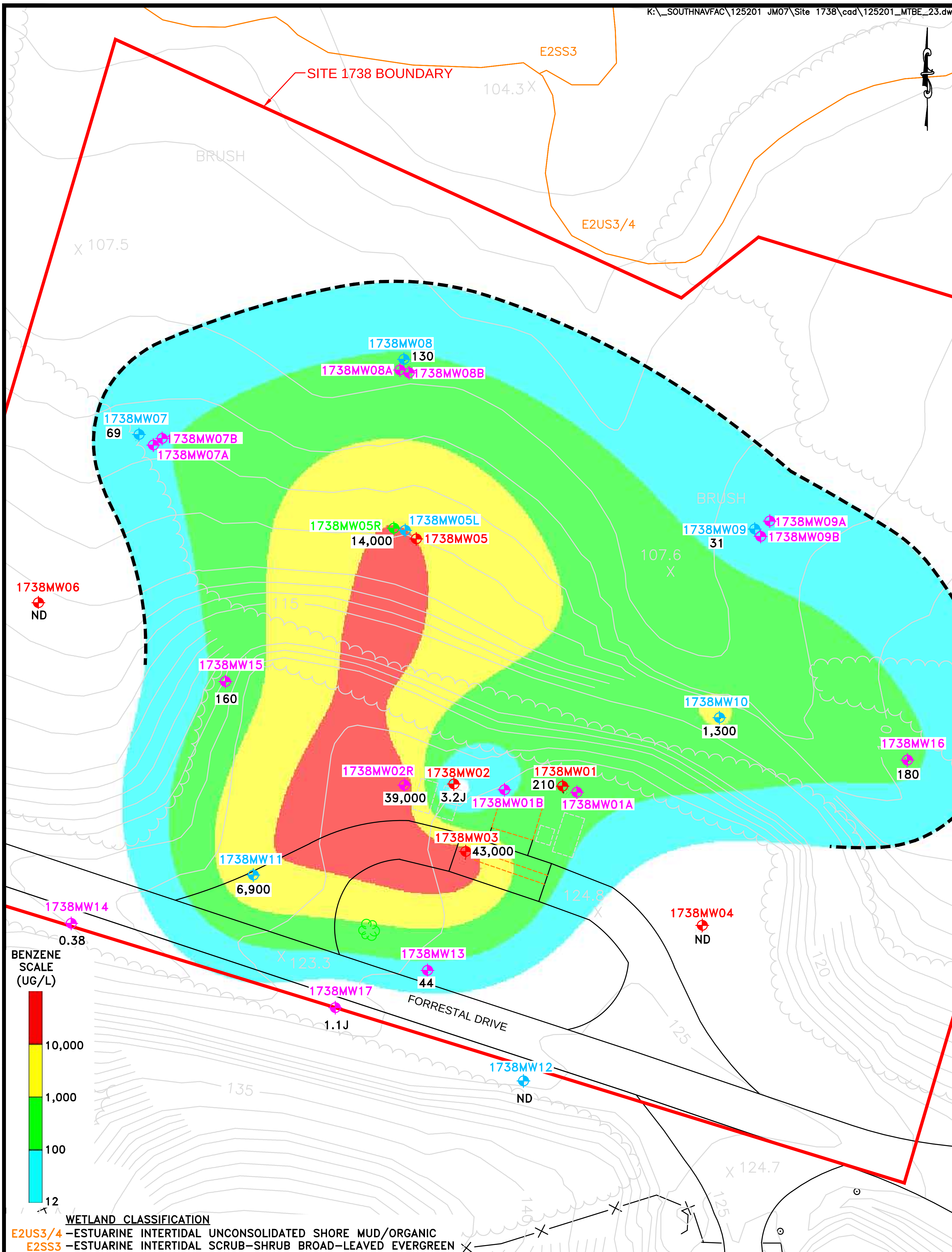
50 0 25 50
1 inch = 50 ft.

Baker

LEGEND

- MONITORING WELL (APRIL 1998)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- 28 MtBE RESULTS
- EXTRAPOLATED BOUNDARY
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 6-8A
HORIZONTAL DISTRIBUTION OF MtBE IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (12 UG/L) IN AUGUST 2012-SHALLOW MONITORING WELLS
AOC F-SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

50 0 25 50
1 inch = 50 ft.

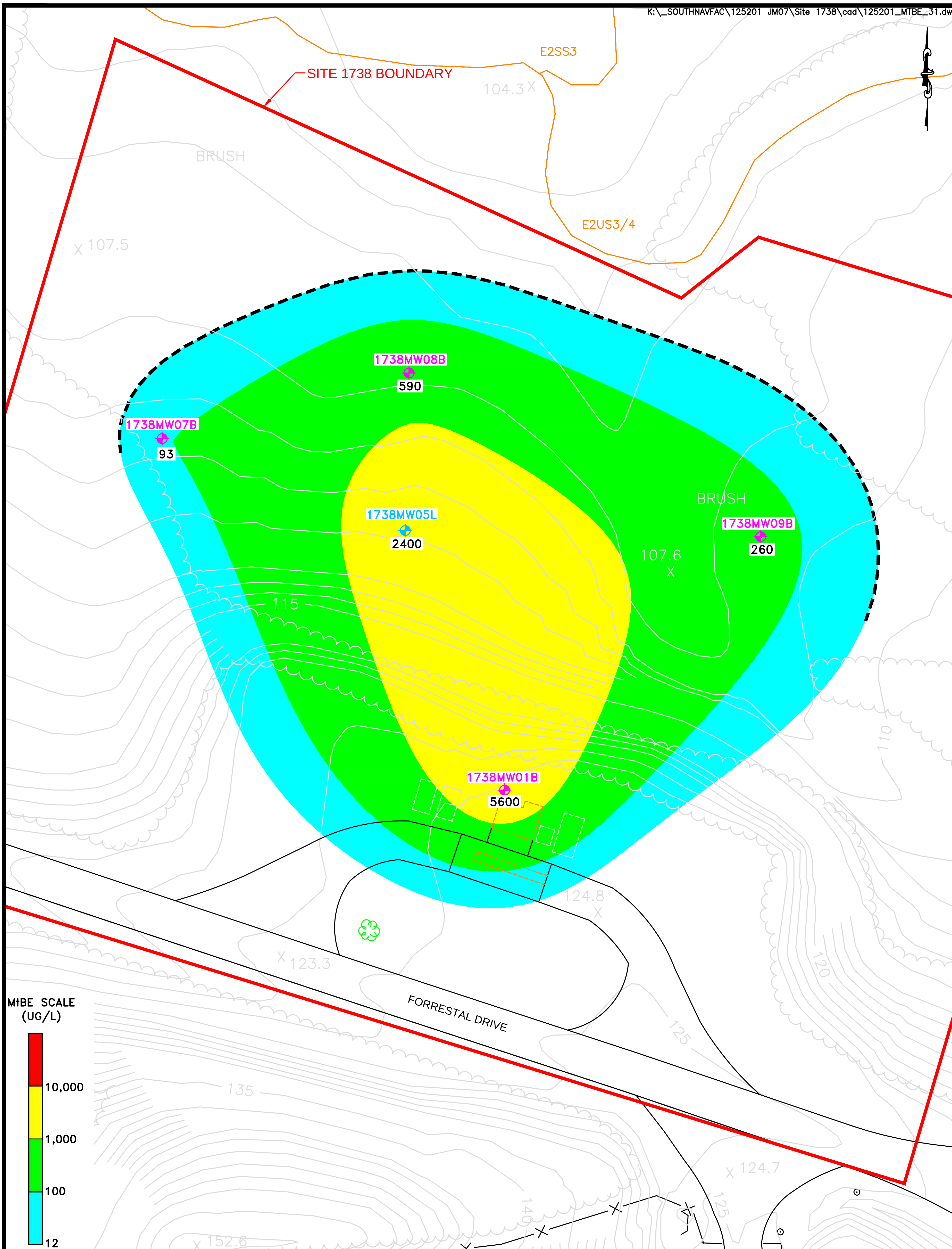
Baker

LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –WETLAND BOUNDARY
- 3.2 –MtBE RESULTS
- –EXTRAPOLATED BOUNDARY

J –ESTIMATED
ND –NOT DETECTED
NA –NOT ANALYZED
–FORMER UNDERGROUND STORAGE TANK (UST)
–FORMER STRUCTURE

FIGURE 6–8B
HORIZONTAL DISTRIBUTION OF MtBE DISSOLVED IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (20 UG/L) IN AUGUST 2012
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

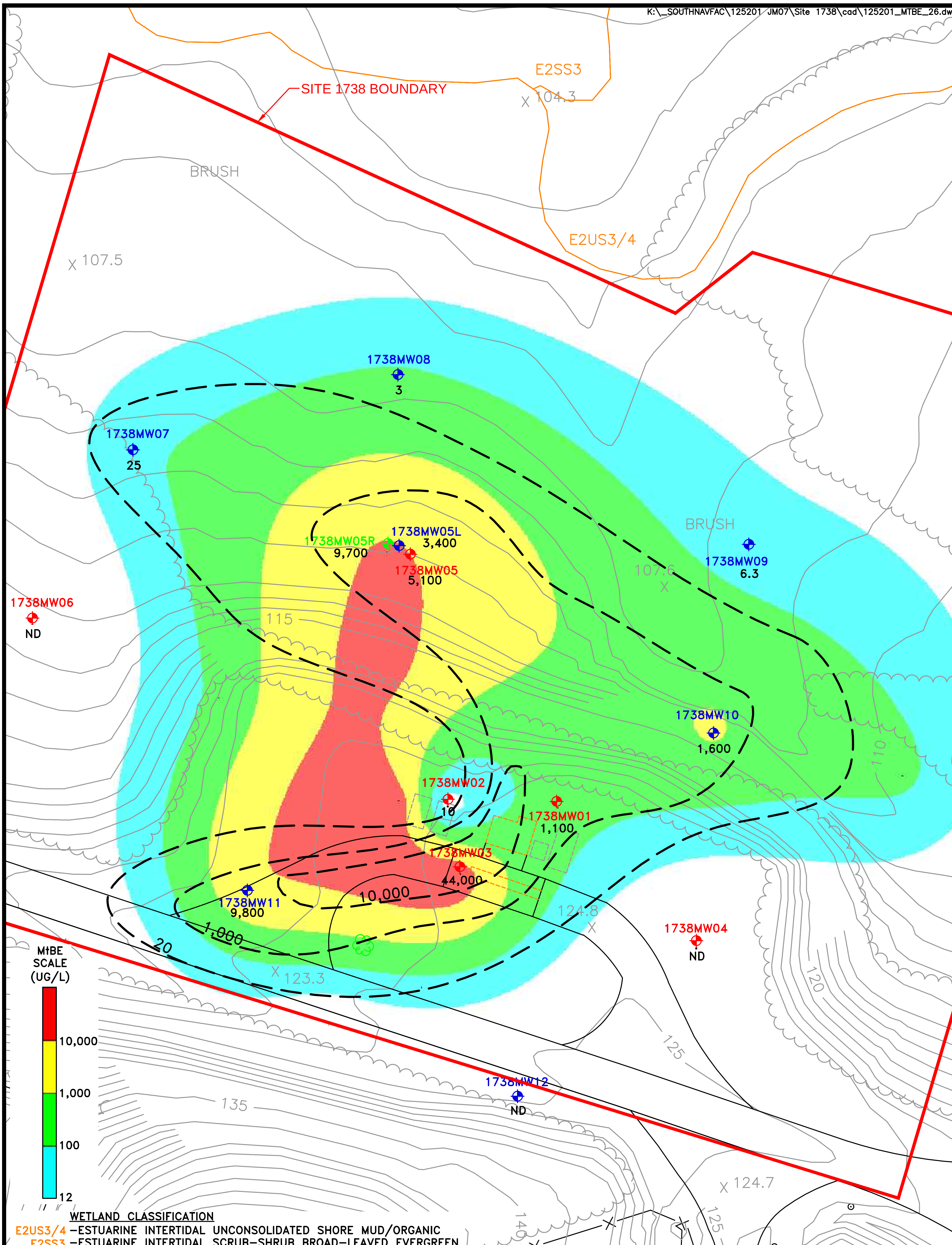
50 0 25 50
1 inch = 50 ft.

Baker

LEGEND

- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- 93 – MtBE RESULTS
- EXTRAPOLATED BOUNDARY
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 – ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 – ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 6-8C
HORIZONTAL DISTRIBUTION OF MtBE IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (12 UG/L) IN AUGUST 2012-DEEP MONITORING WELLS
AOC F-SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTES:
1) MtBE CONCENTRATIONS REPORTED AS ug/L.
2) 20 ug/L CONTOUR LINE REPRESENTS PREQB MtBE STANDARD FOR GROUNDWATER.

50 0 25 50
1 inch = 50 ft.

Baker

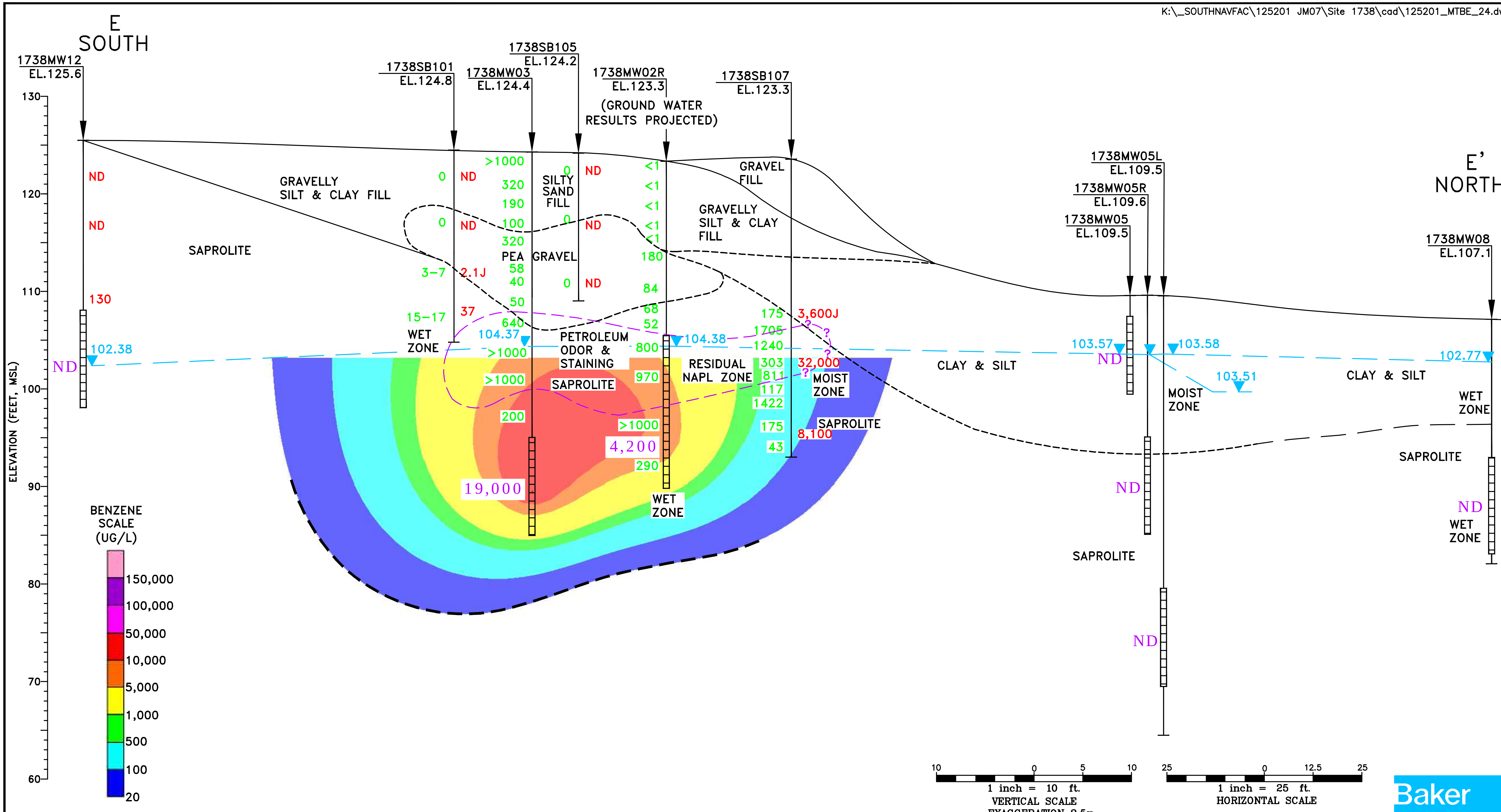
LEGEND

- MONITORING WELL
- MONITORING WELL (MAY 2008)
- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEPT 2010)
- SOIL BORING SAMPLE LOCATION (SEPT 2010)
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- ESTIMATED MtBE CONCENTRATION CONTOURS (ug/L) SEPTEMBER 2010

ND –NOT DETECTED
–WETLAND BOUNDARY
–FORMER UNDERGROUND STORAGE TANK (UST)
–FORMER STRUCTURE

SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

FIGURE 6–9
HORIZONTAL DISTRIBUTION OF MtBE DISSOLVED IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (20 UG/L) IN SEPTEMBER 2010 COMPARED WITH AUGUST 2012
AOC F–SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



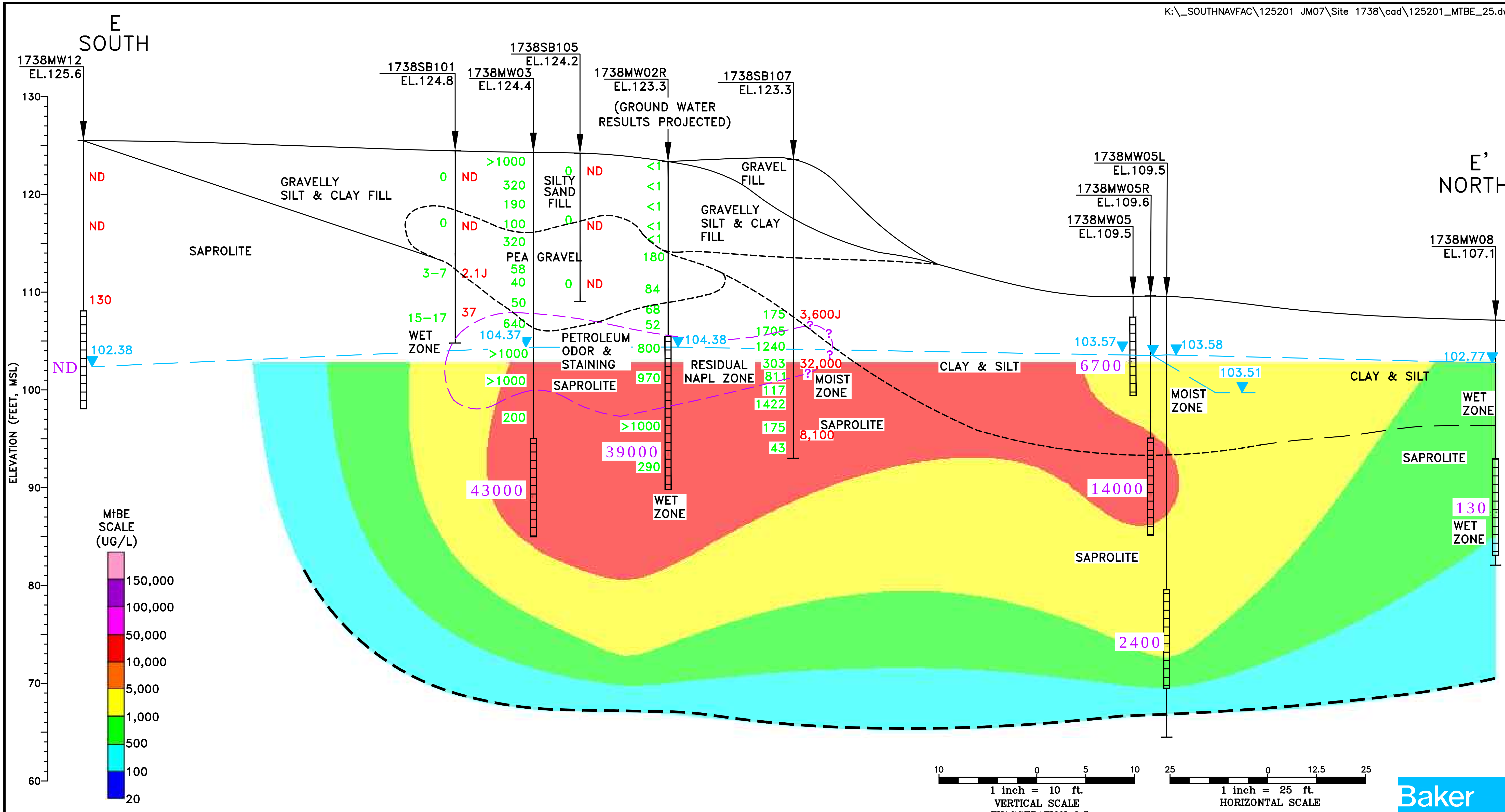
LEGEND

- ▼ — ESTIMATED STATIC WATER ELEVATION (9/22/2010)
- I — WELL RISER
- — WELL SCREEN INTERVAL
- — — — PROJECTED
- — — — ESTIMATED EXTENT OF SOURCE
- ?—?— PROJECTED EXTENT OF SOURCE ZONE
- 7,780 — BENZENE RESULTS
- - - - EXTRAPOLATED BOUNDARY
- 0 — PID READING RESULTS
- 0 — ANALYTICAL RESULTS (MtBE)
- ND — NOT DETECTED
- NA — NOT ANALYZED
- J — RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 6-10
DISTRIBUTION OF BENZENE DISSOLVED IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (5 UG/L) - ALONG CROSS SECTION E-E'
AOC F-SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



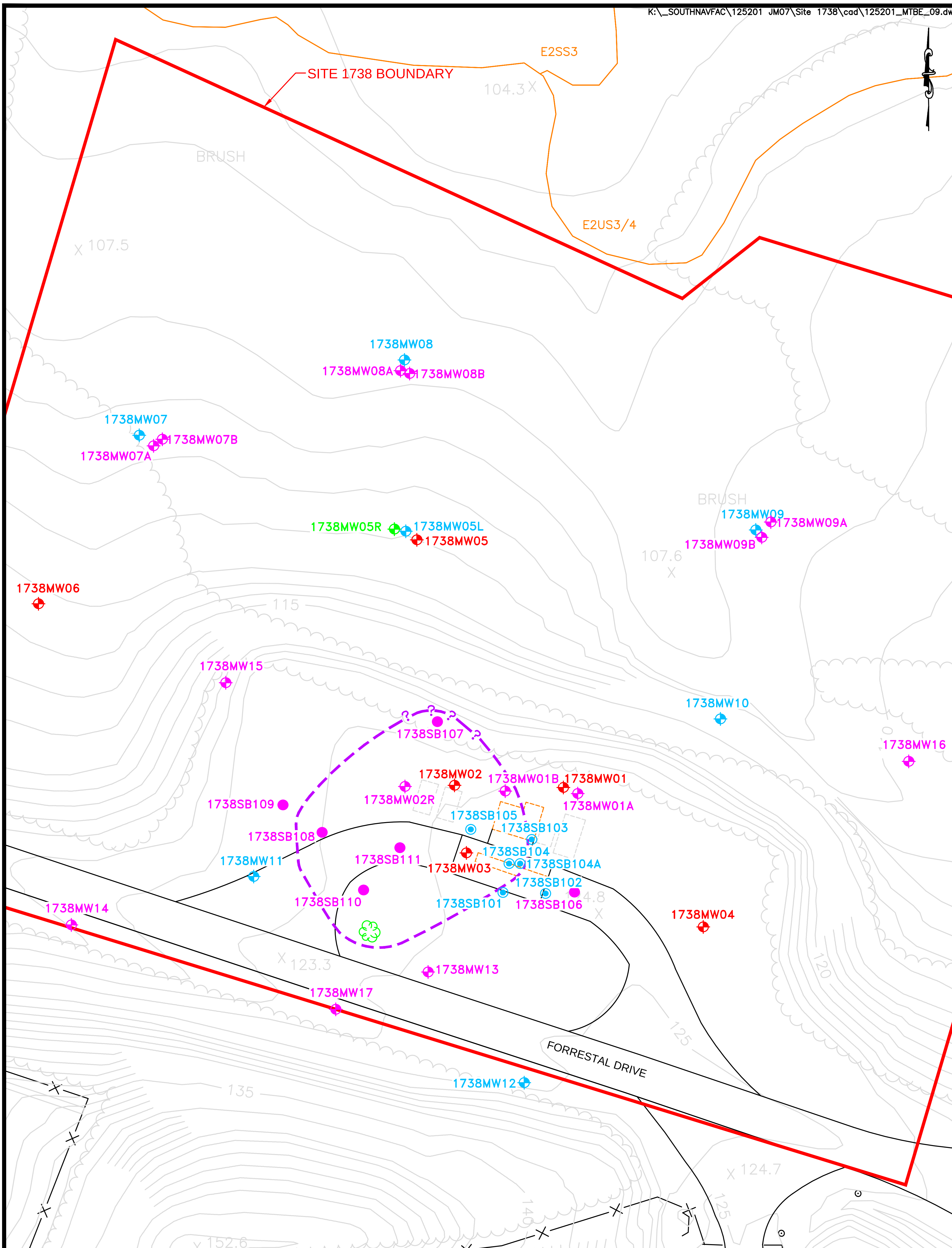
LEGEND

- ▼ –ESTIMATED STATIC WATER ELEVATION (9/22/2010)
- –WELL RISER
- –WELL SCREEN INTERVAL
- – – –PROJECTED
- – – –ESTIMATED EXTENT OF SOURCE
- ?–?– –PROJECTED EXTENT OF SOURCE ZONE
- 2,400 –MtBE RESULTS
- ----- –EXTRAPOLATED BOUNDARY
- 0 –PID READING RESULTS
- 0 –ANALYTICAL RESULTS (MtBE)
- ND –NOT DETECTED
- NA –NOT ANALYZED
- J –RESULTS ESTIMATED

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

FIGURE 6-11
DISTRIBUTION OF MtBE DISSOLVED IN GROUNDWATER ABOVE THE PREQB TARGET LEVEL (12 UG/L) – ALONG CROSS SECTION E-E'
AOC F-SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO



NOTE
SOURCE OF UST LOCATIONS AND PUMP ISLAND FROM SCR (BBL, 1999).

50 0 25 50
1 inch = 50 ft.

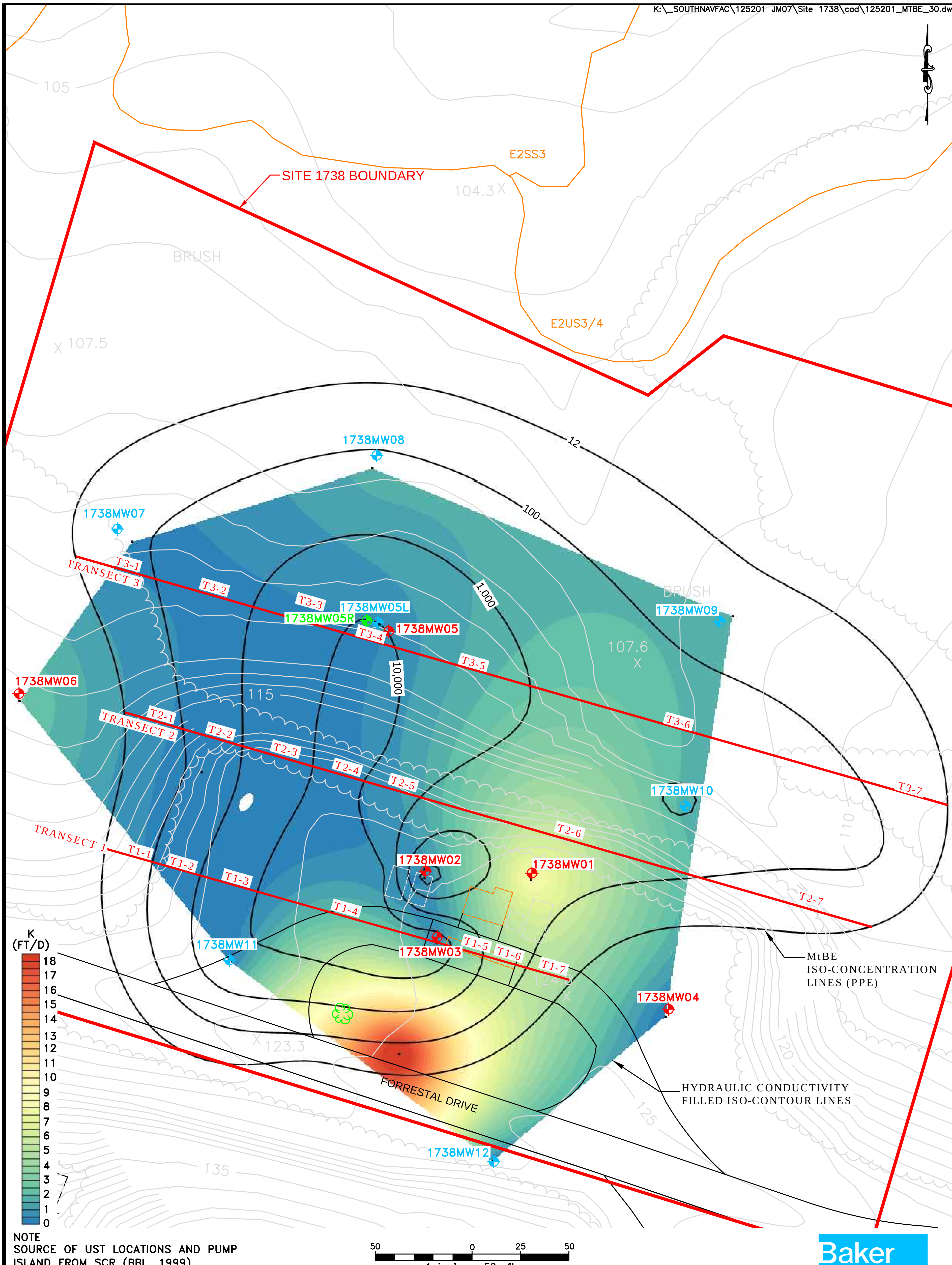
Baker

LEGEND

- MONITORING WELL (APRIL 1998)
- MONITORING WELL (MAY 2008)
- SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- SOIL BORING SAMPLE LOCATION (SEP 2010)
- MONITORING WELL LOCATION (JUN/AUG 2012)
- SOIL BORING LOCATION (JUN/AUG 2012)
- WETLAND BOUNDARY
- ESTIMATED EXTENT OF SOURCE
-?- PROJECTED EXTENT OF SOURCE ZONE
- FORMER UNDERGROUND STORAGE TANK (UST)
- FORMER STRUCTURE
- E2US3/4 ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 6-12
HORIZONTAL EXTENT OF SOURCE ZONE
AOC F-SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO



LEGEND

- –MONITORING WELL (APRIL 1998)
- –MONITORING WELL (MAY 2008)
- –SOIL AND/OR GROUNDWATER SAMPLING LOCATION (SEP 2010)
- –MONITORING WELL LOCATION (JUN/AUG 2012)
- –TRANSECT LOCATIONS
- –WETLAND BOUNDARY
- –FORMER UNDERGROUND STORAGE TANK (UST)
- –FORMER STRUCTURE
- E2US3/4 –ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE MUD/ORGANIC
- E2SS3 –ESTUARINE INTERTIDAL SCRUB-SHRUB BROAD-LEAVED EVERGREEN

FIGURE 6-13
MASS DISCHARGE CALCULATION
AOC F-SITE 1738
MtBE INVESTIGATION REPORT

NAVAL ACTIVITY PUERTO RICO

APPENDIX A
FIELD ACTIVITIES

2010 FIELD ACTIVITIES

Site Photographs

Photo 1. Drilling equipment – subcontractor, GeoEnviroTech, Inc., of San Juan, PR
Upgradient portion of Site 1738. View looking west.

Photo 2. Drilling activities at 1738MW11. View looking northeast.

Photo 3. Soil boring advancement and soil sample collection at 1738SB101.
View looking southeast.

Photo 4. Groundwater sample extraction (TPH DRO analysis) at 1738MW04
View looking west.

Photo 5. Site survey activities – PJDC, Inc.
View looking west.

Photo 6. Groundwater purge activity - groundwater monitoring wells 1738MW05 (left) 1738MW05R (center), and 1738MW05L (right). View looking west.

Photo 7. Groundwater monitoring well installation for 1738MW09
View looking northwest.

Photo 8. Site clearing activities, and existing monitoring well 1738MW06
View looking northeast.

Field Log Book Notes

CONTENTS

PAGE NO.	REFERENCE	DATE

Sunday Sept. 12, 2010

Depart PIT for SJU at 0745.

Arrive at SJU - 1335.

Travel from SJU (rental car pick-up) to NAPR.

1520 - arrive at NAPR. Unpack equip and supplies.

Field Team:
Adam Gorley
Robert Roselius
Derrick Hope
Chris Krivonek

ADG

Monday Sept 13, 2010

0645 - Arrive at NAPR. Prep for day's events - upload GPS bkg. Files, etc.

0750 - Arrive at 1738 - to Field Locate Proposed Sample points with GPS.

0930 - Check on RWEC to assist with site Clearing at 1738. RWEC May be delayed Slightly.

0950 - Back to NAPR Sec. Bldg. to Pack Vehicle with Any Sample equipment for Contin. Sampling.

1020 - Arrive at Summ 3.

1140 - R7GW07R2 - begin Set-up and Purge - However Issues with Pump result in a revisit / Sample of this well in the near future.

1410 - Back to Security Bldg. to repair Pump with replacement Parts.
- Also, prep for next day's events, Including Pump Decontamination.

1600 - Depart Sec. Bldg. for Summ 3.

1625 - Collect ER01 by Running DI H_2O through a Decontaminated Pump.

1710 - Depart NAPR.

LATE ENTRY: Spoke with RWEC - will assist with 1738 Site Clearing 9-14-10.

APG

TUESDAY September 14, 2010

0635 - Arrive at NAPR. Ready for Today's events.

0725 - arrive at 1738. Collect (assist) with Equip Rinsate - See Roselius logs.

0810 - Meet RWEC at Gate #3 and Escort to 1738 - arrive at 0824.

0830 - Commence site clearing
1130 - Site clearing finished.

1138 - AT Security Bld. begin Sample Prep / Shipment for today.

1445 - Arrive at R7GW07R2 for Sample Set-up / Prep - Purge.
(See GW Sample / Purge Sheets)

9-14-10

1615 - R7GW07R2
- Sample time: 1615
3 VOA's - App. I ~~Volatiles~~ APL VOC's
2 1L Ambers - 1,4 Dioxane
2 1L Ambers - BETA BHC
1 500 ml Poly (with HNO_3)
1 500 ml Poly (with HNO_3) - Filtered

1655 - Collect ~~[illegible]~~ R7ER02 by Running D.I. H_2O through Teflon - Lined Tubing used for GW Sample Collection.

1720 - Depart NAPR.

APG

September 15, 2010
Wednesday

0640 - Arrive at NAPR and prep for day's events. Goal is to finish Landfill Sampling

0800 - Arrive at SWMU 3 - R7GW05R assist DNH locate well. high grass and schrubs made locating well difficult. However well was located and cleared for future events.

Weather Conditions: Mid/low 80's Partly cloudy. Slight breeze.

0830 - Arrive at R7GW08R for set-up. See GW sample sheets for additional details.

R7GW08R - Sample time 1025

Breakdown between well decon on pump/parts. New Teflon bladder installed.

9/15/10

1130 - Re-Ice samples at security bldg.

1250 - R7GW11 - set-up for GW sampling.

Weather Conditions: Warm, Moderate breeze. ~~Mid~~ upper 80's - low 90's.

1410 - Sample time R7GW11-22

1445 - at bldg. 1205 to re-ice samples and prep for Landfill Gas Monitoring.

ADG

9/15/10

1730 Depart NAPR

ARB

Thursday September 16, 2010

0645 - Arrive at NAPR. prep for day.
- Decontaminate (Parry) Bladder pump parts. New bladder installed on all pumps.

0810 - Arrive a Site 1738 Existing well 1738MW04 Set-up.

1020 - 1738MW04 Sample time see GW Sample sheets. Also, D, MS, and MSD.

1045 - Back at Sec. Bldg. to prep landfill samples for FEDEX shipment today.

1430 - FEDEX Arrives

1436 - Depart NAPR - Travel to SJU ~~&~~ Drop off field Team member for flight to Charlotte → PIT.

Friday September 17, 2010

0645 - Arrive at NAPR.
Prep for day's events:
Re-ice samples from previous day. And decon (dirty) bladder pumps and parts - Installed New Teflon bladders.

WEATHER: Mostly Sunny, low 80's slight breeze.

Water levels SWMU 3 - See Page # 19.

0920 - Surveyors (PJDC) arrive at 1738. Prep for survey, Tailgate Meeting to discuss specific Needs.

1030 - Security Bldg. Prep and Pack samples for FedEx shipment today.

~~14~~13 05 - Arrive at 1738, locate Soil Borings with mapping-grade GPS.

1405 - Refuel Rental Vehicle at Base Marina.

1445 - Evaluate SWMU 69 Ditch. (JAT Airport)

1550 - Depart JAT

1630 - Depart NAPR.

ARC

9/18/10

APG

Saturday September 18, 2010

0645 - Arrive at UAPR.
Prep for day's events -
Decontaminate Bladder
Pumps and parts. Install
New bladders (Teflon-lined).

0840 - Develop # 1738 MW09
See Roselius logs for
additional details.

Start Development : 0900
Start of Development -
Highly Turbid - Light Brown.

At Approx. 12 gal. beginning
to clear slightly. No odor.

At 20 gal. - Continued clearing.
No odor

1040 = SWL: 6.83
TOTAL Depth: 27.10

Decon Bailer.

APG

9/18/10

1110 - Decon (between well) Bladder Pump and Parts from Pump used today at 1738MW03. New Teflon bladder installed.

Naguabo - Shop for field supplies (site liquids).

1340 - Set up at 1738 MW05 See GW Sample Sheets for add'l information.

Sample Time : 1420

1505 - back at Sec. Bldg. to Re-ice Samples.

1515 - Depart NAPR

APCl

Sunday September 19, 2010

0645 - Arrive NAPR. Prep for day's events. Decon (daily) bladder Pumps - Install new bladders (Teflon lined) for each.

0830 - Arrive at 1738MW09 Set-up for Purge and Sample.

Sample time : 1015

Depart 1738MW09 → 1050

- Vehicle Temporarily stuck in low area (mud ruts) - assistance from field team - Vehicle out in approx. 20 min.

1115 - Depart 1738. Hose off Vehicles.

1145 - Sec. Bld. Re-ice samples from today's sample collection.

9/19/10

1240 - Daily Decon on Bladder Pump + Parts. Install New Bladder in each Pump.

1300 - Depart NAPR

APR

Monday September 20, 2010

0645 - Arrive at NAPR - locate MNA wells for survey - Sites 731, 520 at Bundy. And site 124 Across from Bld. 31 (Public Works).

0715 - At Security building to prep for this day's events.

0920 - Surveyors on-site at 1738. Discuss Plan of Action for today and the following day.

Assist R. Roselius with soil Borings at 1738. See Roselius logs for details.

1130 - Identify Additional Survey locations for PJDC. These loc. were I.D'd earlier today

9/20/10

1230 - back at 1738 - Further assist R. Roseleus. See logbook for details.

1340 - Depart 1738
Back at Sec. Bld. to Package and Prep Supplies for today's shipment.

1540 - FEDEX Arrives.

1610 - Depart NAPR.

APR

Tuesday September 21, 2010

0640 - Arrive at NAPR
Prepare for day's events.
Daily Decon on Bladder Pumps. Install new Bladders.

0815 - Arrive at 1738.

0825 - Collect 1738 ER08
Pump and Teflon Bladder.

- Assist field team with GW set-up and slug test set-up.

0930 - Collect 1738 IDW01 (water)
2 40 ml VOA (GRO)
2 1L Ambers (DRO)

0940 - Collect 1738 IDW02 (soil)
1 ~~8~~ 4 oz. glass Jar (TCLP VOC)
1 ~~16~~ oz. glass Jar (TCLP METALS)
1 2 oz. glass Jar (TPH GRO)
1 ~~8~~ oz. glass Jar (TPH DRO+RRO)

9/21/10

0950 - Back at Sec. Bldg. Manage Samples and begin prep for FEDEX shipment.

1050 - 1738. Assist D. Hupe with 1738 MW07 set-up and Sample. See D. Hupe Log and Sample Sheets for add'l Details.

1230 - Sec. Bldg. Finish Sample prep + Pack.

1430 - Fedex Arrives.
- Clean and organize Supply Room. Prep for FEDEX Tomorrow (Equip)

1600 - Assist with Slug testing See R. Roselins Logs.

1700 - Depart NAPR

S. APA

Wednesday September 22, 2010

0700 - Arrive at NAPR. Continue to get Sampling Equip + Supplies Ready for FEDEX.

0900 - 1738 Dominant Veg. Collection. Placed in Zip-lock bags and placed on ice for later I.D.

1005 - Label IDW Drums for 1738 MTBE INV.
[1 water - 5 soil]

Back to Sec. bldg. - Finish Packing Equipment for Fedex.

1300 - I.D. Dominant Veg. Samples from A.M. Collection. (Next Page)

9-22-10

Leucaena leucocephala (~~White lead tree~~)
Urochloa maxima (guinea grass)
Randia aculeata (white indigoberry)
Cordia collococca (~~Red manjack~~)
Ipomea indica (ocean-blue Morning glory)
Lasiacis divaricata (Small cane)
Vigna adenantha (wild pea)
Bursera simaruba (gumbo limbo)
Capraria biflora (goatweed)
Casearia sylvestris (crack open)
Acacia farnesiana (sweet Acacia)
Cynanchum parviflorum (small flower swallow-wort)

Pack up sampling equipment and prepare for FED-EX.

Organize NAPR supply Room - Inventory.

Investigation Complete.

1445 - Depart NAPR.

APG

SUN (9/12/10) SITE 1738
ROSELING, GRILEY, HUPE, & KRIVANEK
MOBE, PREP/ORG 'EQUIP / GLASSWARE.
WELL WIZARD (COMPRESSOR) FROM FIELD
IN BAD SHAPE.. MISSING SCREWS, W/ CHARGING

MON (9/13/10) P CLOUDY, 80's LOW

0645 ONSITE, PREP, GPS (LOAD MAP).
SOIL
BTEX/MtBE 2 NaHSO$_4$ / 1 MeOH.
TPH DRO 1 - 8 oz
TPH GRO 1 - 2 oz

RINSATE / WATER)
BTEX/MtBE 3 - 40ml (HCL)
TPH DRO 2 AMBER Lt.
TPH GRO 2 - 40ml (HCL)

0730 CALIBRATE MINIRAE 3000
to 100.2 ppm.

0800 @ 1738, EVAL SITE, GPS
SAMP LOCATIONS, ROUTE to LOWER AREA
COMPLETE SAMP LOCATION IDENTIFICATION
CAN ONLY ACCESS AREA FROM THE

WEST. — THE LOOP IS BLOCKED BY
WETLAND / STANDING WATER AND BOULDERS
TO THE EAST.

0930± WRIGHTWAY CALLS - TROUBLE
W/ EQUIP. BAD GATE CONNECTION
ADAM DEPARTS TO GET SIGNAL
AND OBTAIN SPECIFICS.

		~~STW~~	SWL (TOC)	FLUSH MOUNT	SWL BGS
1025					
~~0945~~	1738 MW03		16.25	-2.5	~~16.75~~ 16.5
10~~45~~	" 04		16.95	-2.0	17.15

- BLACKBERRY NOT WORKING
- INTERFACE PROBE NOT WORKING - MAYBE BATTERY

LATE ENTRY
0930 GEOENVIROTECH (ABRAHAM / NASSER)
@ SECURITY. HEAD TO 1738.
CONDUCT KICKOFF H&S AND SOW
MEETING, DRILLER UNLOAD AND
BUILD DECON. (HUPE IS STUCK @ LANDFILL)
— SEE SWL ABOVE -

1200 BEGIN 1738MW11 (SEE NEXT PAGE)

1625
J.S.

1738MW11 (PID BKG - 0.0)

0-5 0-0.3 ASPHALT, BLACK
3.6 0.3-5.0 FILL, ~~CLAY +~~ SILT, TRACE
BKG. AND F. SAND, LITTLE CLAY, ~~GRAVEL~~, SHELLS,
~~SOME FEW GRAVEL~~ MED SAND TO
1738 GRAVEL, YELLOW TAN TO BROWN, DAMP
MW11-01 NON TO SLIGHT PLASTIC, LOOSE.
@1205 (RESIDUUM?)

5-10 5-6.5 CLAY, SOME SILT, DK. ORANGE BR.,
5.0 MED PLASTIC, STIFF, DAMP.
BKG. 6.5-10.0 SILT, F. SAND, LITTLE CLAY,
1738-04 LT GREY AND TAN YELLOW /BROWN, NON PLASTIC,
MW11-04 LOOSE. DRY TO DAMP. (WEATHERED
@1215 BEDROCK) / SAPROLITE
(7-9')

10-14 REFUSAL @ 14 VERY HARD.
4.0 SAME AS ABOVE., M DENSE
BKG.

14-17 VERY HARD, TRY SHORTER RUNS.
3.0 SAME AS ABOVE. BECOMING DENSER.
BKG. GW SHOULD BE AROUND 17±'
1738 @ 50 % COLLECT SAMPLE
MW11-08 VERY
1235
(15-17') -08

1738MW11 (CONT)

17-20 SAME AS ABOVE. W/ OLIVE TINT.
3.0 W/ LESS YELLOW/BR (≈ 30%)
BKG. SPECKS OF WHITE (NOT NO MOTTLED
CLAY.), MAYBE MOIST?, V. DENSE.

WILL TERMINATE SAMPLING AND AUGER
TO DEPTH (26' TD) TO BUILD WELL.

SLOW/TOUGH AUGERING, INSTALLING
WELL SCREEN @ 1500 HRS.

• 1738MW11 •
TD - 26'
SCREEN - 16-26'
SAND - 14'
BENTONITE TO - 12'
FLUSHMOUNT @ SURFACE.

— ADAM INFORMS OF TROUBLES DELAYING
RIGHT-WAY (SEE GAILEY LOG)

1610 COLLECT 1738ER01 FROM NEW
DPT LINER. - SAMPLE MGMT PREP.
1710 DEPART — WORK ON MATRIX
PLANNING AND GICMS DATA ISSUES
@ CONDO.

TUES (9/14/10)

0635 ONSITE, PREP FOR DAY - WRIGHT-WAY SHOULD BE ONSITE @ 0800 HRS PER V-MAIL

0700 CAL PID to 100.2 ppm

0725 @ 1738 DRILLERS ONSITE PREP TO DECON AND SAMPLE @ 1738 MW12.

0740 COLLECT 1738 ER02 FROM NEW DPT LINER.

0750 COLLECT 1738 ~~ER~~ FB01 USING LAB GRADE D.I WATER.

0800 BEGIN @ 1738 MW12

— 1738 MW12 (PID BKG 0.0) —

0-5 0-0.~~4~~ TOPSOIL
4.8 0.~~4~~-5.0 WEATHERED BEDROCK
BKG

1738-MW12-01 +DUP +MS/MSD @ 081~~5~~

1738 MW12 (CONTINUED.)

5-10 5-8.6 SAME AS ABOVE (INCREASE
5.0 ~~8.6-10.0~~ IN ROCK FRAG.
BKG

1738 MW12-04 @ ~~0830~~ 0830
8.6-10.0 SILT AND F. SAND, MAROON W/ OLIVE SPECS. DRY to DAMP, NON PLASTIC, V DENSE (SAMPLE ABOVE MAROON)

10-14.5 VERY HARD, SAME AS ABOVE
4.5 W/ ~~[illegible]~~ OLIVE AND DK GREY
BKG. (+ MAROON) ~~AND~~ STILL V. DENSE. AND NON-PLASTIC

14.5-18.5 REFUSAL @ 18.5 - SAME AS
4.0 ABOVE W/ INCREASE IN ROCK
BKG. FRAG. (ESPECIALLY 18-18.5 - ROCK IN ~~[illegible]~~ MC SAMPLER NOSE. AND GREY
1738 MW12-08 @ 0850

0900 - 1738MW11 @ SWL 15.12' TOC

WILL ATTEMPT TO BUILD 1738MW12 W/ 27' TD (NOT CONCERNED W/ LNAPL - SWL MAY BE ABOVE SCREEN.) - LATE ENTRY RIGHT-WAY ONSITE 0830 ± (SEE DAILY LOG).

20.03
1535

ASSIST w/ CLEAR PLANNING.
TOUGH/SLOW AUGERING, SAND IN @ 1130.

• 1738 MW12 •
TD · 27.5'
SCREEN 17.5-27.5'
SAND 15.5
BENTONITE 13.5
STICKUP @ SURFACE.

HEAD TO OFFICE TO MANAGE SAMPLES.
- DRILLERS COMPLETE ~~DRL~~ BUILDING 1738MW12, IDW, DECON AUGERS. INSPECT REMAINING MW LOCATIONS W/ DRILLERS (THOSE IN THE UPLAND BUFFER AREA OF THE ESTUARINE WETLAND), THEY HAVE OBVIOUS CONCERNS IF/WHEN IT RAINS - DRILLERS WILL SET UP AT 1738 MW05L (DEEP WELL) AND MOVE AUGERS TO START TOMORROW THEN DEPART TO PICK UP CONCRETE.

1535 1738MW12 SWL 20.02 TOC w/ 2.5' STICKUP (17.52' bgs).

ASSIST w/ LANDFILL SAMPLING (SEE GAILEY LOG.)
SAMPLE MANAGEMENT./PREP.
1720 DEPART NAPR.
- RETURNING TO CONDO WE FEEL WE MAY HAVE FAILED TO INCLUDE A TRIP BLANK ~~B~~ WITH THE SHIPMENT.
- COMPLETE MATRIX/PLANNING @ CONDO.

RGR

WED. (9/15/10)

0645 ONSITE PREP. FOR DAY.
0700 CALIBRATE PID. to 100.2 ppm.
0720 @ 1738
0725 1738MW11 SWL 14.70' TOC
gal/VOL TD 26.2~~2~~±' TOC
1.9 = 0.163 g/ft ← 11.5~~2~~' SOFT BOTTOM (MUCK ON PROBE)

DEVELOP 1738MW11

0757 } SURGE/BAIL 6+ gal over 20± min.
0818 } SURGE/BAIL 4± gal over 15± min
0832 SLIGHT PETRO/CHEMICAL ODOR – PID
0849 WITHIN CASING 30± ppm, BREATHING
0.4' AREA BKG. SWL ~~23.80~~ → 23.80' TOC
0745 DRILLERS ONSITE, PREP TO DRILL 1738MW05L, WILL BEGIN SOIL SAMPLING @ 20' bgs. (1738MW05R WAS INSTALLED 5/14/2008 WITH A TD OF 24.5' bgs. – SEE LOG)
DRILLERS GET WATER 0800 to 0815.
0825 BEGIN @ 1738MW05L

1738MW05L (PID BKG 0.0)

→ SEE 5/14/2008 LOG FOR 0-20' STRATIGRAPHY
- PUSH 2¼" DRIVE POINT TO 20' bgs.

20-25
4.2
PID

20-25 – CLAY, TRACE SILT, BROWN W/ WHITE SPECS/INCLUSIONS ($CaCO_3$) MOIST, MED PLASTICITY, MED STIFF

~~20-22.5~~

PID	Interval
~1.5	20-22.5
~2.0	22.5-24.0
~3.0	24-25.0

25-30
3.9
PID.

25-30 – SIMILAR TO ABOVE, CLAY, TRACE SILT. BROWN W/ LT. GRAY TINT, W/ WHITE INCLUSIONS. ALSO LITTLE BLACK MOTTLING, SOFT, MED PLASTICITY.

PID	Interval
~1.5	25-28
~0.5	28-30

30-35 – SAME AS ABOVE W/ BLACK FRACTURE TRACES. – BECOMES M. STIFF @ 33.5'
3.2

PID	Interval
~1.0	30-33.5
~2.0	33.5-35.0

1738MW05L (CON'T)

35-40 SAME AS ABOVE
3.8
1.3 35-39
BKG 39-40

- WILL SAMPLE 40-45' TO CONFIRM REDUCING/BKG PID READING., BUT WILL INSTALL WELL W/ 40' TD.

40-45 SIMILAR TO ABOVE BUT —
4.1 CLAY, LITTLE SILT, TRACE ROCK FRAGS (LESS WEATHERED), LESS
BKG ✓ WHITE INCLUSIONS, BLACK FRACTURE TRACES

- WILL BUILD WELL W/ 40' TD.
- LOST HSA PLUG AT 20' bgs ALLOWING CUTTINGS TO ENTER HSA. (PLUG IS FIBERGLASS, ABRASION SAYS THAT THE SUCTION CREATED BY THE CLAY MAY HAVE PULLED IT OFF).
- TRIP OUT AND CLEAN HSA., RESUME AUGERING
- EVALUATE WELL DEPTHS FOR REMAINING WELLS (GND ELEV, X-SECT.)

~~20.23~~ AGL
~~21.2~~
(SEE PG 72)

1300 RETURN TO 1738MW11 TO CONTINUE DEVELOPMENT. (SWL 14.69' TOC)
1303
1326 SURGE/BAIL 4± GAL OVER 23± MIN
SWL 21.2 (1326 hrs) TD 26.23 HARD
- WATER MUCH LESS TURBID THAN BEFORE. REMOVED 14± TOTAL GALS.
- DECON BAILER

DEVELOP 1738MW12

1350 TD - 30.28 HARD
SWL - 20.05
10.23 × 0.163 = 1.7 GAL/VOL.

1353
1436 SURGE/BAIL 9± GAL OVER 40± MIN.
SWL 20.35' TOC, TD 30.28' TOC
AVG WATER GREY W/ MED TURBID AND CLEARING. NO ODOR, PID 0.2 ppm 0.4' (LENGTH OF PID PROBE) INTO CASING/RISER.

1450 COMPLETE INSTALLING 1738MW05L

• 1738MW05L •
TD 40' bgs
SCREEN 30-40' bgs
SAND 28'
BENTONITE 26'

1505 ~~DEPATS~~ AGRONOM DEPARTS W/ TRUCK TO TRANSFER/MOVE EQUIP AT ANOTHER SITE. HARDY WILL BE WITH WILLIAM TOMORROW.

- WILLIAM PEATEC PLACES BENTONITE SEAL AND CLEANS WORK SITE AND DRILL SITE. DEPART 1535

→ EVALUATE REQUIRED WELL DEPTHS FOR REMAINING MWS (EST. GND ELEVATIONS, EXISTING WELL SCREEN INTERVALS, SPREAD SHEET, X SECT) REMAINING WELLS SHOULD BE AT LEAST 25' DEEP.

- OTHER CREW AT LANDFILL DOING GAS MONITORING (AND PASSIVE VENT SAMPLING)

1730 DEPART NAPR.

THURS (9/16/10)

0645 ONSITE, PREP FOR DAY.
0700 CALIBRATE PID TO 100.2
0730 @ 1738 DRILLERS ONSITE 0740 PREP AND DECON
- NEW/REPLACEMENT INTERFACE METER HERON H.OIL NOT WORKING, REEL WAS OFF BRACKET, ~~REPAIRT~~ REPAIR BY PUTTING ON BRASS RING W/ "C" RING.

0810 TEMP WELL TD 20.44 / STICKUP 2.2
0850 BEGIN ~~1738 10A~~ 1738MW10

1738MW10 (PID BKG 0.0)

0-5 4.1 BKG	0-0.2 TOPSOIL 0.2-2.0 ~~BROWN~~ CLAY, LITTLE SILT. NO F SAND BROWN, MOIST, GRAVEL @ 1.0' MED PLASTICITY, SOFT 2.0-5.0 CLAY, TRACE SILT, YELLOW TAN W/ LITTLE LT GREY RUSTY MAROON MOTTLES, SOFT TO MED STIFF. HIGH PLASTICITY. (SAPROLITE) MOIST.
5-10 5.0 BKG	SAA. W/ ~~FAIR~~ INCREASE OF LT GREY AND MAROON / VARIGATED.

1738MW10 (CONT.)

10-15 10-12.2 SAA.
4.1 12.2-15.0 CLAY, TRACE SILT, RED BROWN, DK GREY AND YELLOW. W/ LITTLE OLIVE
BKG & WHITE SPECS/INCLUSIONS (SIMILAR TO MW05L BUT LESS INCLUSIONS) MOIST, MED PLASTICITY, STIFF.

~~10~~ 15-20 → ~~SL~~ LINER STUCK IN MC SAMPLER.
NA - COULD NOT REMOVE LINER FROM MC SAMPLER
NA GET ANOTHER SAMPLER AND CONTINUE
- MATERIAL IN NOSE SIMILAR TO ABOVE.

20-25 LIMITED RECOVER, MOSTLY SLOUGH
1.5± AND SATURATED - (MUCK)
BKG. SAA BUT SOFT W/ INCREASE COARSE GRAINED/ROCK FRAG./LESS WEATHERED.

0950 WILL BUILD WELL W/ 25' TD.

• 1738MW10 •
TO 25' bgs
SCREEN 15-25' bgs
SAND to 13' bgs
BENTONITE 11' bgs
STICKUP @ SURFACE

1140 HEAD TO DECON
LATE ENTRY - 1125 SHOWER FOR 5± MIN.

1300 — 1738MW09 (PID BKG 0.0) —

0-5 0-0.3 TOPSOIL/ORGANICS
3.1 0.3-5.0 CLAY, TRACE SILT, BROWN,
BKG WET, HIGH PLASTICITY, SOFT.

5-10 5-10 CLAY, TRACE SILT, YELLOW-TAN
3.2 W/ LT GREY, RUST MOTTLES (COARSE
BKG SAND SIZE AND HARD), SOFT, HIGH PLASTICITY, WET/SATURATED.

10-15 10-15 CLAY, TRACE SILT, BROWN
3.6 LT GREY, OLIVE & MAROON W/ SOME SMALL WHITE
BKG INCLUSIONS AND FRAG. TRACE?, MED PLASTICITY
MED STIFF, MOIST

15-20 SAA W/ INCREASE IN GRAIN SIZE (LITTLE SILT &
4.1 F. SAND, SATURATED, V SOFT, MED
BKG PLASTICITY.

20-25; 3.9; BKG; SAME AS ABOVE
— WILL BUILD WELL W/ 24' TD. ✓

• 1738MW09 •
TD 24' bgs
SCREEN 12-24' bgs
SAND to 10' bgs
BENTONITE TO 8' bgs 1530
STICKUP @ SURFACE
4 SOIL BAG SAND.
~1/3 BAG BENTONITE
USE ENVIROPLUG #16 GRANULAR
TUB THESE WELLS WHERE THE
WATER IS VERY SHALLOW –
BENTONITE SLURRY OTHERWISE.

1615 DRILLERS DEPART AFTER MOVING
EQUIP (USA. ETC TO PELON.)
HEAD TO OFFICE – PREP/ORG.
1635 DEPART NOPR

– PLANNING – WELL INSTALL, DEVELOPMENT
SAMPLING SUM AND PLAN FOR
WEEKEND, CONSIDERING THE
PILOT STUDY ANALYSES (MICRO QUANT
ETC.), HOT ZONE VS. UP/DOWN
GRADIENT, 69 SOIL/SED ~~DETC~~ DITCH
SAMPLES, EVAL, RESOLUTION? @ COND.

FRI (9/17/10)

0645 ONSITE – PREP/ORG/PLAN
0720 CALIBRATE PID to 100.4
0735 @ 1738 DRILLERS ONSITE
DECONNING/PREP (ARRIVED 0700)
GROUTING (9+10

DEVELOP 1738MW05L
= TD 40.75' TOC (VERY SOFT & FT w/ MUCK)
0750 SWL 5.01' TOC 17.4-3 VOLS
35.74 × 0.165 = ~5.8 GAL/VOL
WILL RETURN
SURGE/BAIL 6.5 GALS OVER 40 MIN. V

0835 BEGIN SOIL SAMPLING @ 1738MW08
SEE NEXT PAGE →

RESUME BAIL/SURGE @ 0940.
1140 SURGE/BAIL 20± GALS OVER 1.5± HRS.
SWL 8.15' TOC
TD 42.55' TOC HARD.

– DECON BAILER

RGR

8.15
42.85

— 1738MW08 (PID BKG 0.0ppm) —

0-5 0-0.1 TOP SOIL
4.1 0.1 TO 5.0 CLAY, LITTLE SILT, BROWN (SLIGHT ORANGE), MED PLASTICITY,
BKG MED STIFF, MOIST
INCREASE IN ORANGE ≈ 4.0' bgs, ~~WET~~

5-10 5-10 CLAY, TRACE SILT, YELLOW TAN
4.7 W/ LT GREY AND TRACE RUST MOTTLING,
BKG. MOIST TO WET, HIGH PLASTICITY, SOFT.
WET/SATURATED @ 8'

10-15 10-15 CLAY AND SILT, ORANGE BROWN.
3.4 W/ LITTLE LT GREY AND MAROON -
BKG VARIGATED, NON to SLIGHT PLASTICITY,
MOIST TO WET, MED STIFF MOSTLY HORIZONTAL
ALSO SEVERAL BLACK ANGLED FRACTURE
TRACE

15-20 SAME AS ABOVE BUT LESS STIFF
3.8 ie SOFT TO M STIFF.
BKG

20-25 SAME AS ABOVE BUT SATURATED,
2.3 SOFT (MUCK), LESS SILT MORE
BKG. CLAY, SLIGHT PLASTICITY,

WILL BUILD WELL W/ 24' TD
RETURN TO 1738GW05 L TO RESUME
DEVELOPMENT (SEE PG 81)

• 1738MW08 •
TD 24' bgs
SCREEN 14-24' bgs
SAND TO 12' bgs
BENTONITE 10' bgs
~~FLUSHMOUNT~~
STICKUP @ SURFACE.

DECON HSAs. / SET UP @ 1738MW07
1130 BEGIN 1738MW07

— 1738MW07 (PID BKG 0.0) —

0-5 0-0.2 TOPSOIL
4.9 0.2-3.1 - CLAY, TRACE SILT, BROWN
BKG. DAMP TO V MOIST, HIGH PLASTICITY, SOFT.
3.1-5.0 CLAY, TRACE SILT YELLOW TAN
W/ LT GREY/OLIVE, MOIST, HIGH PLASTICITY,
SOFT. TRACE RUST MOTTLING

1738MW07 (CON'T)

5-10 5-9.5 - SAME AS ABOVE
4.6 WET @ 7.0' bgs
BKG 9.5-10.0 CLAY, SOME SILT, ORANGE BROWN W/ RUST AND WHITE INCLUSIONS. MOIST TO WET, LOW TO MED PLASTICITY, STIFF.

10-15 10-15 SIMILAR TO ABOVE W/ NO
3.1 RUST — W/ BLACK FRACTURE
BKG TRACES (NEAR HORIZONTAL & ANGLED.

15-20 15-18.7 Sl CLAY AND SILT (SOME/MUCK)
4.1 DK GREY/W OLIVE TINT, SATURATED.
BKG NO LITTLE PLASTIC (SOUP), VERY SOFT.

18.7-20.0 - SAME AS ABOVE 15 (10-15)

CONSULT W/ NARDY RE: THIS ZONE HE SAYS HE HAS SEEN THIS BEFORE. (i.e. AQUIFERS BETWEEN CONSISTENT ~~LAYERS~~ LAYERS

20-25 - 20-25 SAME AS ABOVE - (BUT
3.0 V. STIFF, INCREASE IN SILT, NON
BKG. PLASTIC (LESS WEATHERED).

— WILL BUILD WELL W/25' TD

1250 BEGIN ANABAINE 1738MW07

● 1738MW07 ●
TD. 25' bgs
SCREEN 15-25' bgs
SAND to 13' bgs
BENTONITE to 11'

1430 DRILLERS DECON / CLEAN UP / ORG.

DEVELOP 1738MW10
TD 26.30 V. SOFT (MUCH)
1336 SWL 4.75
WATER 21.55 (0.163) = 3.5 gal/VOL
— 10 min BREAK → 10.5 3 VOL
SURGE/BAIL 20+ GAL OVER 1 hr 10 MIN
1555 SWL WL 8.4 TD 27.50 NEAR HARD.

— DECON BAILER

LATE ENTRY: DRILLERS COMPLETE DECON / CLEANUP DEPART @ 1515 hrs, GAILEY / NAPE INSPECT 69 DITCH (SEE GAILEY LOG).
1630 DEPART NAPR.

4.75 84.
26.3 27.50

355

SAT (9/18/10)

0745 ONSITE PREP.

EVAL MWS FOR PILOT TEST/TREATABILITY STUDY PLANNING (WP):

GW
- COD CHEMICAL OX DEMAND 1-250ml 2-500ml
- IRON (FE) & MANGANESE (Mn) 6010C TOTAL AND DISSOLVED 1-250ml
NITRATE IC300 1-2500ml

SOIL TOC 1-4oz.

✓ WILL SAMPLE 1738MW5R AND 12 ON MONDAY DUE TO 24 HR HOLDING TIMES. AS MW5R IS DOWN GRADIENT AND REPRESENTATIVE OF CONDITIONS. AND MW12 IS UPGRADIENT

0800 CALIBRATE PID to 99.6 ppm.

DEVELOP 1738MW09
TD 27.05 SOFT
(0855) SWL 3.95 / 24' TD + STICKUP
23.10 (0.163) = 3.8 GAL/VOL
11.4 GAL 3 VOL

BAILEY DEVELOPS (0900)

DEVELOP 1738MW08
TD 22.30 — VERY SOFT MW 24' FROM GND + 2.5' STICKUP ∴ TD SHOULD BE ≈ 26.5.
(0908) SWL 4.25
18.05
+4.00 MUCK
22.05 (0.163) 3.6 GAL/VOL
10.8 GAL 3 VOL

SURGE/BAIL 20± GAL OVER ≈ 1 HRS 50± MIN.
1110 — WL 9.8, TD 26.60 HARD
FELT BOTTOM @ 7 GAL REMOVED
ORANGE BROWN HIGHLY TURBID CLEARING TO TURBID.
- DELON BAILER.

- PURCHASE 5118 UDHIDS

DEVELOP 1738MW07
TD 27.33 FELT BOTTOM (SOME MUCK)
1300 SWL 3.60
23.73 (0.167) 3.9 GAL/VOL
SURGE/BAIL 20± GAL OVER 85 MIN. 11.6 GAL/3VOL
1418 WL 11.25± TD 27.53
BROWN, MED TURBIDITY.

STORAGE BELOW OF BOILER / BUCKETS
ORG / UNLOAD

1815 DEPART WSPR

- SB/MW from TABLE @ CONDO
- SLUG TEST PREP

RGR

SUN 9/19/10

0645 ONSITE PREP. FOR HYDRAULIC CONDUCTIVITY TESTING. LOAD USB/SERIAL DRIVER - CANNOT DETECT SENSOR (TRANSDUCER) AS BEFORE (USING AQUISTAR 1.8.4). SOFTWARE USES COM 3 - CANNOT CHANGE PORT. WILL USE GAILEY COMPUTER ~~YET~~ (IT HAS THE 9 PIN PORT.)

0835 1738MW03 SWL 16.34' TOC
0855 START FALLING HEAD TEST (1738MW03F)
0920 START RISING HEAD TEST (1738MW03R)
SLUG TANGLED W/ PROBE CABLE WHEN WITHDRAWN - LIKELY FAILED TEST, ALSO FALLING TEST LOOKED ROUGH WILL ~~REST~~ RETEST.
0940 START FALLING HEAD TEST #2 (1738MW03F2)
START RISING HEAD TEST #2 (1738MW03R2)
- DECON SLUG & TRANSDUCER

1040 1738MW02 SWL 14.30' TOC
1048 START FALLING HEAD TEST
GAILEY STUCK IN LOWER SECTION ASSIST
1126 RISING HEAD TEST - START
- DECON SLUG & TRANSDUCER

- ORG EQUIP / VEHICLES

1300 DEPART WOPR

— LABEL GLASSWARE FOR REMAINING SOIL SAMPLES, BORINGS ANALYSES FOR GW, REVIEW SLUG TEST DATA, PLAN FOR REMAINING PROJECT, AOCF WELLS FOR SURVEY.

RLR

9/20/10 (MON)

0640 ONSITE INSPECT/LOCATE AOCF MWs TO BE SURVEYED @ ~~BLDG~~ SITE 731 AND SITE 520 AT BUNDY / AND SITE 124 NEAR BLDG 31 (PUBLIC WORKS). RE ARRIVE @ SECURITY / OFFICE @ 0715 PREP, GLASSWARE (TOC)

0740 @ 1738 DRILLERS ONSITE, ALSO, RIG @ MW07 WILL BRING DRUMS UP BEFORE SAMPLING.

0805 CALIBRATE PID to 100.4 ppm. TOO MUDDY TO MOVE DRUMS W/ ATTEMPT TO GET THE RIG OUT (FROM MW07) AND SOIL SAMPLE.

—1738SB101 (PID BKG 0.0)—

0-5   0-0.2 TOPSOIL

4.6   0.2-1.0 CLAY AND SILT, COUPLE GRAVEL, ORANGE BROWN, DAMP, SLIGHT PLASTICITY, SOFT TO MED STIFF (FILL)

BKG.   1.0-5.0 FILL → CLAY TO GRAVEL, BROWN AND LT GREY, DAMP (MATRIX) NON TO SLIGHT PLASTICITY, LOOSE TO MED STIFF.

1738-SB101-01 + DUP + MS/MSD + TOC @ 0920 (SINGLE VOL MS/MSD FOR DRO)

1738SB101 (CON'T)

5-10 FILL - CLAY TO F. SAND, SOME MED SAND & GRAVEL, DAMP.
5.0
BKG

1738-SB101-04 @0940

10-15 10-15 SILT AND CLAY W/ WHITE INCLUSION/SPECS, SOME F SAND
4.6 DK GREY AND OLIVE, DAMP, NON
3.0-7.0 (THROUGHOUT) PLASTIC, MED STIFF, SLIGHT PETRO/ CHEMICAL ODOR.

1738 SB101-06 @0950 +TOC

15-20
4.7

1738 SB101-08 @ ~~0955~~ 1000

15-20 SAME AS ABOVE.
PID - 7ppm 15-17±
3± 17-20' (BELOW WATER TABLE

— 1738SB102 (PID BKG 0.0) —

0-5 0-0.2 TOPSOIL
4.6 0.2-5.0 FILL - SIMILAR TO SB101 - SEE
BKG. DESCRIPTION PG. 91.

SB102-01 @1015

5-10 5-10 SILT AND CLAY, BROWN BR., DAMP
3.0 NON-PLASTIC, SOFT TO MED HARD.
BKG

SB102-04 @1030 + TOC

10-14 10-14 VERY HARD - SHORT RUN, SOME AS
2.8 ABOVE BUT STIFF.
BKG.

14-18. 14-18 SILT AND CLAY, ORANGE BR, DAMP (MOIST @ 17'), NON PLASTIC, MED STIFF

1738 SB102-08 @1035 +TOC

PID - BKG 14-16
0.2± 16-17 (ABOVE WATER TABLE)
1.0 17-18 - IN WATER

— 1738 SB103 (PID BKG 0.0) —

REFUSAL @ 1' bgs OFFSET 1' WEST SAME
OFFSET 3' SOUTH – SAME., OFFSET –
6±' NW

0-5
3.4
BKG
0 - 0.3 TOPSOIL
0.3 - 5.0 FILL (AS SB101 & 102
SEE PG 91).

1738
SB103-01
@ 1100

5-10
3.0
BKG
5-10 FILL AS ABOVE W/ MORE
GRAVEL, LT GREY, DRY to DAMP.
NON PLASTIC, LOOSE.

1738
SB103-04
@ 1110

10-14
REFUSAL VERY HARD CAN'T GO DEEPER.
TERMINAL BORING.
NO RECOVERY. (HARD FILL IN
NOSE.

— 1738 SB104 (PID BKG 0.0) —

0-5.
3.6
BKG
0-5 SAME AS OTHERS (SEE PG 91)

1738
SB104-01
@ 1115

5-10
4.6
BKG
5-7.5 SAME AS ABOVE
7.5-10.0 CLAY AND SILT, TRACE GRAVEL
DK GREY OLIVE, DAMP TO MOIST, NON to
SLIGHT PLASTIC, LOOSE to SOFT. (FILL).

1738
~~1045~~
SB104-04
@ 1150
4.7

10-15
5.0
0.1-0.3
SAME AS ABOVE (ORANGE BR 10.5-12.5 FILL)
(SAMPLED MOSTLY DK GREY / OLIVE.)

1738
SB104-06
@ 1200
+ TOC

15-19
4.0
15-17 SAME AS ABOVE (PID 1-3±)
17-19. ORANGE/BR. (AS 10.5'-12')
(PID 70-90 SHOULD BE BELOW
WATER TABLE @ 17' BUT SAMP DPT
DRIVES WATER OUT. (PETRO/CHEMICAL ODOR.

1738
SB104-08 @ 1215 + TOC

— 1738 SB105 (PID BKG 0.0) —

0-5 0-0.2 TOPSOIL ~~to~~ TRACE CLAY + COARSE GRAVEL to COARSE SAND
BKG 2.9 0.2-5.0 SILT ~~AND CLAY~~, ~~SAND~~.
1738 ~~GRAY/RED SAND~~, BROWN, DAMP
SB105-01 NON PLASTIC, LOOSE. (FILL.
+DUP
@1305

5-10 SAME AS ABOVE FILL - COARSE
2.2 GRAINED FALLING OUT OF SAMPLER
BKG
1738
SB105-04 (LITTLE RECOVERY)
@1315

10-15 VERY LITTLE RECOVERY ONLY IN NOSE
0.3 OF ~~the~~ SAMPLES, ATTEMPT TWO
BKG (FROM JAR) SAMPLES OF 10-15. AS
ABOVE COARSE MATERIALS (SAND)
1738 NO CLAY = NO RECOVERY.
SB105-07 (13-15?)
@1325

3 VOA VIALS, 4oz GRO, 1/2 of 8oz. DRO.

< DEPART FOR OFFICE (1345), TO MANAGE SAMPLES (24 hr HOLDING TIME FOR MICROBIAL COUNT AND I.D.) SOMEONE WILL HAVE TO DELIVER SAMPLES TO FEDEX SAN JUAN BECAUSE FEDEX CAN'T HAVE LATER PICKUP (SEE GAILEY LOG.)

- DRILLER TO MOVE DRUMS (IF THEY CAN GET THEM OUT OF LOWER SECTION DUE TO MUD) — YES MOVE 5 SOIL / WATER TO HOLDING AREA.
- SCARRETT IN OFFICE, WAITED FOR US TO FINALIZE PACKAGING.

1600 DRILLER DEPART.
1610 DEPART NAPR.

@ CONDO - ASSIST SAMPLES MATRIX, PROJECT PUNCH LIST, SLUG TEST WELLS, IDW SAMPLES, EXPENSE

RGR

TUES. (9/21/10)

0640 ONSITE, PREP.
0710 CALIBRATE PID TO 100.2 ppm.
0750 @ 1738 PREP TO K TEST
1738MW11

0815 1738MW11 SWL 14.58' TOC
0835 START FALLING HEAD TEST (1738MW11F)
0855 START RISING HEAD TEST (1738MW11R)

0930 GEOENVIRO TECH ONSITE (WILLIAM & NAEGER) TO COMPLETE WELLS @ SURFACE (BOLLARDS ONLY ON 1738MW12)

1000 1738MW01 SWL 15.89' TOC
1015 START FALLING HEAD TEST (1738MW01F)
~~1010~~ 1030 START RISING HEAD TEST (1738MW01R)

1005 SURVEYORS ONSITE
LATE ENTRY: DRILLERS ATTEMPT TO PULL PVC RISER AND SCREEN FROM TEMP WELL, RISER BREAKS BREAKS JUST BELOW SURFACE (APPROX 3' RISER ≈ 0.8' BELOW GND SURFACE).

1035 SURVEYORS HEAD TO SITE 124.

1145 1738MW12 SWL 19.87' TOC
1150 START FALLING HEAD TEST (1738MW12F)
1210 START RISING HEAD TEST (1738MW12R)
— TRADE VEHICLES - GET JEEP

1245 1738MW10 SWL 4.46' TOC
1300 START FALLING HEAD TEST (1738MW10F)
1315 START RISING HEAD TEST (1738MW10R)

1335 1738MW05 SWL 4.55' TOC (SHALLOW)
1340 START FALLING HEAD TEST (1738MW05F)
1351 START RISING HEAD TEST (1738MW05R)

1353 1738MW05R SWL 3.23' TOC
1410 START FALLING HEAD TEST (1738MW05RF)
1427 START RISING HEAD TEST (1738MW05RR)

1443 1738MW05L SWL 4.26' TOC
1445 START FALLING HEAD TEST (1738MW05LF)
1500 START ~~FA~~ RISING HEAD TEST (1738MW05LR)

1520 1738MW08 SWL 3.15' TOC
1525 START FALLING HEAD TEST (173808F)
1537 START RISING HEAD TEST (173808R.

2.72 .57

[redacted]/557 1738MW07 SWL 2.72
1600 START FALLING HEAD TEST (1738MW07F)
1620 ~~1600~~ START RISING HEAD TEST (1738MW07R)

RETURN TO OFFICE. PREP/ORG.
1705 DEPART WAPR.
UPLOAD/REVIEW K/SLUG TEST DATA, DEVELOP SUM TABLE @ CONDO.

RGR

WED (9/22/10)

0700 ONSITE - EMPTY/CLEAN VEHICLES, ORG/PACK EQUIP, CLEAN OFFICE. (PINE ENVIRONMENTAL AND FIELD ENVIRONMENTAL RENTAL)

TIME	WELL	SWL
0923	1738MW01	15.88
0926	03	15.91
0928	02	14.13
0931	04	16.82
0933	12	19.82
0937	11	14.47
0941	05	4.74
0942	05R	3.46
0943	05L	4.41
0944	10	4.46
0945	09	3.14
0948	08	3.37
0951	07	2.85
0954.	06	6.88

CONTENTS

PAGE NO.	REFERENCE	DATE

9/16/10

weather: Partly cloudy, a passing shower, breezy, ~ 82°F

0645 - Arrive @ NAPR to prep. for 1738 Sampling, Meter Calibration & Daily Decon. on both pumps. (Bladders Replaced)

0825 - Arrive @ SWMU 1738

0845 - See Field Data Sheets for [1738GW02] Purge & Sample Details.

1000 - Sample Taken (1738GW02) + Duplicate (1738GW02D)

1110 - Performed Btw. well Decon. on pump.

1135 - See Field Data Sheets for [1738GW01] Purge & Sample Details.

1303 - Sample Taken (1738GW01)

1355 - Performed Btw. well Decon. on pump.

1420 - obtained Equip. Rinsate (1738ER03) on Bladder Pump.

- Back to Bld. 1205 to ice samples

1630 - Depart NAPR

DNH

9/17/10

Weather: Mostly cloudy, breezy, ~85°F

0645- Arrive @ Napr to prep. for the day meter calibration* + Daily Decon. of pumps (Bladders Replaced)

0750. Arrive @ SWMU 1738

0800. See Field Data Sheets for [1738GW06] Purge/Sample Details.

* Due to yesterdays Negative Turb. readings the zero std. was ~~replaced~~ Replenished (per meter operating instructions)

0950- Sample Taken (1738GW06)

1020. See Field Data Sheets for [1738GW11] Purge/Sample Details

* Am using 2nd pump Deconned this AM.

1157- Sample Taken (1738GW11)

1230- Performed btw. well Decon. on pump

1320- obtained Equip. Rinsate (1738 ~~MW~~ ER 04) from Bladder pump + Tubing

~~Weather: Sunny, breezy, ~88°F~~

9/17/10

1445- Adam + I drove over to SWMU 69 to ascertain the status of the ditch (Whether water ~~remains~~ is still standing - it is.)

1630 - Depart NAPR

9/18/10

Weather: Sunny, light breeze ~88°F

0645. Arrive @ NAPR to prep for the day Meter Calibration + Daily Pump Decon (Replaced Bladders).

0840. At site 1738

0845. See Field Data Sheets for [1738GW03] Purge/Sample Details

1026 - Sample Taken (1738MW03)

1100 - A. Gailey performed btw. well Decon. on pump.

1130 - obtained Equip. Rinsate (1738ER05) from Pump + Tubing

9/18/10

1250. See Field Data Sheets for [1738GW5L] Purge/Sample Details

1426 – Sample Taken (1738GW05L)

Back to Bld. 1205 to ice samples

1515 – Depart NAPR

9/19/10 Weather: partly cloudy, humid, ~ 90°F

0645 - Arrive @ NAPR to prep. for the day, Meter calibration & pump Decontamination.

0820 – Arrive @ 1738

0830 – obtain Equip. Rinsate (1738ER06) From ~~pump~~ Tubing

0840 - See Field Data Sheets for [1738GW10] Purge/Sample Details.

1006 – Sample Taken (1738GW10)

1100 - Assist in helping Adam get vehicle unstuck.

1145 - Back to Bld. 1205

1300 - Depart NAPR

4 DNH

Weather: Mostly cloudy, breezy, ~ 90°F

9/20/10

0645 - Arrive @ NAPR. Proceed to AOCF Sites 731, 520 & 124 to show Adam newly found wells for the surveyors to shoot in.

0715 - Arrive @ Bld. 1205 to prep. for the day Meter calibration & Daily Decon. of pumps (Bladders Replaced)

0755 - Perform Equip. Rinsate (1738ER07) from Pump & Teflon Bladder.

0845 - At site 1738 - prep. for well GW12 Sampling.

0900 - Assist R. Roselius with soil Boring sampling.

1050 - Back @ GW12 to purge & Sample - See Field Data Sheets for purge & sample Details

1157 – Sample Taken (1738GW12)
* Additional Bottles filled

5 DNH

9/20/10

1240. See Field Data sheets for [1738GW05R] Purge/Sample Details.
*used 2nd Pump Deconned in AM

1411 - Sample Taken (1738GW05R)
* Additional Bottles filled

Back to Bld. 1205 to assist in prepping coolers for Fed-x pickup.

1615 - Depart NAPR

6
DNH

Weather: Sunny, breezy, ~85 °F

9/21/10

0645 - Arrive @ NAPR. Prep for the day Meter calibration & Daily pump Decon on both pumps.
(Bladders Replaced)

0800 - At site 1738

0805. See Field Data sheets for [1738GW08] Purge & Sample Details.

0954 - Sample Taken (1738GW08)

1030. See Field Data Sheets for [1738GW07] Purge & Sample Details
*used 2nd Pump Deconned this AM.

1145 - Sample Taken (1738GW07)

1220 - At Bld. 1205 to assist in packing/shipping coolers

1415 - Back to Site 1738 to assist w/ Well Slug Testing

1700 - Depart NAPR

7
DNH

9/22/10

0650 - Arrive @ NAPR to pack Rental Equip. for return shipping, clean up, inventory, water levels, etc.

1445. Depart NAPR, Investigation complete

9/23/10

0700. At SJU for return trip to PIT.

8 DNH

Soil Boring and Monitoring Well Logs

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island   BORING NO.: 1738SB101
COORDINATES: EAST: 780629.1   NORTH: 149275.5
ELEVATION: SURFACE: 124.8

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"				9/20/2010	0.0 - 20.0	sunny, mid-80s	~17
Length	5'							
Type								
Hammer Wt.								
Fall								

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

S = Split Spoon   A = Auger
T = Shelby Tube   W = Wash
R = Air Rotary   C = Core
D = Direct Push   P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1–5	5.0	D-1	4.6 92%		1738SB101-01 +duplicate +MS/MSD +TOC	BKG	TOPSOIL (organics) 0.2 FILL; CLAY and SILT, coarse gravel, orange brown, damp, slight plasticity, soft to medium stiff 1.0 FILL; Clay to gravel, brown and lt gray, damp non to slight plasticity, loose to medium stiff	124.6
6–10	10.0	D-2	5.0 100%		1738SB101-04	BKG	FILL; Clay to fine sand, some medium grained sand, some gravel, damp	

DRILLING CO.: GeoEnviroTech, Inc.   BAKER REP.: Robert Roselius
DRILLER: William Rodrigez   BORING NO.: 1738SB101   SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

SO NO.: 119197, 18.1 On Island   BORING NO.: 1738SB101

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11–15	D-3	4.0 100%		1738SB101-06 +TOC	3.0 to 7.0	SILT and CLAY; some fine sand, dark gray and olive with white inclusions/specs, damp non plastic, medium stiff, slight petroleum odor	
16–20	D-4	4.7 94%		1738SB101-08	15.0 to 17.0	wet at 17'	104.8
21–30						End of Boring 20.0'	

DRILLING CO.: GeoEnviroTech, Inc.   BAKER REP.: Robert Roselius

DRILLER: William Rodrigez   BORING NO.: 1738SB101   SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

PROJ. NO.: 119197, 18.1 On Island — BORING NO.: 1738SB102

COORDINATES: EAST: 780653.5 — NORTH: 149275.3

ELEVATION: SURFACE: 125.4

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"				9/20/2010	0.0 - 18.0	sunny, mid-80s	~17
Length	5'							
Type								
Hammer Wt.								
Fall								

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston	BKG/PS = Background/Point Source
N = No Sample	ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
0 – 5	5.0	D-1	4.6 92%		1738SB102-01	BKG	TOPSOIL (organics) 0.2 FILL; Clay to Gravel, brown and light gray, damp non to slight plasticity, loose to medium stiff	125.2
5 – 10	10.0	D-2	3.0 60%		1738SB102-04 +TOC	BKG	FILL; SILT and Clay; orange brown, damp, non-plastic, soft to moderately hard	

DRILLING CO.: GeoEnviroTech, Inc. — BAKER REP.: Robert Roselius

DRILLER: William Rodrigez — BORING NO.: 1738SB102 — SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

SO NO.: 119197, 18.1 On Island BORING NO.: 1738SB102

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample	SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector Measurement MSL = Mean Sea Level ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11							same as above but stiff, hard	
12								
13		D-3	2.8 70%			BKG		
14	14.0							
15						BKG to 16	FILL; SILT and CLAY; orange brown, damp non plastic, med stiff	
16		D-4	4.0 100%		1738SB101-08 +TOC			
17						14 - 16 at 17'	wet at 17'	
18	18.0							107.4
19							End of Boring 18.0'	
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 1738SB102 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

PROJ. NO.: 119197, 18.1 On Island — BORING NO.: 1738SB103

COORDINATES: EAST: 780643.6 — NORTH: 149302.3

ELEVATION: SURFACE: 124.7

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"				9/20/2010	0.0 - 10.0	sunny, mid-80s	-
Length	5'							
Type								
Hammer Wt.								
Fall								

Remarks: PID background (BKG) is 0.0. Refusal at 1' bgs. offset 1' west-same, offset 3' south -same, offset 6' Northwest - OK

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston	BKG/PS = Background/Point Source
N = No Sample	ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
							TOPSOIL (organics) 0.3	124.4
1							FILL; Clay to Gravel, brown and light gray, damp non to slight plasticity, loose to medium stiff	
2								
3		D-1	3.4 68%		1738SB103-01	BKG		
4								
5	5.0							
6							same as above, more gravel, light gray, dry to damp, non-plastic, loose	
7								
8		D-2	3.0 60%		1738SB103-04	BKG		
9								
10	10.0							114.7
							refusal, very hard, no recovery	

DRILLING CO.: GeoEnviroTech, Inc. — BAKER REP.: Robert Roselius

DRILLER: William Rodrigez — BORING NO.: 1738SB103 — SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

SO NO.: 119197, 18.1 On Island BORING NO.: 1738SB103

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11							refusal, very hard, no recovery	
12								
13		D-3	0.0 0%					
14	14.0							
15							End of Boring 14.0'	
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 1738SB103 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

PROJ. NO.: 119197, 18.1 On Island   BORING NO.: 1738SB104

COORDINATES: EAST: 780632.2   NORTH: 149290.1

ELEVATION: SURFACE: 124.7

Rig:	Geoprobe Track Rig 6610 DT				**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
	Macro Sampler	**Casing**	**Augers**	**Core Barrel**				
Size (ID)	1.48"				9/20/2010	0.0 - 19.0	sunny, mid-80s	~17
Length	5'							
Type								
Hammer Wt.								
Fall								

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
							TOPSOIL (organics) 0.3	124.4
1							FILL; Clay to Gravel, brown and light gray, damp non to slight plasticity, loose to medium stiff	
2								
3		D-1	3.6 72%		1738SB104-01	BKG		
4								
5	5.0							
6							same as above, more gravel, light gray, dry to damp, non-plastic, loose	
7								
8		D-2	4.6 92%		1738SB104-04	BKG	FILL; CLAY and SILT, trace gravel, dark gray olive, damp to moist, non to slight plasticity, loose to soft	
9								
10	10.0							

DRILLING CO.: GeoEnviroTech, Inc.   BAKER REP.: Robert Roselius

DRILLER: William Rodrigez   BORING NO.: 1738SB104   SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

SO NO.: 119197, 18.1 On Island BORING NO.: 1738SB104

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11							same as above, orange brown, dry	
12								
13		D-3	5.0 100%		1738SB104-06 +TOC	0.1 to 0.3		
14								
15	15.0							
16							same as above	
17		D-4	4.0 100%		1738SB104-08 +TOC	1.0 to 3.0		
18						70 to 90	orange brown, damp, petroleum odor	
19	19.0							105.7
20							End of Boring 19.0'	
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 1738SB104 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738SB105
COORDINATES: EAST:	780612.9	NORTH:	149307.4
ELEVATION: SURFACE:	124.2		

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"				9/20/2010	0.0 - 10.3	sunny, mid-80s	-
Length	5'							
Type								
Hammer Wt.								
Fall								

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston	BKG/PS = Background/Point Source
N = No Sample	ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
0-5	5.0	D-1	2.9 58%		1738SB105-01 + duplicate	BKG	TOPSOIL (organics) 0.2 Silt to coarse sand, brown, damp, non-plastic, loose	124.0
5-10	10.0	D-2	2.2 44%		1738SB105-04	BKG	FILL; coarse gravel	

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB105 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

SO NO.: 119197, 18.1 On Island   BORING NO.: 1738SB105

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11							very little recovery, Sand; coarse grained attempted two samples of 10-15'	
12		D-3	0.3 6%		1738SB105-07	BKG		
13								
14								
15	15.0							109.2
16							End of Boring 15.0'	
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc.   BAKER REP.: Robert Roselius

DRILLER: William Rodrigez   BORING NO.: 1738SB105   SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW05L
COORDINATES:	EAST: 780580.1	NORTH:	149457.8
ELEVATION:	SURFACE: 109.5	TOP OF PVC CASING:	111.96

Rig:	Geoprobe 6610DT				**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
	MC Sampler	**Casing**	**Augers**	**Core Barrel**				
Size (ID)	1.48"	--	3.25"	--	9/15/2010	0.0 - 45.0	Sunny, mid 80s	-
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

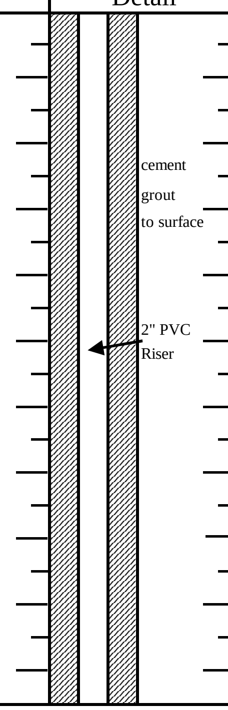
SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	30.0
Schedule 40 PVC Screen	2"	30.0	40.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						Begin macrocore sampling at 20'		
2						See log for 1738SB5R		
3								
4								
5	A	NA			NA			
6								
7								
8								
9								
10						see next page		



DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB05L SHEET 1 OF 3

Baker
Michael Baker Jr., Inc.

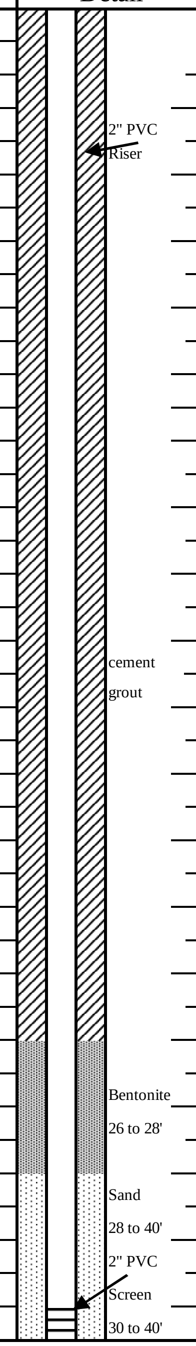
TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW05L

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11								
12								
13								
14								
15								
16								
17								
18								
19								
20	20.0							89.5
21						~1.5	CLAY, trace silt; brown with white specs/inclusions; moist; medium plasticity; medium stiff: saprolite	
22		D-1	4.2 84%					
23						~2.0		
24						~3.0		
25	25.0							84.5
26						~1.5	similar to above; CLAY; trace silt; brown, light. orange tint, with white inclusions and some black mottling; moist; soft; medium plasticity saprolite	83.5
27								
28		D-2	3.9 78%					81.5
29						~0.5		
30	30.0							79.5
							see next page	

Well Installation Detail:



DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 1738SB05L SHEET 2 OF 3

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

PROJ. NO.: 119197, 18.1 On Island   BORING NO.: 1738MW05L

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31						same as above with black fracture traces		
32					~1.0			
33	D-3	3.2 64%						
34								
35 (35.0)					~2.0	medium stiff at 33.5'	Sand 28 to40'	74.5
36								
37					1 to 3		2" PVC Screen 30 to 40'	
38	D-4	3.8 76%						
39								
40 (40.0)					BKG			69.5
41						CLAY, some silt, trace rock fragments; less white inclusions and black fracture traces		
42							Soil Cuttings	
43	D-5	4.1 82%			BKG			
44								
45 (45.0)								64.5
46						End of Boring at 45.0'		
47								
48								
49								
50								

DRILLING CO.: GeoEnviroTech, Inc.   BAKER REP.: Robert Roselius

DRILLER: William Rodrigez   BORING NO.: 1738SB05L   SHEET 3 OF 3

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW07
COORDINATES:	EAST: 780445.6	NORTH:	149506.2
ELEVATION:	SURFACE: 107.6	TOP OF PVC CASING:	110.11

Rig:	Geoprobe 6610DT							
	MC Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1.48"	--	3.25"	--	9/17/2010	0.0 - 25.0	Sunny, mid 80s	
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	15.0
Schedule 40 PVC Screen	2"	15.0	25.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
0.2						TOPSOIL (organics)		107.4
1						CLAY, trace silt; brown damp to moist; high plasticity; soft		
2								
3	D-1	4.9 98%			BKG		cement grout to surface	
4						CLAY, trace silt; yellow tan with light gray and olive, trace rust mottling; moist; high plasticity; soft		
5 — 5.0							2" PVC Riser	
6								
7						wet at ~7.0'		
8	D-2	4.6 92%			BKG			
9						CLAY, some silt; orange brown with rust and white inclusions;		
10 — 10.0						moist to wet; low to med plasticity; stiff. see next page		

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB07

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW07

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11							no rust but with black fracture traces		96.6
							(near horizontal and angled)	Bentonite	
12								11 to 13'	
		D-3	3.1			BKG			
13			62%						94.6
14								2" PVC Riser	
15	15.0						15		92.6
16							Clay and SILT (soup/muck); dark gray w/olive, saturated; non plastic; very soft	Sand 13 to 25'	
17									
		D-4	4.1			BKG			
18			82%						
19									
20	20.0								
21							increase in silt; non-plastic very stiff (less weathered)		
22									
		D-5	3.0			BKG		2" PVC	
23			60%					Screen	
								15 to 25'	
24									
25	25.0								82.6
26							End of Boring at 25.0'		
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 1738SB07 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island — BORING NO.: 1738MW08
COORDINATES: EAST: 780579.5 — NORTH: 149544.2
ELEVATION: SURFACE: 107.1 — TOP OF PVC CASING: 109.55

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"	--	3.25"	--	9/18/2010	0.0 - 25.0	Sunny, mid 80s	
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	14.0
Schedule 40 PVC Screen	2"	14.0	24.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
0.1						TOPSOIL (organics)		107.0
1 – 5.0	D-1	4.1 82%			BKG	CLAY, some silt; brown with slight orange; moist; medium plasticity; medium stiff increase in orange color ~4.0'	cement grout to surface	
5 – 10.0	D-2	4.7 94%			BKG	CLAY, trace silt; yellow tan with light gray and rust mottling; moist to wet; high plasticity; soft wet/saturated at ~8'	2" PVC Riser	97.1

see next page

DRILLING CO.: GeoEnviroTech, Inc. — BAKER REP.: Robert Roselius
DRILLER: William Rodrigez — BORING NO.: 1738SB08

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW08

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11							Clay and SILT; orange brown with		96.1
							little light gray and maroon,	Bentonite	
12							several black and near horizontal	10 to 12'	95.1
		D-3	3.4			BKG	fracture traces; moist to wet; non to	Sand	
13			68%				slight plasticity, saprolite	12 to 24'	
14								2" PVC Riser	93.1
15	15.0								
16							soft to medium, stiff		
17									
		D-4	3.8			BKG			
18			76%						
19									
20	20.0								
21							less silt; saturated; slight plasticity; soft		
22									
		D-5	2.3			BKG		2" PVC	
23			46%					Screen	
								14 to 24'	
24									83.1
								soil	
25	25.0							cuttings	82.1
26							End of Boring at 25.0'		
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 1738SB08 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW09
COORDINATES:	EAST: 780756.7	NORTH:	149458.4
ELEVATION:	SURFACE: 107.2	TOP OF PVC CASING:	110.12

Rig:	Geoprobe 6610DT							
	MC Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1.48"	--	3.25"	--	9/16/2010	0.0 - 25.0	Sunny, mid 80s	
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

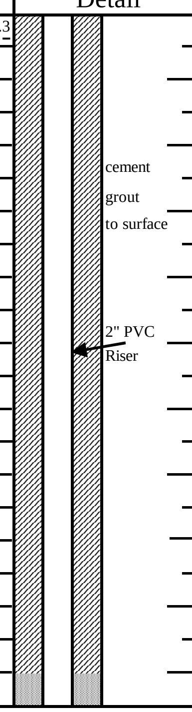
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	14.0
Schedule 40 PVC Screen	2"	14.0	24.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. MSL)
0–5	5.0	D-1	3.1 62%			BKG	TOPSOIL (organics) 0.3 CLAY, trace silt; brown; wet; high plasticity; soft	106.9
5–10	10.0	D-2	3.2 64%			BKG	CLAY, trace silt; yellow tan with light gray and rust mottling; (coarse sand and hard); wet/saturated; soft; high plasticity	97.2

Well Installation Detail



see next page

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB09

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW09

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11 – 15	15.0	D-3	3.6 72%			BKG	CLAY; trace silt; brown, light gray, olive and maroon, some small white inclusions and fracture trace; moist; medium plasticity; medium stiff	Bentonite 10 to 12' Sand 12 to 24' 2" PVC Riser	95.2 93.2
15 – 20	20.0	D-4	4.1 82%			BKG	increase in grain size (some silt and fine sand); saturated; very soft; medium plasticity		
20 – 25	25.0	D-5	3.9 78%			BKG	same as above	2" PVC Screen 14 to 24' soil cutttings	81.2 82.2
25 – 30							End of Boring at 25.0'		

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 1738SB09 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW10
COORDINATES:	EAST: 780738.9	NORTH:	149363.1
ELEVATION:	SURFACE: 110.1	TOP OF PVC CASING:	112.49

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1.48"	--	3.25"	--	9/16/2010	0.0 - 25.0	Sunny, mid 80s	
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	15.0
Schedule 40 PVC Screen	2"	15.0	25.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
0–5	5.0	D-1	4.1 82%			BKG	TOPSOIL (organics) 0.2 CLAY, little silt and fine sand; brown moist; medium plasticity; soft; gravel ~1.0' CLAY, trace silt; yellow tan, some light gray and rust /maroon mottling; moist; high plasticity; soft to medium stiff (saprolite)	cement grout to surface	109.9 108.1
5–10	10.0	D-2	5.0 100%			BKG	increase of light gray and maroon (variegated)	2" PVC Riser	

see next page

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB10

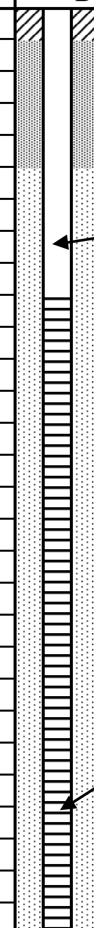
Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738
PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW10

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11							same as above	Bentonite 11 to 13'	99.1
12									
13		D-3	4.1 82%			BKG	CLAY, trace silt; brown, dark gray, and yellow with olive and white specs/inclusions;(similar to SB05L but with less inclusions (saprolite) moist; med plasticity; stiff	2" PVC Riser	97.1
14									
15	15.0								95.1
16								Sand 13 to 25'	
17		N	NA			NA	liner stuck in macrocore sampler material in nose similiar to above		
18									
19									
20	20.0								
21							limited recovery; mostly slough; increase in coarse sand sized rock fragments, less weathered, saturated		
22									
23		D-4	1.5 30%			BKG		2" PVC Screen 15 to 25'	
24									
25	25.0								85.1
26							End of Boring at 25.0'		
27									
28									
29									
30									



DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 1738SB10 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW11
COORDINATES:	EAST: 780503.4	NORTH:	149283.6
ELEVATION:	SURFACE: 122.7	TOP OF PVC CASING:	122.67

Rig:	Geoprobe 6610DT							
	MC Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1.48"	--	3.25"	--	9/13/2010	0.0 - 26.0	Sunny, mid 80s	~17+
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0. Sample designations include the prefix 1738. Completed at surface with a flushmount.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~0.2	16.0
Schedule 40 PVC Screen	2"	16.0	26.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
0–5	5.0	D-1	3.6 72%		MW11-01	BKG	TOPSOIL (organics) 0.3 FILL; silt and fine sand, little clay and medium sand to gravel, trace shells, yellow tan to brown; damp, non to slight plasticity, loose	cement grout to surface	122.4 117.7
5–10	10.0	D-2	5.0 100%		MW11-04	BKG	CLAY, some silt; dark orange brown; damp; medium plasticity; stiff (residuum) SILT and FINE SAND, little clay, light gray, yelllow tan and brown; dry to damp; non plastic; loose (weather bedrock/saprolite) see next page	2" PVC Riser	

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB11

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico AOC F Site 1738

PROJ. NO.: 119197, 18.1 On Island BORING NO.: 1738MW11

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11–14	14.0	D-3	40.0 100%			BKG	medium dense; very hard drillling; refusal at 14',	2" PVC Riser; Bentonite 12 to 14'	110.7 (12); 108.7 (14)
14–17	17.0	D-4	3.0 100.0		MW11-08	BKG	very hard and becoming denser	Sand 13 to 25'	106.7 (16)
17–20	20.0	D-4	3.0 100%			BKG	olive tint and less yellow brown, specks of white, mottled clay; very dense		
20–26	26.0	A	NA			NA	terminated sampling due to hardness; augered to 26' bgs to construct well. slow/tough augering, cuttings similar to above	2" PVC Screen 16 to 26'	96.7 (26)
26–30							End of Boring at 26.0'		

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 1738SB11 SHEET 2 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

Baker
Michael Baker Jr., Inc.

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW12
COORDINATES:	EAST: 780639.9	NORTH:	149179.6
ELEVATION:	SURFACE: 125.6	TOP OF PVC CASING:	128.06

Rig:	Geoprobe 6610DT							
	MC Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1.48"	--	3.25"	--	9/14/2010	0.0 - 27.5	Sunny, mid 80s	
Length	5'	--	5'	--				
Type	--	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0. Sample designations include the prefix 1738.

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~2.5	16.0
Schedule 40 PVC Screen	2"	17.5	27.5

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1							TOPSOIL (organics) 0.4 SILT and FINE SAND, some clay, light gray, yelllow tan and brown; dry to damp; non plastic; loose (weathered bedrock/saprolite)		125.2
2									
3		D-1	4.8 96%		MW12-01 +duplicate +MS/MSD	BKG		cement grout to surface	
4									
5	5.0							2" PVC Riser	120.6
6							increase in rock fragments		
7									
8		D-2	5.0 100%		MW12-04	BKG			
9							SILT and FINE SAND, maroon with olive specs; dry; non plastic; very		
10	10.0						dense		

see next page

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB12

Baker
Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico AOC F Site 1738		
PROJ. NO.:	119197, 18.1 On Island	BORING NO.:	1738MW12

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11–14.5	D-3	4.5 100%			BKG	very hard olive, gray and light maroon; non plastic; very dense refusal at 14'	2" PVC Riser Bentonite 13.5 to 15.5'	112.1
14.5–18.5	D-4	4.0 100.0		MW12-08	BKG	very hard same as above with increasing in gray rock fragments; especially 18 to 18.5 rock in sampler nose refusal at 18.5'	Sand 15.5 to 27.5'	110.1 108.1
18.5–27.5	A	NA			NA	terminated sampling due to hardness; augered to 27.5' bgs to construct well slow/tough augering, cuttings similar to above	2" PVC Screen 17.5 to 27.5'	98.1
27.5–30						End of Boring at 27.5'		

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	1738SB12

Well Detail and Sampling Logs

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW01　　DATE: 9/16/10

PROJECT: MtBE Investigation　　WEATHER: overcast, some rain, ~ 80°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F　　Well Cap: F　　PVC Locking Cap/Plug: F

Cap Lock: None　　Cover Bolts: None　　Water over PVC? Y / N (Y circled)

Casing (outer): F　　Casing (inner): G　　SWL Reference Mark: G　　Reference Mark Location? PVC

Casing Dia.: 2"　　Casing Material: PVC　　Flushmount / Stickup (Flushmount circled)

Comments:

(OTHER):

Static Water Level (ft.): 16.09　　Time: 1143 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 16.08　　Time: 1148 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 34.41　　Time: 1345

PID Reading (PPM) - Unopened: 0　　Opened: 0

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log:　　Total Depth (ft.):　　Screened Interval (ft.):

Pump Intake Set @ (ft.): 31　　Controller Settings / Pressure: CPM 4 10/5 P = 40

Comments:

SAMPLE DATA

Sample ID #: 1738GW01　　Dup.: Y / N (N circled) (ID#:)

Sample Time: 1303　　MS / MSD: Y / N (N circled)　　Field Filtered: Y / N (N circled)

Sampled By: D. Hupe　　Signature: [signature]

Sample Description: Clear, w/ very light fuel odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE / BTEX
" "	2	"	TPH GRO
1l Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW01
DATE: 9/16/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW01

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1148	16.08	- (Water Level : Post-Pump Installation, Pre-Start)								
1157	- (Start of Purging)		—	28.25	2.714	5.32	6.90	-141	2.87	Clear, w/ light Fuel odor
1202	16.08	1000	200	28.19	3.018	2.77	6.83	-172	0.41	
1207	16.12	1750	150	28.28	3.071	2.30	6.81	-173	-0.27	
1212	16.10	2550	160	28.52	3.094	2.00	6.81	-167	-0.85	
1217	16.09	3350	160	28.69	3.100	1.75	6.81	-162	-1.05	
1222	16.09	4100	150	28.62	3.106	1.56	6.81	-149	-1.18	
1227	16.08	4950	160	28.48	3.104	1.31	6.81	-149	-1.30	
1232	16.08	5700	140	28.62	3.097	1.13	6.80	-143	-1.31	
1237	16.09	6450	150	28.64	3.100	0.98	6.80	-126	-1.38	
1242	16.09	7200	150	28.64	3.100	0.84	6.81	-121	-1.47	
1247	16.09	8000	160	28.66	3.099	0.74	6.81	-122	-1.81	
1252	16.09	8800	160	28.65	3.098	0.68	6.80	-111	-1.63	
1257	16.07	9600	160	28.62	3.099	0.64	6.81	-112	-1.64	
1302	16.07	10400	160	28.64	3.098	0.62	6.81	-113	-1.61	
1303	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Page: 1 of 1

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 ~~MW~~ G W02 DATE: 9/16/10

PROJECT: MtBE Investigation WEATHER: Mostly Sunny, breezy, ~82°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad F Well Cap G PVC Locking Cap/Plug F

Cap Lock None Cover Bolts None Water over PVC? Y N

Casing (outer) F Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): ______ Time: ______ **(Pre-Pump Installation)**

Depth to Product (ft.): –

Water Level (ft.): 13.99 Time: 0855 **(Post-Pump Installation, Pre-Purge)**

Total Well Depth (ft.) - Post Sampling: 32.93 Time: 1055

PID Reading (PPM) - Unopened: 0 Opened: 15

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ______ Screened Interval (ft.): ______

Pump Intake Set @ (ft.): 30 Controller Settings / Pressure: CPM 4 D/5 P = 40

Comments:

SAMPLE DATA

Sample ID #: 1738GW02 Dup. Y N - (ID#: 1738GW02D)

Sample Time: 1000 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ very light Fuel odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40mL	3	HCL	MtBE / BTEX
" "	2	"	TPH GRO
1L Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW02 (G written above)

DATE: 9/16/10

PROJECT: 1738 Mtbe Investigation

SAMPLER (s): D. Hope

SAMPLE ID: 1738GW02

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0855	13.99	- (Water Level : Post-Pump Installation, Pre-Start)								
0903	- (Start of Purging)		—	29.16	2.537	3.91	6.41	-26	0.43	clear, w/very light fuel odor.
0908	15.23	1100	220	29.06	2.545	2.54	6.42	-38	0.07	Bump press. down
0913	15.05	1700	120	29.09	2.544	2.21	6.44	-25	-0.85	
0918	14.98	2400	140	29.08	2.541	1.99	6.45	-16	-1.07	
0923	14.95	2950	110	29.14	2.538	1.90	6.45	-17	-1.06	
0928	14.93	3400	90	29.12	2.537	1.87	6.46	-12	-1.40	Bump press. up.
0938	14.97	—	—	29.11	2.530	1.92	6.46	-13	-1.20	(10 min. interval) Meas. Flask overflowed
0943	14.97	900	180	29.12	2.527	1.92	6.46	-9.5	-1.48	
0948	14.98	1450	110	29.12	2.524	1.98	6.46	-4.5	-1.58	
0953	14.99	2000	110	29.14	2.522	1.98	6.46	-4.6	-1.61	
0958	14.99	2600	120	29.16	2.522	1.95	6.46	-4.5	-1.52	
1000	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW03 DATE: 9/18/10

PROJECT: MtBE Investigation WEATHER: Sunny, ~ 85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F | Well Cap: G | PVC Locking Cap/Plug: F

Cap Lock: None | Cover Bolts: None | Water over PVC? Y / N (N circled)

Casing (outer): G | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup (Flushmount circled)

Comments:

(OTHER):

Static Water Level (ft.): 16.36 Time: 0850 (Pre-Pump Installation)

Depth to Product (ft.):

Water Level (ft.): 16.34 Time: 0904 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 28.72 Time: 1055

PID Reading (PPM) - Unopened: 0 Opened: 130.2

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): Screened Interval (ft.):

Pump Intake Set @ (ft.): 26 Controller Settings / Pressure: CPM4 10/5 - P=35

Comments:

SAMPLE DATA

Sample ID #: 1738GW03 Dup.: Y / N (N circled) (ID#:)

Sample Time: 1026 MS / MSD: Y / N (N circled) Field Filtered: Y / N (N circled)

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ strong Fuel odor (Gasoline +/or Benzene)

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE/BTEX
"	2	"	TPH GRO
1L Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW03
DATE: 9/18/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW03

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.] 16.34	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0904	~~20.72~~	- (Water Level : Post-Pump Installation, Pre-Start)								
0910	- (Start of Purging)		—	29.68	3.389	4.51	6.82	-101	8.5	Clear w/ Moderate Fuel odor
0915	16.64	950	190	29.69	3.443	3.92	6.83	-114	4.0	
0920	16.63	1850	180	29.69	3.453	3.61	6.83	-114	0.8	
0925	16.62	2750	180	29.70	3.454	3.12	6.82	-113	-0.56	
0930	16.65	3600	170	29.73	3.452	2.68	6.80	-116	-1.44	
0935	16.64	4400	160	29.79	3.452	2.18	6.79	-112	-1.00	
0940	16.64	5200	160	29.79	3.452	1.62	6.78	-112	-2.15	
0945	16.64	6000	160	29.86	3.448	0.95	6.76	-113	-2.37	
0950	16.65	6900	180	29.85	3.447	0.65	6.75	-105	-1.85	
0955	16.64	7600	140	29.88	3.445	0.55	6.74	-102	-1.81	
1000	16.64	8200	120	29.88	3.453	0.50	6.73	-96	-1.95	
1005	16.64	8900	140	29.90	3.454	0.45	6.73	-101	-1.93	
1010	16.64	9650	150	29.92	3.452	0.41	6.72	-97	-1.87	
1015	16.64	10400	150	29.96	3.452	0.37	6.72	-95	-1.85	
1020	16.64	11200	160	29.94	3.455	0.35	6.71	-93	-1.81	
1025	16.64	12000	160	29.95	3.456	0.34	6.70	-91	-1.80	
1026	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW04 DATE: 9/16/2010

PROJECT: 1738 MTBE Investigation WEATHER: Partly Cloudy, Mid 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: F

Cap Lock: G Cover Bolts: F Water over PVC? Y / N

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2 in. Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 16.92 Time: 0845 (Pre-Pump Installation)

Depth to Product (ft.): NA

Water Level (ft.): 16.48 Time: 0855 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: Time:

PID Reading (PPM) - Unopened: Background (0.0 ppm) Opened: Background

PURGE DATA

Pump Type: Bladder (Geotech)

From Boring Log: Total Depth (ft.): Screened Interval (ft.):

Pump Intake Set @ (ft.): 26 ft. Controller Settings / Pressure: CPM4 10/5, Pressure at approximately 20.

Comments:

SAMPLE DATA

Sample ID #: 1738 GW04 Dup.: Y / N - (ID#:)

Sample Time: 1020 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: A. Gailey Signature:

Sample Description: Clear - No odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA	3	HCL	BTEX / MTBE
1L Amber	2	—	DRO
40 ml VOA	3	HCL	GRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW04

DATE: 9/16/2010

PROJECT: 1738 MTBE Investigation

SAMPLER (s): A. Gailey, C. Krikorek

SAMPLE ID: ~~MW~~ 1738 ~~B~~W04

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0855	16.48	- (Water Level : Post-Pump Installation, Pre-Start)								
0905	- (Start of Purging)									
0910	17.49	1400	280	31.21	1.133	3.98	6.87	51	23.2	Slightly clear, no odor, pump adjust
0915	17.51	400	80	31.40	1.164	2.81	6.84	47	23.2	
0920	17.56	550	110	31.16	1.198	1.24	6.84	43	22.3	
0925	17.59	450	90	31.12	1.214	0.84	6.85	39	20.4	
0930	17.59	450	90	31.36	1.228	0.68	6.86	37	17.0	
0935	17.55	400	80	31.61	1.242	0.61	6.87	35	17.0	
0940	17.56	450	90	31.26	1.270	0.56	6.88	34	15.6	
0945	17.57	400	80	31.32	1.279	0.52	6.88	34	14.8	
0950	17.60	400	80	31.23	1.287	0.49	6.88	34	15.3	
0955	17.59	400	80	31.31	1.294	0.46	6.89	33	14.1	
1000	17.65	500	100	30.89	1.304	0.45	6.88	33	14.6	
1020	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Page: ___ of ___

14.03 TD

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW05 DATE: 9/18/10

PROJECT: 1738 MtBE Invest. WEATHER: Mostly Sunny + Warm – High 90's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: F PVC Locking Cap/Plug: F

Cap Lock: — Cover Bolts: Missing Water over PVC? Y/N (N circled)

Casing (outer): G Casing (inner): G SWL Reference Mark: Yes Reference Mark Location? PVC

Casing Dia.: 2 in. Casing Material: PVC Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 5.47 Time: 1400 (Pre-Pump Installation)

Depth to Product (ft.): NA

Water Level (ft.): 5.10 Time: 1410 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 14.03 Time: 1442

PID Reading (PPM) - Unopened: Background (0.0) Opened: Background (0.0)

PURGE DATA

Pump Type: Bladder Pump (Geotech)

From Boring Log: Total Depth (ft.): 14.03 (Field) Screened Interval (ft.):

Pump Intake Set @ (ft.): 10.0 Controller Settings / Pressure: CPM4 Pressure @ 25

Comments:

SAMPLE DATA

Sample ID #: 1738 MW05 Dup.: Y/N (N circled) (ID#:)

Sample Time: 1520 MS / MSD: Y/N (N circled) Field Filtered: Y/N (N circled)

Sampled By: A. Gailey Signature:

Sample Description: Clear - With a Slight Sweet odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA	3	HCL	MTBE + BTEX
40 ml VOA	2	HCL	TPH GRO
1L Amber	2	—	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW05
DATE: 9/18/10
PROJECT: 1738 MtBE Investigation

SAMPLER (s): A. Gailey
SAMPLE ID: 1738 GW05
1738 GW05

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1410	5.10	- (Water Level : Post-Pump Installation, Pre-Start)								
1415	- (Start of Purging)									
1420	6.76	2000	400	28.85	17.90	2.35	6.27	45.7	33.6	Adj. Pump. Clearing - No odor
1425	6.72	400	80	29.16	19.59	1.68	6.22	44.1	26.8	Clearing. No odor.
1430	6.72	800	260	28.76	21.44	0.89	6.17	38.4	40.3	" " Pump Adj
1435	6.67	400	80	29.09	20.46	0.94	6.19	36.0	36.3	Clearing - Slight Sweet odor
1440	6.59	350	70	29.29	20.86	0.87	6.16	28.6	41.5	" "
1445	6.64	420	84	28.81	20.87	0.63	6.15	27.5	39.3	" " Pump Adj.
1450	6.47	220	44	28.92	20.66	0.58	6.15	27.5	27.9	" "
1455	6.60	400	80	28.85	20.43	0.57	6.15	25.4	30.9	" "
1500	6.58	450	90	28.67	20.03	0.55	6.15	24.7	25.7	" "
1505	6.58	350	70	28.78	20.07	0.53	6.15	25.0	24.3	
1510	6.56	350	70	28.76	19.96	0.53	6.15	25.2	26.2	
1520	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 173BGW054 DATE: 9/18/10

PROJECT: MtBE Investigation WEATHER: Mostly cloudy, some breeze, ~87°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Newly Installed Well: 9/15/10 Developed: 9/17/10

Pad ____ Well Cap ____ PVC Locking Cap/Plug ____

Cap Lock ____ Cover Bolts ____ Water over PVC? Y / N

Casing (outer) ____ Casing (inner) ____ SWL Reference Mark ____ Reference Mark Location? ____

Casing Dia.: ____ Casing Material: ____ Flushmount / Stickup

Comments: ____

(OTHER):

Static Water Level (ft.): 5.36 Time: 1259 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 5.08 Time: 1308 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 42.60 Time: 1455

PID Reading (PPM) - Unopened: 0 Opened: 4.9

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ____ Screened Interval (ft.): ____

Pump Intake Set @ (ft.): 38 Controller Settings / Pressure: CPM4 10/5 P=50

Comments: ____

SAMPLE DATA

Sample ID #: 173BGW054 Dup.: Y (N) (ID#:)

Sample Time: 1426 MS / MSD: Y (N) Field Filtered: Y (N)

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ light sweet odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE/BTEX
"	2	"	TPH GRO
1L Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW05L
DATE: 9/18/10
PROJECT: MtBE Investigation

SAMPLER (s): D H[illegible]
SAMPLE ID: 1738 GW05L

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1308	5.08	- (Water Level : Post-Pump Installation, Pre-Start)								
1315	- (Start of Purging)		—	29.34	16.31	2.71	6.28	44	2602	cloudy, w/very light sweet odor
1320	5.54	900	180	28.67	17.33	1.20	6.21	50	3481	
1325	5.54	2000	220	28.59	17.01	0.86	6.23	47	1573	
1330	5.63	3100	220	28.44	16.46	0.68	6.25	41	2546	Bump press. down
1335	5.58	4200	220	28.44	15.74	0.62	6.27	39	75	
1340	5.56	5400	240	28.24	15.35	0.55	6.28	37	54	
1345	5.57	6400	200	28.06	15.07	0.49	6.29	37	40	
1350	5.58	7500	220	27.98	14.92	0.46	6.29	36	27	clearer
1355	5.59	—	—	27.99	14.85	0.45	6.29	37	20	Meas. Flask overflowed
1400	5.62	1100	220	28.01	14.80	0.41	6.30	35	19	
1405	5.62	2200	220	27.98	14.77	0.39	6.30	35	17	
1410	5.62	3200	200	27.98	14.72	0.37	6.30	33	16	
1415	5.63	4300	220	27.99	14.70	0.38	6.31	31	13	
1420	5.64	5500	240	27.93	14.66	0.37	6.30	27	12	
1425	5.63	6500	200	27.89	14.64	0.35	6.30	25	12	
1426	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [illegible]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW05R DATE: 9/20/10

PROJECT: MtBE Investigation WEATHER: Mostly Sunny, breezy, ~90°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad F Well Cap F PVC Locking Cap/Plug F

Cap Lock None Cover Bolts — Water over PVC? ~~Y/N~~

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 3.73 Time: 1244 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 3.62 Time: 1252 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 26.89 Time: 1500

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): Screened Interval (ft.):

Pump Intake Set @ (ft.): 24 Controller Settings / Pressure: CPM4 10/5 P= 40

Comments:

SAMPLE DATA

Sample ID #: 1738GW05R Dup.: Y / N (ID#:)

Sample Time: 1411 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ Moderate sweet (solvent) odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE / BETX
"	2	"	TPH GRO
1l Amber	2	None	TPH DRO
250ml pl	1	H2SO4	COD
125ml pl	1	None	Nitrate
" "	1	"	Microbial Plate Count
500ml pl	1	HNO3	T. Fe+MS
" "	1	"	Diss. Fe+MS

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW05R
DATE: 9/20/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW05R

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1252	3.62	- (Water Level : Post-Pump Installation, Pre-Start)								
1300	- (Start of Purging)		–	29.31	7.646	3.75	6.51	91	3317	Milky, slight sweet odor
1305	4.10	950	190	28.19	7.848	1.47	6.42	53	3482	
1310	4.12	1900	190	27.98	7.782	1.01	6.40	45	3142	
1315	4.18	2900	200	27.86	7.764	0.96	6.40	43	2,363	Bump press. Down
1320	4.12	3800	180	27.79	7.738	0.90	6.40	42	1,859	
1325	4.12	4700	180	27.75	7.703	0.92	6.41	42	57	clearer
1330	4.13	5600	180	27.71	7.668	0.80	6.41	41	37	
1335	4.13	6550	190	27.73	7.634	0.80	6.41	41	26	
1340	4.13	7450	180	27.72	7.632	0.72	6.41	40	23	
1345	4.13	8400	190	27.71	7.620	0.64	6.41	39	17	
1350	4.14	9300	180	27.67	7.608	0.69	6.42	40	16	
1355	4.14	10200	180	27.67	7.581	0.53	6.41	39	13	
1400	4.14	11100	180	27.65	7.562	0.55	6.42	38	10	
1405	4.13	12000	180	27.67	7.557	0.57	6.42	38	10.5	
1410	4.14	12950	190	27.63	7.559	0.58	6.42	38	10.0	
1411	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Page: 1 of 1

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW06 DATE: 9/17/10

PROJECT: MtBE Investigation WEATHER: Mostly cloudy, humid, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F Well Cap: F PVC Locking Cap/Plug: F

Cap Lock: None Cover Bolts: ~~None~~ Water over PVC? Y / N

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 7.06 Time: 0809 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 6.48 Time: 0817 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.17 Time: 1015

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): Screened Interval (ft.):

Pump Intake Set @ (ft.): 16 Controller Settings / Pressure: CPM 4 10/5 P = 20

Comments:

SAMPLE DATA

Sample ID #: 1738GW06 Dup.: Y / N (ID#:)

Sample Time: 0950 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: Darrin Hope Signature: [signature]

Sample Description: Clear, No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE/BTEX
" "	2	"	TPH GRO
1L Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW06
DATE: 9/17/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW06

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0817	6.48	- (Water Level : Post-Pump Installation, Pre-Start)								
0833	- (Start of Purging)		—	27.38	11.81	1.06	6.81	30.1	-0.32	clear, w/No odor
0838	7.78	400	80	27.44	11.84	0.80	6.81	30.3	0.14	
0843	7.97	800	80	27.51	11.69	0.62	6.81	29.6	1.24	
0848	8.09	1200	80	27.67	11.43	0.51	6.82	28.4	0.79	
0853	8.09	1550	70	27.73	11.17	0.46	6.83	27.6	0.86	
0858	8.11	1900	70	27.73	10.82	0.43	6.84	27.7	0.86	Bump press. up slightly
0903	8.26	2300	80	27.71	10.41	0.40	6.85	27.6	0.94	
0908	8.40	2800	100	27.71	9.984	0.36	6.86	26.5	0.91	
0913	8.54	3300	100	27.71	9.555	0.34	6.87	25.7	0.98	
0918	8.58	3750	90	27.93	9.220	0.33	6.88	25.9	1.14	
0923	8.53	4250	100	28.02	8.975	0.32	6.89	25.1	1.27	
0928	8.63	4750	100	27.80	8.700	0.32	6.89	24.4	1.32	
0933	8.52	5250	100	28.11	8.341	0.29	6.91	24.1	1.37	
0938	8.45	5500	50	28.12	8.223	0.28	6.91	24.5	1.41	
0943	8.53	5900	80	27.99	8.127	0.29	6.92	23.2	1.40	Bump press. up slightly
0948	8.57	6500	120	27.91	7.980	0.28	6.92	22.1	1.36	
0950	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW07 DATE: 9/21/10

PROJECT: MtBE Investigation WEATHER: Sunny, little breeze, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Newly Installed Well : 9/17/10 Developed ! 9/18/10

Pad ______ Well Cap ______ PVC Locking Cap/Plug ______

Cap Lock ______ Cover Bolts ______ Water over PVC? Y / N

Casing (outer) ______ Casing (inner) ______ SWL Reference Mark ______ Reference Mark Location? ______

Casing Dia.: ______ Casing Material: ______ Flushmount / Stickup

Comments: ______

(OTHER): Static Water Level (ft.): 2.72 Time: 1030 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 2.00 Time: 1050 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 27.52 Time: 1210

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ______ Screened Interval (ft.): ______

Pump Intake Set @ (ft.): 23 Controller Settings / Pressure: CPM4 10/5 P= 25

Comments: ______

SAMPLE DATA

Sample ID #: 1738GW07 Dup.: Y/N (ID#:)

Sample Time: 1145 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear. No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE/BTEX
"	2	"	TPH GRO
1l Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW07
DATE: 9/21/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW07

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1050	2.00	- (Water Level : Post-Pump Installation, Pre-Start)								
1054	- (Start of Purging)	—	—	30.23	10.90	5.05	6.56	37	2,371	1. Hle cloudy. No odor
1059	3.66	1000	200	29.34	10.68	3.50	6.47	44	2,153	Bumped press down
1104	3.82	1600	120	29.49	10.66	3.02	6.45	45	143	
1109	3.92	2450	170	29.71	10.64	2.59	6.43	46	2298	
1114	4.05	3200	150	29.53	10.62	2.46	6.43	48	71	
1119	4.03	3850	130	29.61	10.61	1.98	6.42	49	1,691	
1124	4.12	4500	130	29.42	10.60	2.04	6.41	49	46	
1129	4.15	5200	140	29.22	10.62	2.44	6.41	50	22	
1134	4.13	5800	120	29.20	10.60	2.05	6.40	51	24	
1139	4.13	6600	160	29.21	10.61	2.01	6.40	50	23	
1144	4.15	7300	140	29.14	10.58	2.20	6.40	50	23	
1145	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Page: 1 of 1

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW08 DATE: 9/21/10

PROJECT: MtBE Investigation WEATHER: Mostly sunny, some breeze, ~83°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Newly Installed Well: 9/17/10 Developed: 9/18/10

Pad ____ Well Cap ____ PVC Locking Cap/Plug ____

Cap Lock ____ Cover Bolts ____ Water over PVC? Y / N

Casing (outer) ____ Casing (inner) ____ SWL Reference Mark ____ Reference Mark Location? ____

Casing Dia.: ____ Casing Material: ____ Flushmount / Stickup

Comments: ____

(OTHER): Static Water Level (ft.): 2.93 Time: 0813 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 2.35 Time: 0820 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 26.96 Time: 1020

PID Reading (PPM) - Unopened: 0 Opened: 0.2

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ____ Screened Interval (ft.): ____

Pump Intake Set @ (ft.): 23 Controller Settings / Pressure: CPM 4 10/5 P=25

Comments: ____

SAMPLE DATA

Sample ID #: 1738GW08 Dup.: Y / N (ID#:)

Sample Time: 0954 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE / BTEX
"	2	"	TPH GRO
1l Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW08
DATE: 9/21/10
PROJECT: MTBE Investigation

SAMPLER (s): D. Hupe
SAMPLE ID: 1738GW08

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0820	2.35	- (Water Level : Post-Pump Installation, Pre-Start)								
0827	- (Start of Purging)		—	27.66	27.06	3.24	5.90	52	over	Very Turbid - no odor.
0832	4.02	1050	210	27.45	27.05	1.24	5.88	46	over	Bump press. Down
0837	3.95	1850	160	27.59	27.06	0.77	5.87	43	over	
0842	3.93	2600	150	27.61	27.05	0.60	5.87	41	over	Bump press. Down
0852	3.68	3800	120 ~~240~~	27.89	27.02	0.48	5.87	41	over	10 MIN Interval
0902	3.63	5000	120	27.99	27.04	0.43	5.86	39	2919	10 MIN Interval
0912	3.48	5850	85	28.63	27.04	0.40	5.86	37	1,892	10 MIN Interval
0917	3.48	6300	90	28.59	27.13	0.40	5.86	38	1,835	Back to 5 MIN Intervals - Bump press.
										up - Emptied Flow Cell - Restart
0928	3.48	—	—	28.73	26.90	1.58	5.91	40	1,929	clearer
0933	3.48	600	120	28.64	27.11	0.96	5.89	39	1,451	
0938	3.57	1050	90	28.73	27.19	0.81	5.89	38	1,404	
0943	3.57	1600	110	28.61	~~28.62~~ 27.21	0.78	5.88	38	45	clear
0948	3.62	2100	100	28.54	27.22	0.71	5.88	38	42	
0953	3.63	2600	100	28.56	27.23	0.71	5.88	38	41	
0954	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

27.1
TD

Well ID #: 1738 MW 09 DATE: 9/19/10

PROJECT: 1738 MtBE Investigation WEATHER: Mostly Sunny, Low 80's No Breeze, Humid.

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: G Cover Bolts: G Water over PVC? Y / N

Casing (outer): G Casing (inner): G SWL Reference Mark: ____ Reference Mark Location? PVC

Casing Dia.: 2 in. Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 3.12 Time: 0839 (Pre-Pump Installation)

Depth to Product (ft.): –

Water Level (ft.): 3.12 Time: 0851 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 27.1 Time: 1040

PID Reading (PPM) - Unopened: Background Opened: 26.5

PURGE DATA

Pump Type: Bladder

From Boring Log: Total Depth (ft.): 27.1 (Field measured) Screened Interval (ft.):

Pump Intake Set @ (ft.): 23.0 Controller Settings / Pressure: CPM4 10/5 Pressure at approximately 25

Comments:

SAMPLE DATA

Sample ID #: 1738 MW 09 Dup.: Y / N (ID#:)

Sample Time: 1015 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: A. Gruet Signature: [signature]

Sample Description: Clear - No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA	3	HCl	MTBE + BTEX
1 L Amber	2	–	TPH DRO
40 mL VOA	3	HCl	TPH GRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW09
DATE: 9/19/10
PROJECT: 1738 MTBE INV.

SAMPLER (s): A. Gainey
SAMPLE ID: 1738~~MW~~09 1738GW09

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0951	3.12	- (Water Level : Post-Pump Installation, Pre-Start)								
0952	- (Start of Purging)									
0858	3.60	1400	280	28.62	19.60	1.90	5.93	72.0	Highly Turbid	Highly Turbid. No odor.
0903	3.66	1050	210	27.81	19.47	0.90	5.92	51.9	" "	" "
0908	3.71	1400	280	27.53	19.44	0.65	5.91	47.5	825	Turbid. No odor.
0913	3.71	1200	240	27.54	19.43	0.51	5.90	45.8	1296	" "
0918	3.74	1400	280	28.00	19.34	0.40	5.90	43.9	1568	" "
0923	3.73	1050	210	28.08	19.34	0.36	5.89	43.9	52.9	Clearing. No odor
0928	3.73	1200	240	28.06	19.30	0.32	5.89	43.7	45.6	" "
0933	3.75	1400	280	28.08	19.27	0.29	5.89	44.8	38.0	" "
0938	3.76	1400	280	28.10	19.28	0.27	5.89	45.9	35.3	" "
0943	3.76	1400	280	28.10	19.31	0.25	5.88	47.2	30.0	" "
0948	3.75	1350	~~280~~ 270	27.94	19.31	0.24	5.88	47.4	35.1	" "
0953	3.74	1100	220	28.05	19.36	0.22	5.88	48.6	33.6	Clearing. No odor.
0958	3.76	1400	280	27.96	19.40	0.23	5.88	49.3	23.6	
1003	3.78	1400	280	27.97	19.60	0.20	5.87	50.3	28.4	
1007	3.78	1250	250	27.96	19.57	0.20	5.87	52.3	27.1	
1011	3.78	1200	240	27.99	19.59	0.19	5.87	52.5	27.5	Clear. No odor.
1015	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW10 DATE: 9/19/10

PROJECT: MtBE Investigation WEATHER: Mostly Sunny, little breeze, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Newly Installed Well: 9/16/10 Developed: 9/17/10

Pad ______ Well Cap ______ PVC Locking Cap/Plug ______

Cap Lock ______ Cover Bolts ______ Water over PVC? Y / N

Casing (outer) ______ Casing (inner) ______ SWL Reference Mark ______ Reference Mark Location? ______

Casing Dia.: ______ Casing Material: ______ Flushmount / Stickup

Comments: ______

(OTHER): Static Water Level (ft.): 4.72 Time: 0838 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 4.70 Time: 0846 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 26.97 Time: 1040

PID Reading (PPM) - Unopened: 0 Opened: 4.0

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ______ Screened Interval (ft.): ______

Pump Intake Set @ (ft.): 23 Controller Settings / Pressure: CPM4 10/5 P≈25

Comments: ______

SAMPLE DATA

Sample ID #: 1738GW10 Dup.: Y / N - (ID#:)

Sample Time: 1006 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ very light sweet odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE / BTEX
"	2	"	TPH GRO
1 l Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW10
DATE: 9/15/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hupe
SAMPLE ID: 1738GW10

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0846	4.70	- (Water Level : Post-Pump Installation, Pre-Start)								
0854	- (Start of Purging)		—	27.81	9.989	2.78	6.21	103	over	Turbd, w/ very light sweet odor
0900	5.08	1150	230	27.68	9.947	1.20	6.21	76	over	
0905	5.08	2100	190	27.66	9.882	0.76	6.23	68	6,106	
0910	5.05	3100	200	27.63	9.796	0.61	6.24	59	4,126	
0915	5.08	3900	160	27.66	9.764	0.54	6.24	57	2,440	
0920	5.08	4800	180	27.67	9.723	0.50	6.25	51	2,230	
0925	5.08	5800	200	27.69	9.676	0.43	6.25	48	60	
0930	5.08	6800	200	27.78	9.601	0.41	6.26	44	44	
0935	5.08	7650	170	27.79	9.546	0.40	6.27	43	41	
0940	5.07	8600	190	27.77	9.483	0.36	6.28	40	33	
0945	5.05	9600	200	27.78	9.424	0.35	6.27	38	27	
0950	5.05	10300	140	27.80	9.377	0.34	6.29	37	23	
0955	5.05	11200	180	27.81	9.341	0.34	6.29	35	23	
1000	5.05	12200	200	27.91	9.298	0.32	6.30	33	24	
1005	5.05	13000	220	27.92	9.263	0.32	6.30	32	22	
1006	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW11 DATE: 9/17/10

PROJECT: MtBE Investigation WEATHER: Mostly Sunny, breezy, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Well Just Installed: 9/13/10

Developed: 9/15/10

Pad ______ Well Cap ______ PVC Locking Cap/Plug ______

Cap Lock ______ Cover Bolts ______ Water over PVC? Y / N

Casing (outer) ______ Casing (inner) ______ SWL Reference Mark ______ Reference Mark Location? ______

Casing Dia.: ______ Casing Material: ______ Flushmount / Stickup

Comments: ______

(OTHER): Static Water Level (ft.): 14.81 Time: 1022 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 14.52 Time: 1031 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 26.22 Time: 1220

PID Reading (PPM) - Unopened: ______ Opened: ______

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ______ Screened Interval (ft.): ______

Pump Intake Set @ (ft.): 24 Controller Settings / Pressure: CPM 4 10/5 P = 20

Comments: ______

SAMPLE DATA

Sample ID #: 1738GW11 Dup.: Y / N - (ID#:)

Sample Time: 1157 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature: [signature]

Sample Description: Clear, w/ Sweet (possible solvent) odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE / BTEX
"	2	"	TPH GRO
1l Amber	2	None	TPH DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW11
DATE: 9/17/10
PROJECT: MTBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW11

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1031	14.52	- (Water Level : Post-Pump Installation, Pre-Start)								
1036	- (Start of Purging)		—	32.01	9.898	3.57	6.72	-18	24	
1041	15.45	700	140	31.81	9.995	1.03	6.68	-43	37	Lightly cloudy w/ very light sweet odor
1046	15.63	1550	170	31.80	9.723	0.56	6.69	-55	44	Bump press. Down
1051	15.53	2200	130	32.01	9.407	0.45	6.70	-61	35	
1056	15.47	2700	100	32.07	9.245	0.44	6.72	-63	35	
1101	15.44	3200	100	32.10	9.033	0.41	6.72	-63	26	
1106	15.44	3650	90	32.20	8.814	0.43	6.73	-60	25	
1111	15.41	4000	70	32.38	8.680	0.42	6.74	-61	17	Bump press. up slightly
1116	15.42	4550	110	32.24	8.579	0.39	6.74	-60	16	
1121	15.46	5100	110	32.29	8.463	0.37	6.74	-61	14	
1126	15.46	5600	100	32.48	8.300	0.37	6.74	-61	10.7	
1131	15.42	5900	60	32.61	8.235	0.39	6.75	-61	9.5	Bump press. up slightly
1136	15.48	6600	140	32.29	8.148	0.37	6.75	-60	7.0	
1141	15.53	7200	120	32.20	8.135	0.35	6.74	-58	6.5	
1146	15.59	7800	120	32.32	8.125	0.35	6.74	-57	5.5	
1151	15.61	8350	110	32.35	8.109	0.35	6.75	-57	5.2	
1156	15.64	8950	120	32.32	8.084	0.35	6.74	-56	5.1	
1157	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738GW12 DATE: 9/20/10

PROJECT: MtBE Investigation WEATHER: Partly cloudy, some breeze, Humid, ~92°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor) Newly Installed Well: 9/14/10 Developed: 9/15/10

Pad ____ Well Cap ____ PVC Locking Cap/Plug ____

Cap Lock ____ Cover Bolts ____ Water over PVC? Y / N

Casing (outer) ____ Casing (inner) ____ SWL Reference Mark ____ Reference Mark Location? ____

Casing Dia.: ____ Casing Material: ____ Flushmount / Stickup

Comments: ____

(OTHER): Static Water Level (ft.): 20.06 Time: 0850 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 20.05 Time: 1052 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 30.28 Time: 1230

PID Reading (PPM) - Unopened: ____ Opened: ____

PURGE DATA

Pump Type: Geotech Bladder

From Boring Log: Total Depth (ft.): ____ Screened Interval (ft.): ____

Pump Intake Set @ (ft.): 26 Controller Settings / Pressure: CPM4 10/5 p = 35

Comments: ____

SAMPLE DATA

Sample ID #: 1738GW12 Dup.: Y / N - (ID#:)

Sample Time: 1157 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Hope Signature:

Sample Description: Clear. No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40ml	3	HCL	MtBE/BTEX
"	2	"	TPH GRO
1L Amber	2	None	TPH DRO
250 pl	1	H2SO4	COD
125 pl	1	None	Nitrate
" "	1	None	Microbial plate Count
500ml pl	1	HNO3	T. Fe & MS
" "	1	"	Diss. Fe & MS

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738GW12
DATE: 9/20/10
PROJECT: MtBE Investigation

SAMPLER (s): D. Hope
SAMPLE ID: 1738GW12

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1052	20.05	- (Water Level : Post-Pump Installation, Pre-Start)								
1056	- (Start of Purging)		—	29.83	7.391	4.50	6.87	20	1710	Milky, no odor
1101	20.62	~~2062~~ 1600	320	29.49	7.423	1.60	6.82	26	37	Bump press. Down
1106	20.75	2750	230	29.46	7.392	1.22	6.81	28	33	
1111	20.84	3950	240	29.44	7.270	1.01	6.81	28	24	Bumped press. Down
1116	20.86	5100	230	29.50	7.135	0.90	6.81	27	20	
1121	20.88	6200	220	29.49	6.941	0.82	6.82	26	12	
1126	20.92	7200	200	29.53	6.746	0.75	6.82	25	9.3	
1131	20.94	8200	200	29.63	6.613	0.73	6.83	24	6.5	
1136	20.96	9200	200	29.52	6.505	0.72	6.83	24	5.2	
1141	20.97	10200	200	29.47	6.330	0.73	6.83	23	4.7	
1146	20.98	11300	220	29.41	6.297	0.74	6.83	23	3.9	
1151	20.98	—	—	29.40	6.223	0.76	6.84	23	4.1	Meas. Flask overflowed
1156	20.98	1150	230	29.36	6.142	0.77	6.84	23	3.7	
1157	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Page: 1 of 1

Daily Meter Calibration Record

DAILY METER CALIBRATION RECORD

Date: 9/16/10 Time: 0715

Model: **YSI 556 MPS**	**Model:** **RAE 2000**
Serial #: 0551366	**Serial #:**

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.02	4.00
Buffer:	7	6.88	7.00
Buffer:	10	10.47	10.07
ORP (mV's)			
Std.:	240	243.1	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.405	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	7.99	8.72
Temp. (Celsius)		22.12	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model: LaMotte 2020	
Serial #: 10454	

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	9.14	10.00

DAILY METER CALIBRATION RECORD

Date: 9/16/10 Time: 0715

Model: YSI 556 MPS
Serial #: 096100709

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.85	4.00
Buffer:	7	7.17	7.00
Buffer:	10	9.77	9.96
ORP (mV's)			
Std.:	240	240.6	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.448	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.66	8.79
Temp. (Celsius)		21.92	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model: LaMotte 2020
Serial #: ~~26858~~ 11466

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	10.95	10.00

DAILY METER CALIBRATION RECORD

Date: 9/17/10 Time: 0715

Model: YSI 556 MPS	**Model:** RAE 2000
Serial #: 096100709	**Serial #:**

	Std.	Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.97	4.00
Buffer:	7	7.02	7.00
Buffer:	10	9.97	10.00
ORP (mV's)			
Std.:	240	246.3	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.420	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.25	8.53
Temp. (Celsius)		23.29	N/A

	Initial	Adjusted
Isobutylene (100ppm)	X	X

Model: LaMotte
Serial #: 10454

	Std.	Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	10.27	10.00

DAILY METER CALIBRATION RECORD

Date: 9/18/10 Time: 0715

Model: YSI 556 MPS
Serial #: 0551366

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.14	4.00
Buffer:	7	7.01	7.00
Buffer:	10	10.19	10.03
ORP (mV's)			
Std.:	240	239.5	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.434	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	10.96	8.81
Temp. (Celsius)		21.66	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model: LaMotte
Serial #: 10454

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	9.66	10.00

DAILY METER CALIBRATION RECORD

Date: 9/18/10 Time: 0715

Model: YSI 556 MPS
Serial #: 096100709

Model: RAE 2000
Serial #:

	Initial	Adjusted
pH (Std. Units)		
Buffer: 4	3.92	4.00
Buffer: 7	6.99	7.00
Buffer: 10	9.91	9.98
ORP (mV's)		
Std.: 240	234.9	240.0
Sp.Cond. (mS/cm)		
Std.: 1.413	1.485	1.413
D.O. (mg/l)		
Baro. Pressure (mm/Hg): 760	9.28	8.69
Temp. (Celsius)	22.32	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model: LaMotte
Serial #: 11466

	Initial	Adjusted
Turbidity (NTU's)		
Std.: 10	9.09	10.00

DAILY METER CALIBRATION RECORD

Date: 9/19/10 Time: 0710

Model: YSI 556 MPS	
Serial #: 09G100789	

Model: RAE 2000	
Serial #:	

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.89	4.00
Buffer:	7	7.00	7.00
Buffer:	10	9.92	9.99
ORP (mV's)			
Std.:	240	241.9	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.424	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	7.79	8.62
Temp. (Celsius)		22.42	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model:	
Serial #: 11466	

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	10.31	10.00

DAILY METER CALIBRATION RECORD

Date: 9/19/10 Time: 0710

Model: YSI 556 MPS	Model: RAE 2000
Serial #: 0551366	Serial #:

	Initial	Adjusted
pH (Std. Units)		
Buffer: 4	3.96	4.00
Buffer: 7	7.10	7.00
Buffer: 10	10.03	10.01
ORP (mV's)		
Std.: 240	239.4	240.0
Sp.Cond. (mS/cm)		
Std.: 1.413	1.490	1.413
D.O. (mg/l)		
Baro. Pressure (mm/Hg): 760	9.01	8.38
Temp. (Celsius)	22.09	N/A

	Initial	Adjusted
Isobutylene (100ppm)	X	

Model:
Serial #: 10454

	Initial	Adjusted
Turbidity (NTU's)		
Std.: 10	10.57	10.00

DAILY METER CALIBRATION RECORD

Date: 9/20/10 Time: 0720

Model: YSI 556 MPS	Model: RAE 2000
Serial #: 09G100709	Serial #:

	Initial	Adjusted
pH (Std. Units)		
Buffer: 4	3.99	4.00
Buffer: 7	6.95	7.00
Buffer: 10	10.01	10.00
ORP (mV's)		
Std.: 240	241.5	240.0
Sp.Cond. (mS/cm)		
Std.: 1.413	1.414	1.413
D.O. (mg/l)		
Baro. Pressure (mm/Hg): 760	9.27	8.50
Temp. (Celsius)	23.51	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model:
Serial #: 10V54

	Initial	Adjusted
Turbidity (NTU's)		
Std.: 10	10.0	10.0

DAILY METER CALIBRATION RECORD

Date: 9/21/10 Time: 0715

Model: YSI 556 MPS
Serial #: 096100709

Model: RAE 2000
Serial #:

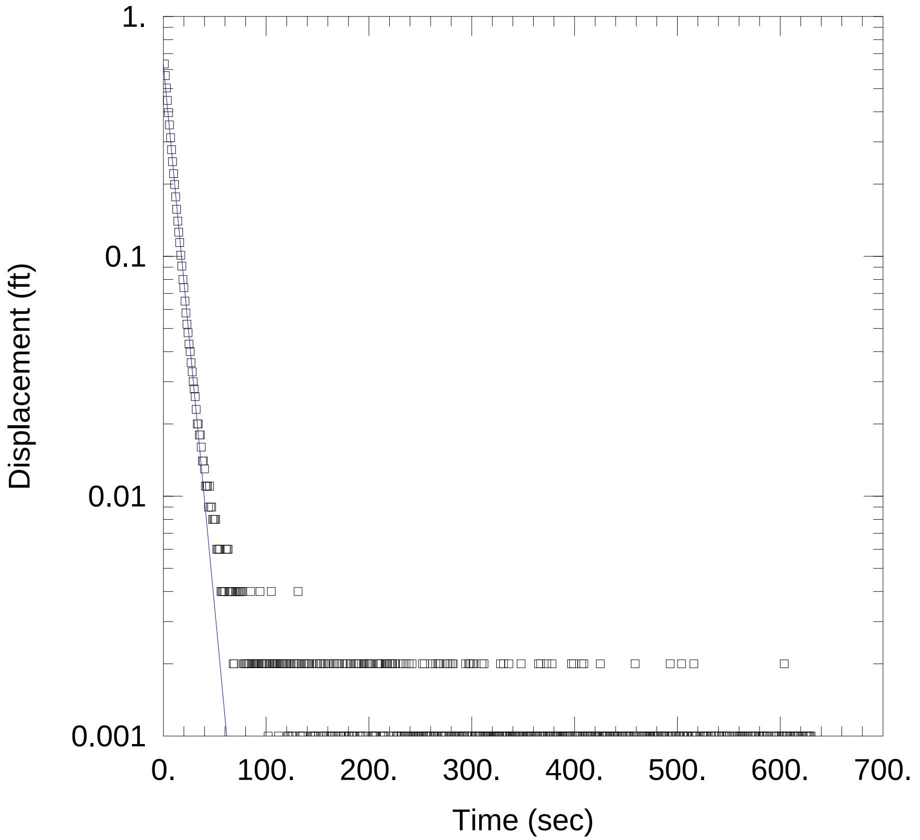
		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.01	4.00
Buffer:	7	7.04	7.00
Buffer:	10	9.98	
ORP (mV's)			
Std.:	240	237.6	240.0
Sp.Cond. (mS/cm)			
Std.:	1.413	1.402	1.413
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.21	8.55
Temp. (Celsius)		23.20	N/A

	Initial	Adjusted
Isobutylene (100ppm)	X	

Model:
Serial #: 10454

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10	9.93	10.00

Slug Test Data Plots



RISING HEAD

Data Set: K:\...\MW01R_MKD_DMG.aqt
Date: 05/10/13 Time: 09:14:59

PROJECT INFORMATION

Location: 1738
Test Well: MW01
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

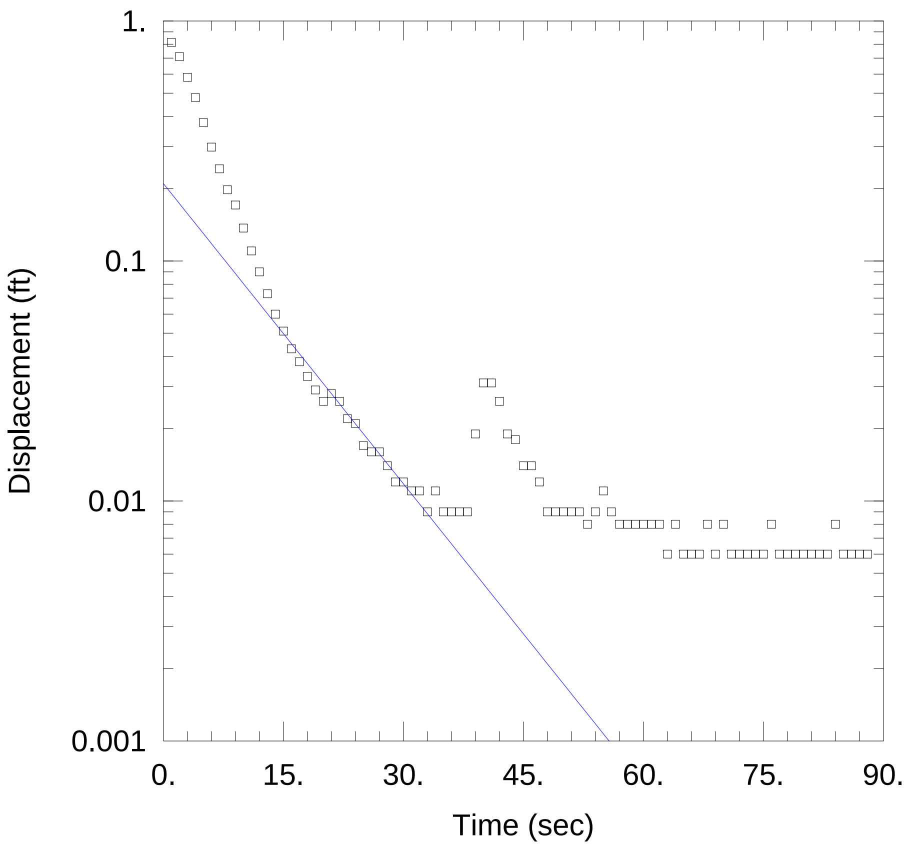
K = 8.866 ft/day
y0 = 0.6289 ft

AQUIFER DATA

Saturated Thickness: 18. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW01)

Initial Displacement: 1.54 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.083 ft
Static Water Column Height: 18. ft
Screen Length: 15. ft
Well Radius: 0.417 ft



FALLING HEAD

Data Set: K:\...\MW01F_MKD_DMG.aqt
Date: 03/26/13 Time: 09:57:55

PROJECT INFORMATION

Location: 1738
Test Well: MW01
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

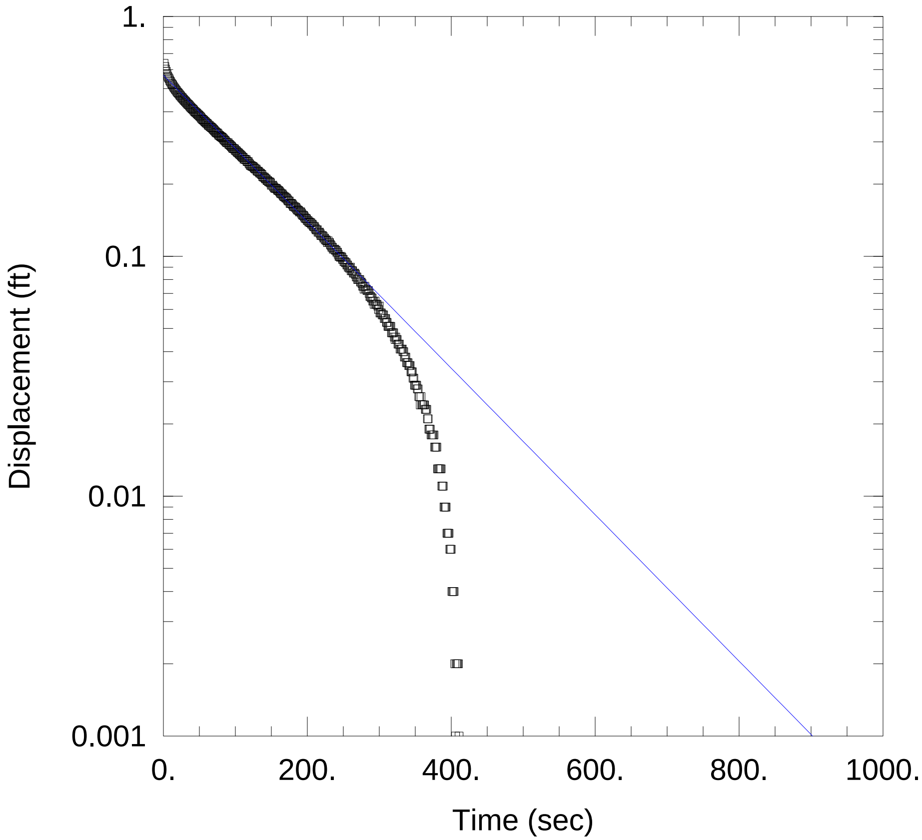
K = 8.141 ft/day
y0 = 0.2098 ft

AQUIFER DATA

Saturated Thickness: 18. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW01)

Initial Displacement: 1.98 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.083 ft
Static Water Column Height: 18. ft
Screen Length: 15. ft
Well Radius: 0.417 ft
Gravel Pack Porosity: 0.3



RISING HEAD

Data Set: K:\...\MW02R Hvorslev-MKD_Rev.aqt
Date: 04/04/13 Time: 06:38:39

PROJECT INFORMATION

Location: 1738
Test Well: MW02
Test Date: 9/19/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

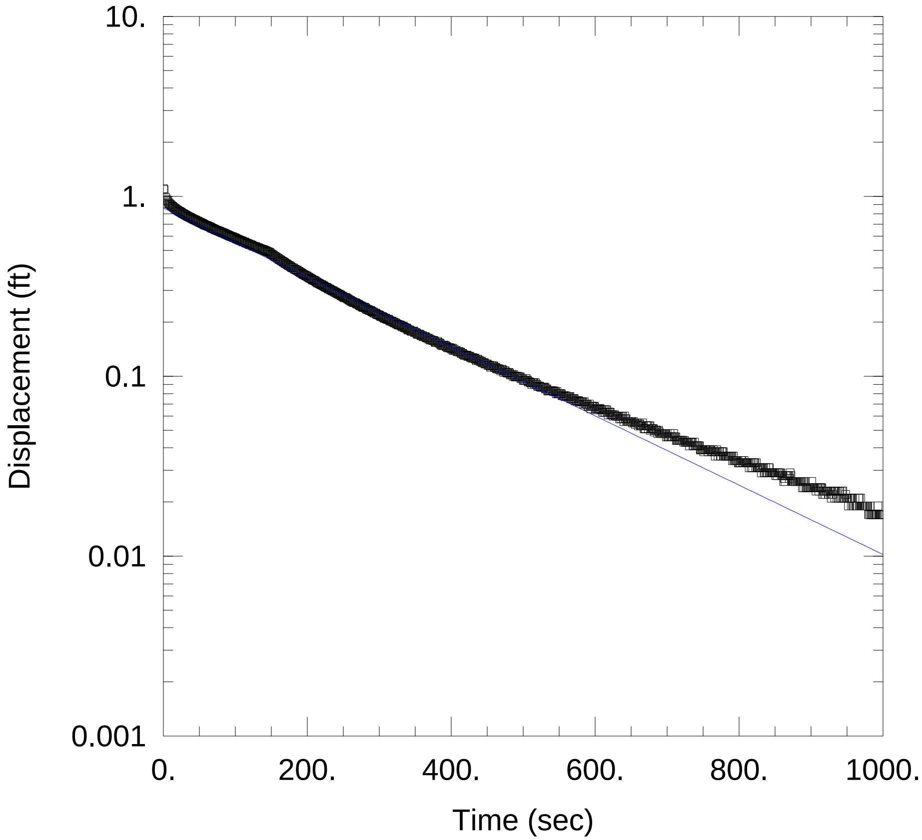
K = 0.5965 ft/day
y0 = 0.5684 ft

AQUIFER DATA

Saturated Thickness: 18.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW02)

Initial Displacement: 1.51 ft
Total Well Penetration Depth: 18.7 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.7 ft
Screen Length: 15. ft
Well Radius: 0.417 ft



FALLING HEAD

Data Set: K:\...\MW02F Hvorslev-MKD_Rev.aqt
Date: 04/04/13 Time: 06:38:02

PROJECT INFORMATION

Location: 1738
Test Well: MW02
Test Date: 9/19/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

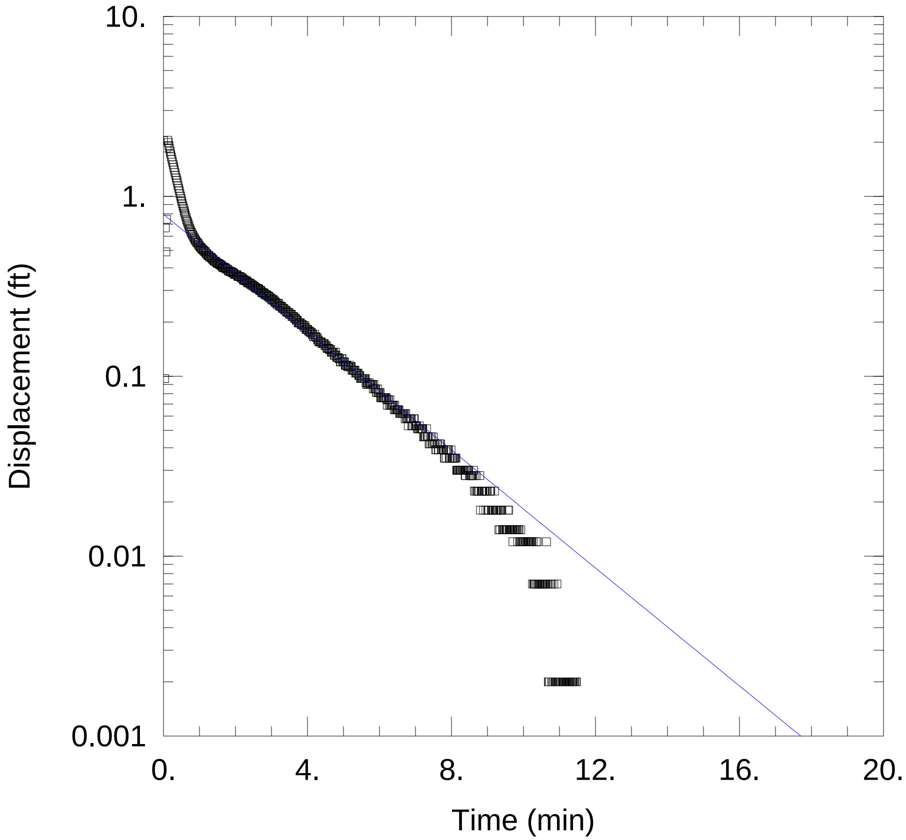
K = 0.3762 ft/day
y0 = 0.8611 ft

AQUIFER DATA

Saturated Thickness: 18.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW02)

Initial Displacement: 1.101 ft
Total Well Penetration Depth: 18.7 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.7 ft
Screen Length: 15. ft
Well Radius: 0.417 ft



RISING HEAD (2)

Data Set: K:\...\MW03R2_Rev.aqt
Date: 04/04/13 Time: 06:39:51

PROJECT INFORMATION

Location: 1738
Test Well: MW03
Test Date: 9/19/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

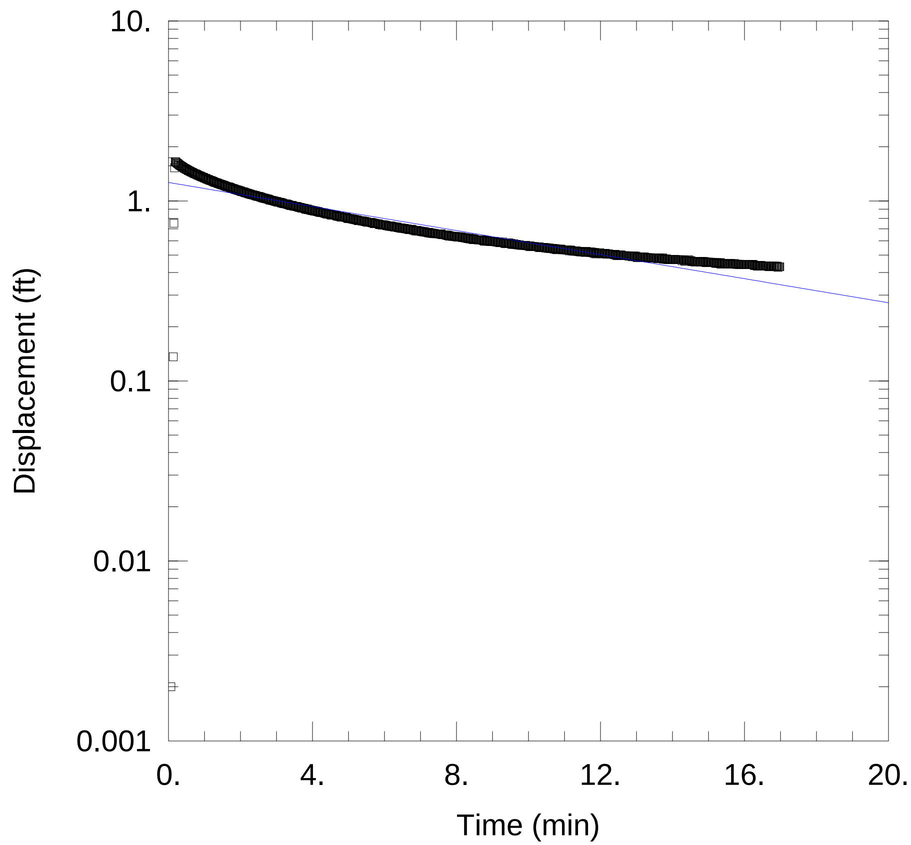
K = 0.5333 ft/day
y0 = 0.7945 ft

AQUIFER DATA

Saturated Thickness: 16.34 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW03)

Initial Displacement: 2.04 ft
Total Well Penetration Depth: 16.34 ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.34 ft
Screen Length: 15. ft
Well Radius: 0.417 ft
Gravel Pack Porosity: 0.3



RISING HEAD

Data Set: K:\...\MW05R_Rev.aqt
Date: 04/04/13 Time: 06:42:22

PROJECT INFORMATION

Location: 1738
Test Well: MW05
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

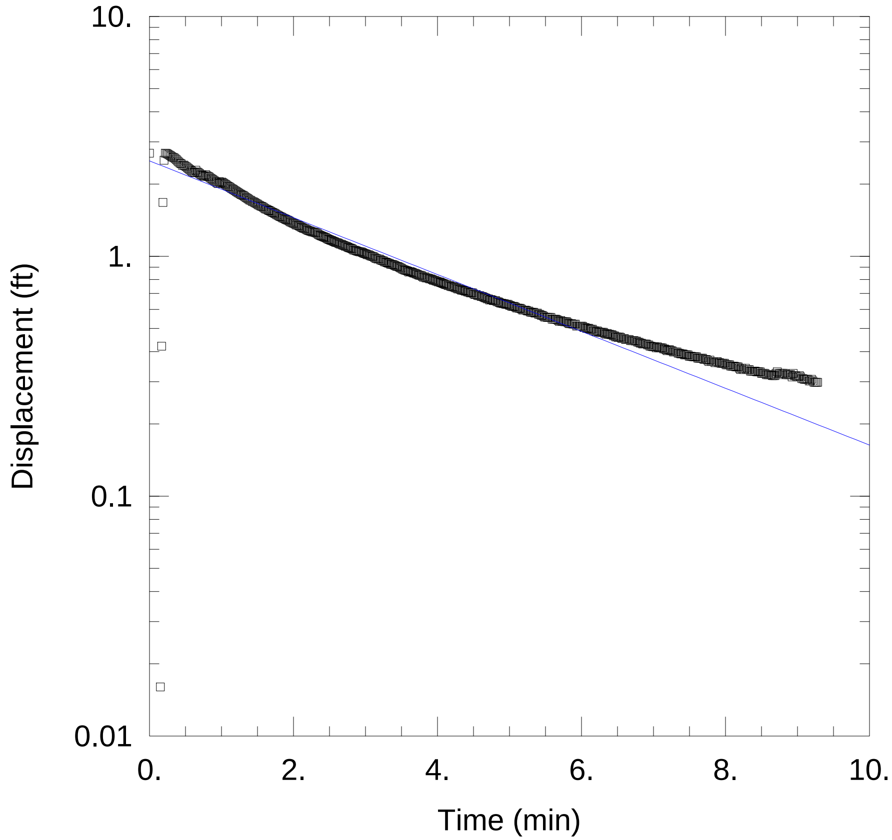
K = 0.1915 ft/day
y0 = 1.266 ft

AQUIFER DATA

Saturated Thickness: 8.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW05)

Initial Displacement: 1.65 ft
Total Well Penetration Depth: 8.7 ft
Casing Radius: 0.083 ft
Static Water Column Height: 8.7 ft
Screen Length: 7. ft
Well Radius: 0.417 ft
Gravel Pack Porosity: 0.3



FALLING HEAD

Data Set: K:\...\MW05F_Rev.aqt
Date: 04/04/13 Time: 06:40:36

PROJECT INFORMATION

Location: 1738
Test Well: MW05
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

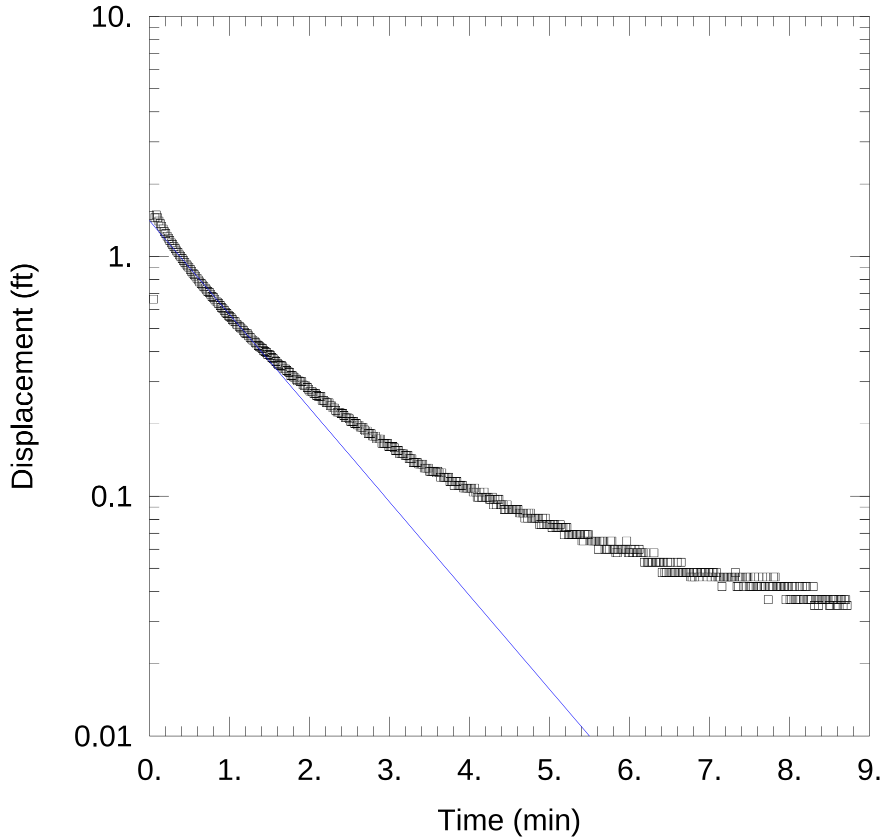
K = 0.7782 ft/day
y0 = 2.499 ft

AQUIFER DATA

Saturated Thickness: 8.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW05)

Initial Displacement: 2.69 ft
Total Well Penetration Depth: 8.7 ft
Casing Radius: 0.083 ft
Static Water Column Height: 8.7 ft
Screen Length: 7. ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.3



RISING HEAD

Data Set: K:\...\MW05RR Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:43:43

PROJECT INFORMATION

Location: 1738
Test Well: MW05R
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 1.954 ft/day
y0 = 1.407 ft

AQUIFER DATA

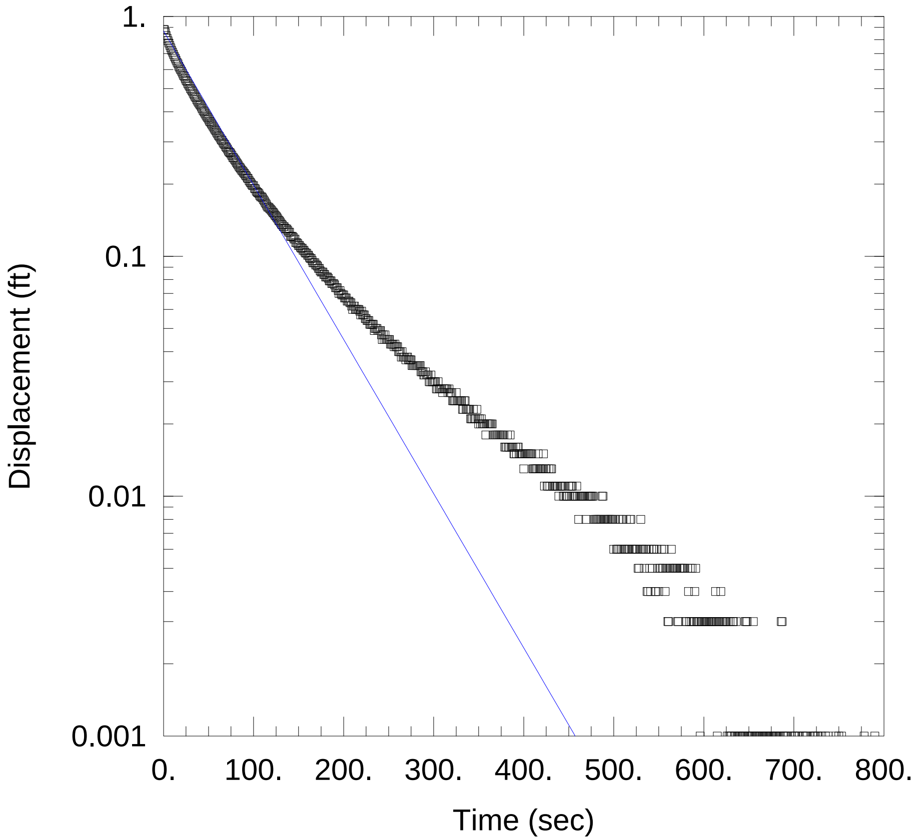
Saturated Thickness: 23. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW05R)

Initial Displacement: 1.48 ft
Total Well Penetration Depth: 23. ft
Casing Radius: 0.083 ft

Static Water Column Height: 23. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW05LR HvorslevMKD_Rev.aqt
Date: 04/04/13 Time: 06:41:50

PROJECT INFORMATION

Location: 1738
Test Well: MW05L
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 1.931 ft/day
y0 = 0.8685 ft

AQUIFER DATA

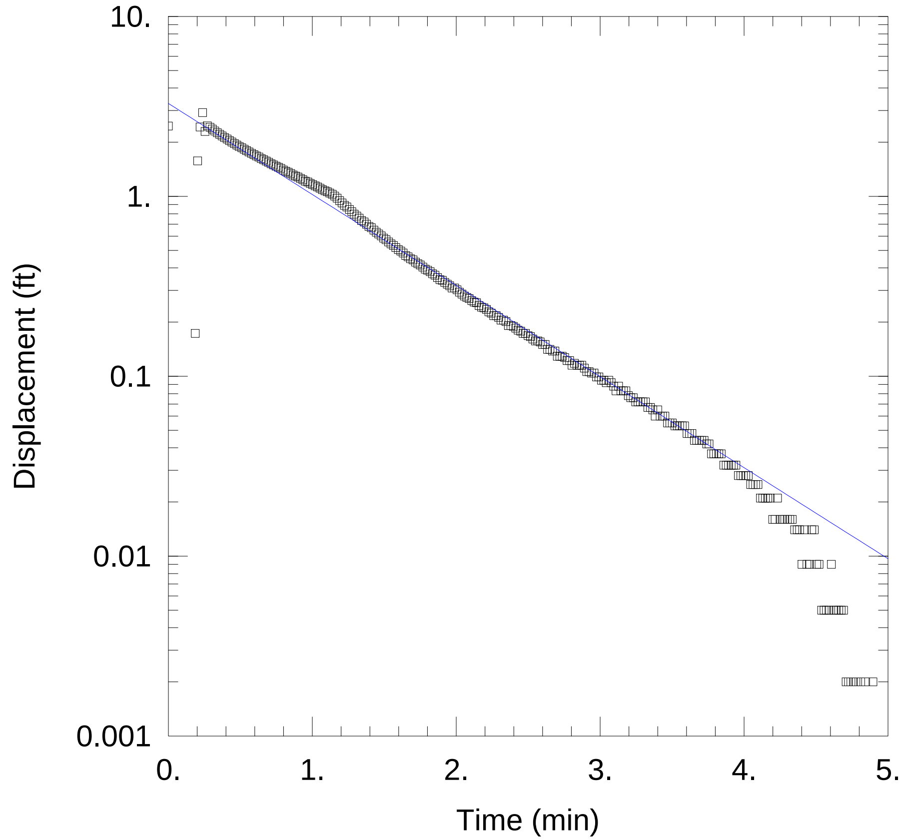
Saturated Thickness: 38. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW05L)

Initial Displacement: 0.882 ft
Total Well Penetration Depth: 38. ft
Casing Radius: 0.083 ft

Static Water Column Height: 38. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



FALLING HEAD

Data Set: K:\...\MW05LF Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:41:15

PROJECT INFORMATION

Location: 1738
Test Well: MW05L
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 2.533 ft/day
y0 = 3.283 ft

AQUIFER DATA

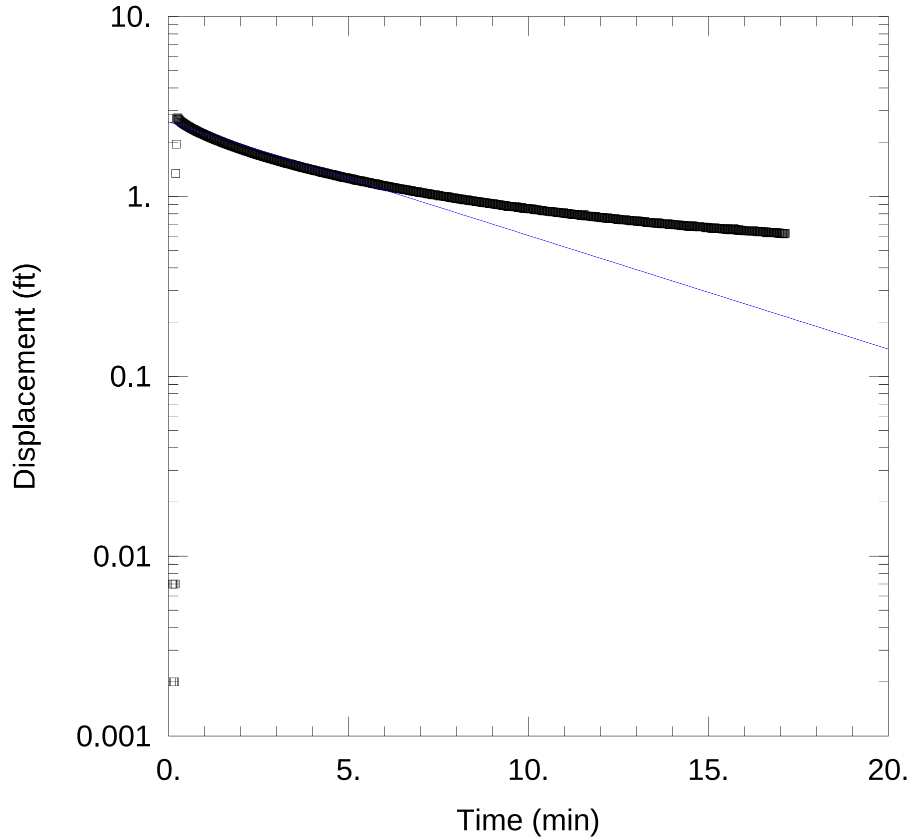
Saturated Thickness: 38. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW05L)

Initial Displacement: 2.46 ft
Total Well Penetration Depth: 38. ft
Casing Radius: 0.083 ft

Static Water Column Height: 38. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW07R Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:44:38

PROJECT INFORMATION

Location: 1738
Test Well: MW07
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

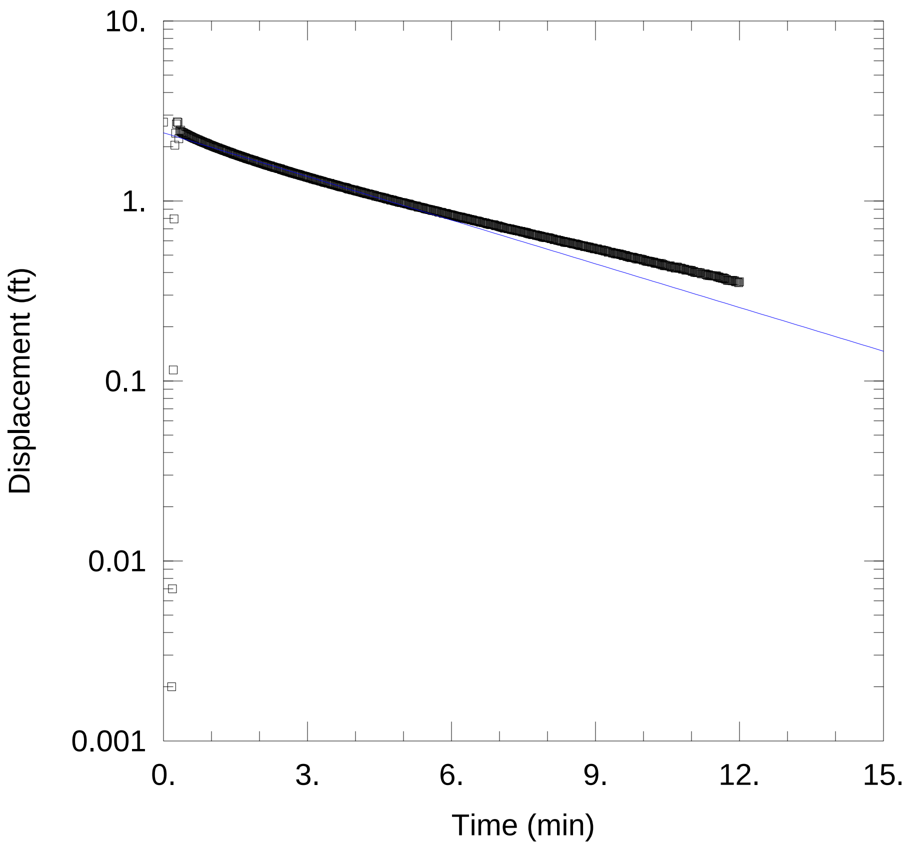
K = 0.3161 ft/day
y0 = 2.592 ft

AQUIFER DATA

Saturated Thickness: 25. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW07)

Initial Displacement: 2.72 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 25. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



FALLING HEAD

Data Set: K:\...\MW07F Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:44:08

PROJECT INFORMATION

Location: 1738
Test Well: MW07
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 0.4048 ft/day
y0 = 2.39 ft

AQUIFER DATA

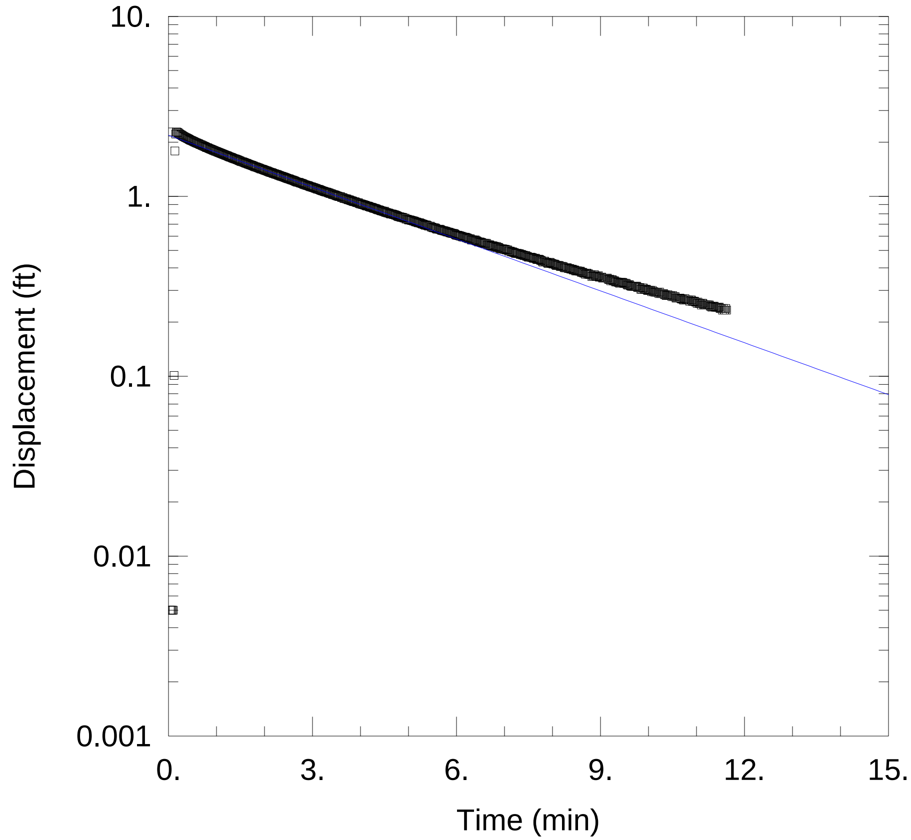
Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW07)

Initial Displacement: 2.74 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft

Static Water Column Height: 25. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW08R Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:45:32

PROJECT INFORMATION

Location: 1738
Test Well: MW08
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

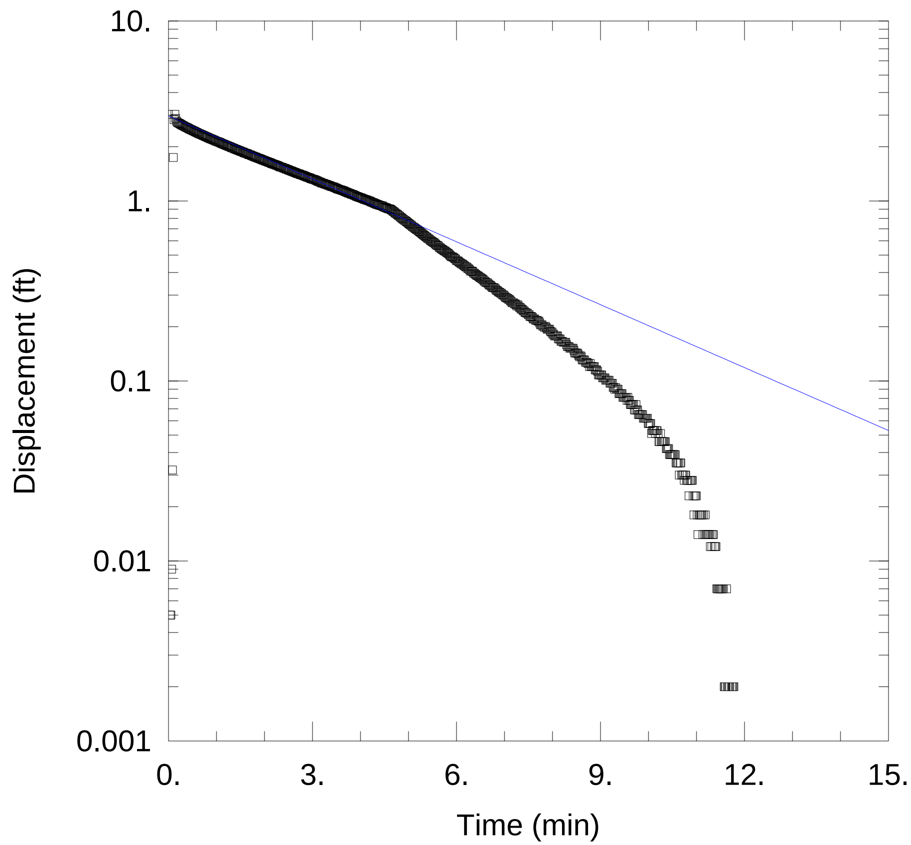
K = 0.4812 ft/day
y0 = 2.185 ft

AQUIFER DATA

Saturated Thickness: 23. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW08)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 23. ft
Casing Radius: 0.083 ft
Static Water Column Height: 23. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



FALLING HEAD

Data Set: K:\...\MW08F Hvorslev_Rev.aqt
Date: 04/04/13 Time: 06:45:08

PROJECT INFORMATION

Location: 1738
Test Well: MW08
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

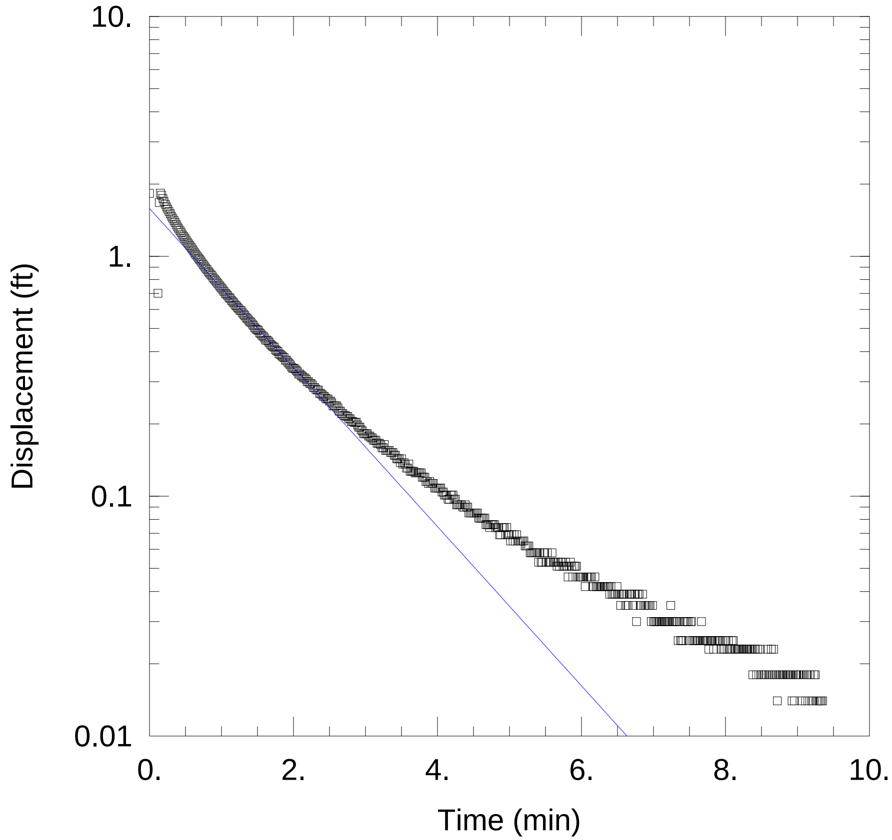
K = 0.583 ft/day
y0 = 2.964 ft

AQUIFER DATA

Saturated Thickness: 23. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW08)

Initial Displacement: 3.03 ft
Total Well Penetration Depth: 23. ft
Casing Radius: 0.083 ft
Static Water Column Height: 23. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW10R_Rev.aqt
Date: 04/04/13 Time: 06:46:31

PROJECT INFORMATION

Location: 1738
Test Well: MW10
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 1.659 ft/day
y0 = 1.582 ft

AQUIFER DATA

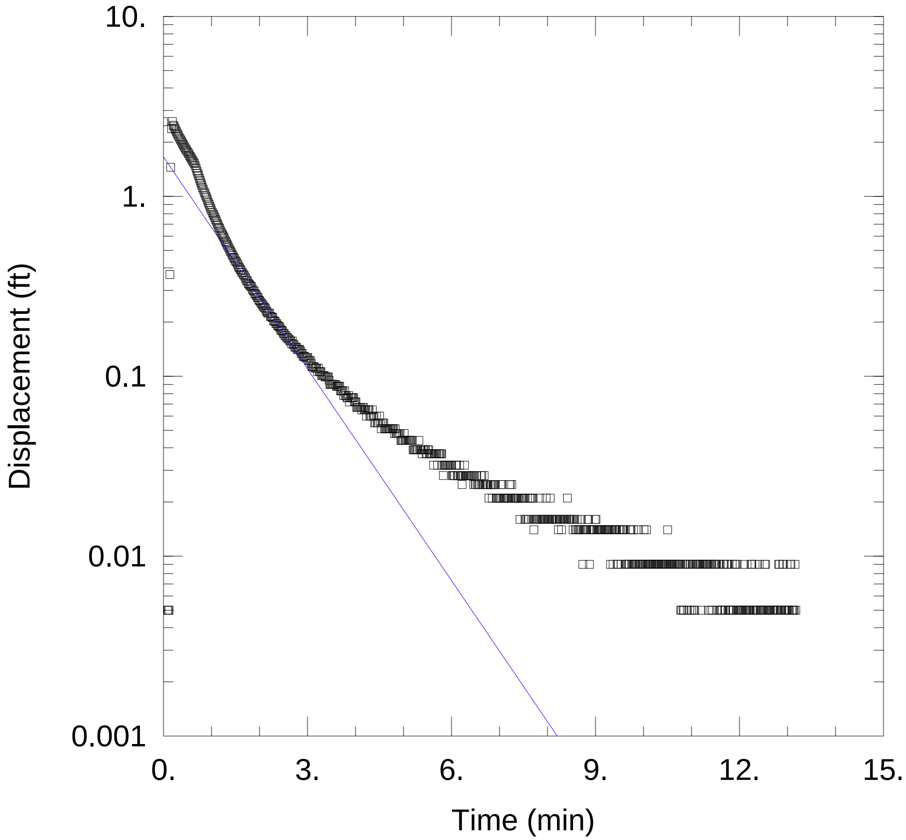
Saturated Thickness: 23. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW10)

Initial Displacement: 1.83 ft
Total Well Penetration Depth: 23. ft
Casing Radius: 0.083 ft

Static Water Column Height: 23. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



FALLING HEAD

Data Set: K:\...\MW10F_Rev.aqt
Date: 04/04/13 Time: 06:45:56

PROJECT INFORMATION

Location: 1738
Test Well: MW10
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

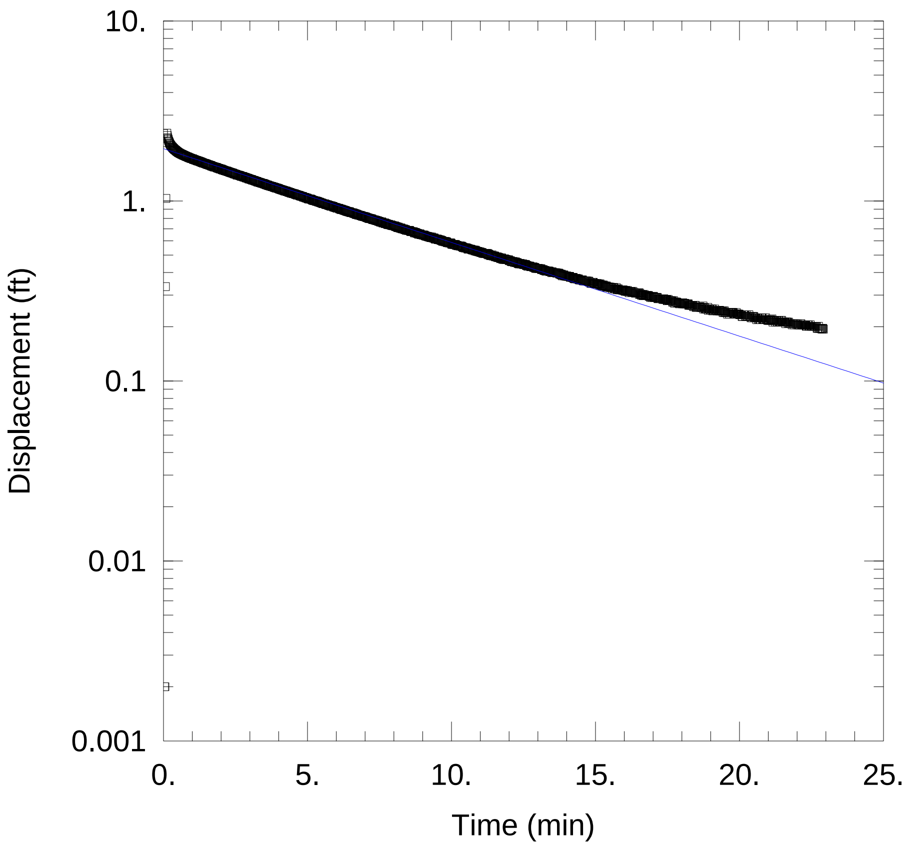
K = 1.964 ft/day
y0 = 1.656 ft

AQUIFER DATA

Saturated Thickness: 23. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW10)

Initial Displacement: 2.6 ft
Total Well Penetration Depth: 23. ft
Casing Radius: 0.083 ft
Static Water Column Height: 23. ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW11R_Rev.aqt
Date: 04/04/13 Time: 06:52:04

PROJECT INFORMATION

Location: 1738
Test Well: MW11
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

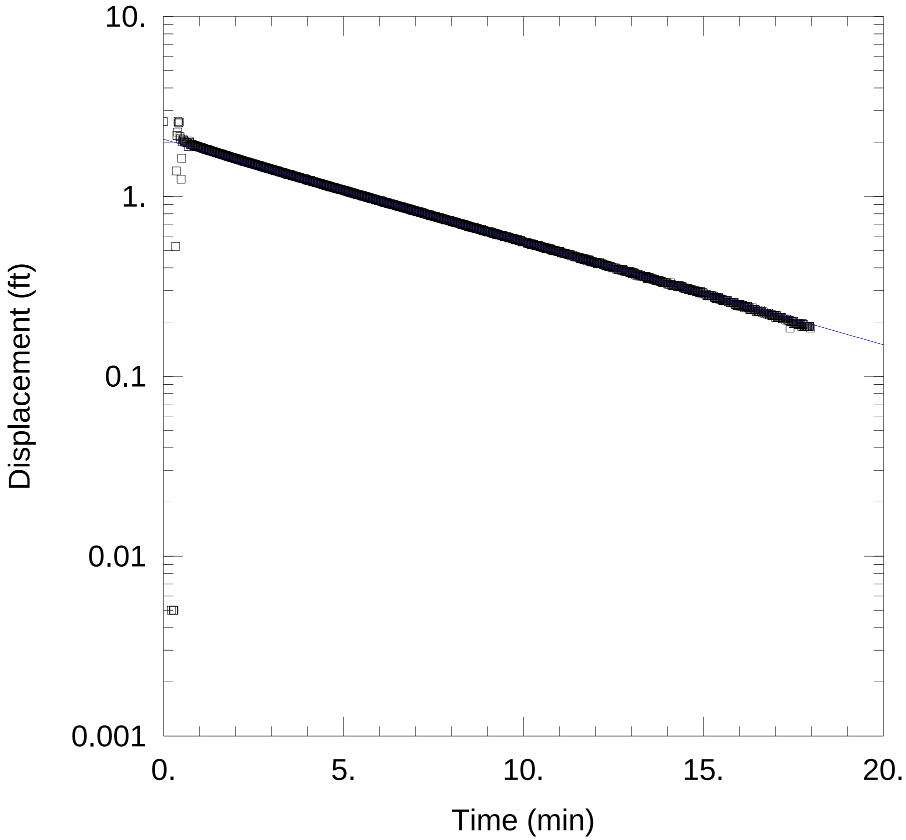
K = 0.2606 ft/day
y0 = 1.95 ft

AQUIFER DATA

Saturated Thickness: 11.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW11)

Initial Displacement: 2.37 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft



FALLING HEAD

Data Set: K:\...\MW11F_Rev.aqt
Date: 04/04/13 Time: 06:50:48

PROJECT INFORMATION

Location: 1738
Test Well: MW11
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

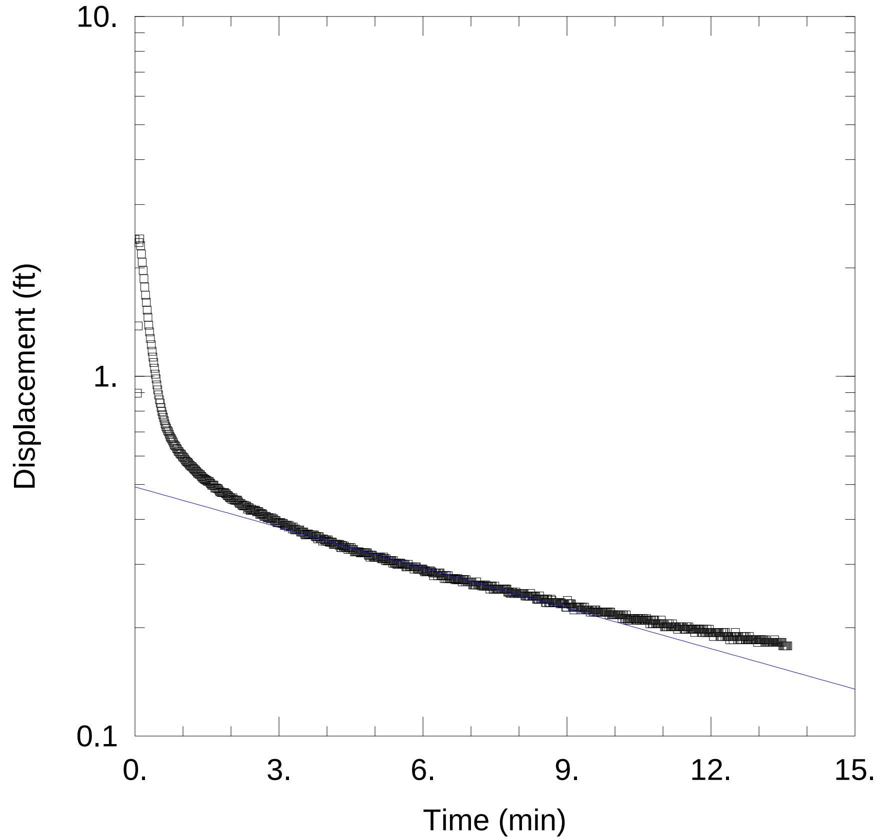
K = 0.2858 ft/day
y0 = 2.073 ft

AQUIFER DATA

Saturated Thickness: 11.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW11)

Initial Displacement: 2.6 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft



RISING HEAD

Data Set: K:\...\MW12R_Rev.aqt
Date: 04/04/13 Time: 06:53:32

PROJECT INFORMATION

Location: 1738
Test Well: MW12
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

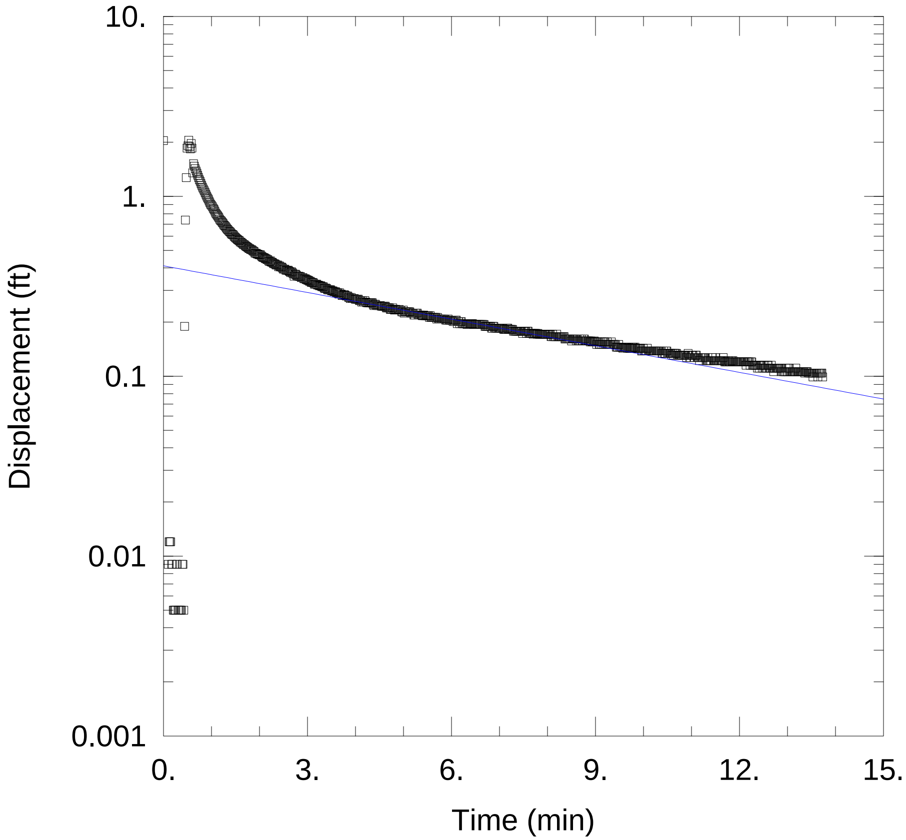
K = 0.2268 ft/day
y0 = 0.4923 ft

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW12)

Initial Displacement: 2.4 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 10. ft
Screen Length: 10. ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.3



FALLING HEAD

Data Set: K:\...\MW12F_Rev.aqt
Date: 04/04/13 Time: 06:52:43

PROJECT INFORMATION

Location: 1738
Test Well: MW12
Test Date: 9/21/10

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 0.2987 ft/day
y0 = 0.4106 ft

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW12)

Initial Displacement: 2.04 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft

Static Water Column Height: 10. ft
Screen Length: 10. ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.3

Chain-of-Custody Forms

24975

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Residual Chlorine Present? Yes ______ No X MAH

CHAIN OF COUSTODY

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Page 1 of 2

Courier: FEDEX
Airbill No. 8617 8652 7178
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: Michael Baker Jr., Inc.	Project Name: Site 1738 M+BE
Address: 100 Airside Drive	Sampling Location: NAPR - Puerto Rico
City: Moon Twp. State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or N If yes, which ID(s)?

Requested Analysis (include method and bottle type):
- BTEX: ~~Either 2 HCl~~ ~~1-4oz~~ Either 3-40ml VOA vials w/HCl. MAH
- M+BE: or 2-40ml vials w/NaHSO4 and 1-40ml vial w/MeOH + 1-4oz jar
- TPH DRO: Either 2 ALs (water) OR 1-8oz jar (soils)
- TPH GRO: ~~Either 2 ALs or~~ Either 2 40ml vials w/HCl or MAH

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other NaHSO4	BTEX	M+BE	TPH DRO	TPH GRO	TCLP Volatiles	TCLP Metals	TPH	RIC		pH / Sample Info (Lab Use)
1009153-01	1738 FB01	9/14/10	0750	O	7	5						3	X	2	2						
-02	1738 ER01	9/13/10	1610	RI	7	5						3	X	2	2						
-03	1738 ER02	9/14/10	0740	RI	7	5						3	X	2	2						
1009155-03	1738 MW11-01	9/13/10	1205	SO	5					1	2	3	X	1	2						
-04	1738 MW11-04	9/13/10	1215									3	X	1	2						
-05	1738 MW11-08	9/13/10	1235									3	X	1	2						
1009155-01	1738 MW12-01	9/14/10	0815									3	X	1	2						
1009155-02	1738 MW12-01 ~~D~~		0815		~~5~~ 0	OR MAH				~~1~~ 0	~~2~~ 0	~~3~~ 0	X	1	2						
1009155-01	1738 MW12-01 MS		0815		4					1	2	3	X		1	MS/MSD base 2-8oz & 2-8oz					
	1738 MW12-01 MSD	9/14/10	0815	SO	4					1	2	3	X		1						

Lab Use Only

Sample Unpacked By: Matthew R Howard
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA MAH 9/15/10
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Rec'd no trip blank for VOAs
~~Rec'd no VOAs for vials for sample 1738 MW12-01D~~ MAH @ 9/15/10

Sample Custody

Relinquished by: [signature]	Date/Time: 9/14/10 1600	Received by: Matthew R Howard	Date/Time: 9/15/10 @ 0927
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.9 °C

taped with date and signature

Samples stored 60 days after date report mailed at no extra charge.

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Courier	FEDEX
Airbill No.	8617 8652 7178
Sampling Complete? Y or N	

Client/Reporting Information	Project Information
Company Name: Michael Baker Jr., Inc.	Project Name: Site 1738 M+BE
Address: 100 Airside Drive	Sampling Location: NAPR - Puerto Rico
City: Moon Twp. State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): BTEX + M+BE: 2-40mL vials w/ NaHSO4 and 1 40mL vial w/ MeOH; TPH DRO: 8oz jar; TPH GRO: 4oz jar

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other NaHSO4	BTEX	M+BE	TPH DRO	TPH GRO	TCLP Volatiles	TCLP Metals	TPH	RIC			pH / Sample Info (Lab Use)
1009155-01	1738 MW 12-01	9/14/10	0815	SO	1						[illegible]			1	[illegible] RDG							
1009155-06	1738 MW12-04	9/14/10	0830	SO	5					1	2	3	X	1	1							
✓ -07	1738 MW12-08	9/14/10	0850	SO	5					1	2	3	X	1	1							

Lab Use Only		Comments
Sample Unpacked By: Matthew R. Howard	Cyanide samples checked for sulfide & chlorine? Y or NA	Rec'd no trip blank w/ VOAs
Sample Order Entry By: [signature]	625 & Phenol samples checked for chlorine? Y or NA	
Samples Received in Good Condition? Y or N	608 samples checked for pH between 5.0-9.0? Y or NA	
If no, explain:		

Sample Custody

Relinquished by: [signature]	Date/Time: 9/14/10 1600	Received by: Matthew R. Howard	Date/Time: 9/15/10 @ 0927
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N — taped with date and signature	On Ice? Y or N	Cooler Temp: 2.9 °C

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Courier: FEDEX
Airbill No. 8617 8652 7145
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Michael Baker Jr., Inc.
Address: 100 Airside Drive
City: Moon Twp. State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: Site 1738 M+BE
Sampling Location: NAPR - Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	BTEX	M+BE	TPH DRO	TPH GRO	TCLP Volatiles	TCLP Metals	TPH	RIC		pH / Sample Info (Lab Use)
1009153-04	1738 GW01	9/16/10	1303	GW	7	5						3	✓	2	2						
-05	1738 GW02		1000																		
-06	1738 GW02 D		1000																		
~~-07~~	~~1738 GW03~~		~~1420~~													did not receive this sample.					
1009153-08	1738 GW04		1020																		
1009153-09	1738 GW04 D																				
1009153-08	1738 GW04 MS																				
	1738 GW04 MSD		1020																		
1009153-10	1738 GW06	9/17/10	0950	GW	7							3	✓	2	2						
-11	1738 TB01	9/16/10	—	TB	5	5						3	✓		2						

CJD 9/20/10

Lab Use Only

Sample Unpacked By: Matthew [signature]
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments: most vials for VOC & GRO had small (less than pea-size air bubbles) CJD 9/20/10

Sample Custody

Relinquished by: [signature]	Date/Time: 9/17/10 1500	Received by: Jennifer Does		Date/Time: 9/18/10 1120	
Relinquished by:	Date/Time:	Received by:		Date/Time:	
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.2, 1.4, 0.7 °C	

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Courier FEDEX
Airbill No. 8617 8652 7145
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Michael Baker Jr., Inc.
Address: 100 Airside Drive
City: Moon Twp. State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: Site 1738 M+BE
Sampling Location: NAPR - Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	BTEX	M+BE	TPH DRO	TPH GRO	TCLP Volatiles	TCLP Metals	TPH	RIC			pH / Sample Info (Lab Use)
1009153-12	1738 ER03	9/16/10	1420	RI	7	5						3	✓	2	2							

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by:	Date/Time: 9/17/10 1500	Received by: Jennifer Dorer	Date/Time: 9/18/10 1120
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: °C

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Courier: FEDEX
Airbill No. 8617 8652 7156
Sampling Complete? Y or N (N circled)

Client/Reporting Information

- Company Name: Michael Baker Jr., Inc.
- Address: 100 Airside Drive
- City: Moon Twp. State: PA Zip: 15108
- Project Contact: Mark Kimes
- Phone #: 412-269-2009
- Sampler's Name: A. Gailey/R. Roselius

Project Information

- Project Name: Site 1738 M+BE
- Sampling Location: NAPR - Puerto Rico
- Turnaround time: Standard
- Batch QC or Project Specific? If Specific, which Sample ID?
- Are aqueous samples field filtered for metals? Y or N
- Are high concentrations expected? Y or N (N circled) If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

Residual Chlorine Present? Yes ______ No ✓

Requested Analysis (include method and bottle type): BTEX / M+BE (3-40ml); TPH DRO (2-AL); TPH GRO (2-40ml)

CompuChem No (Lab Use)	Field ID	Date	Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	BTEX	M+BE	TPH DRO	TPH GRO	~~TCL Volatiles~~	~~TCLP Metals~~	~~TPH~~	~~RES~~			pH / Sample Info (Lab Use)
1009153-13	1738 GW05	9/18/10	1420	GW	7	5						3	✓	2	2							
-14	1738 GW11	9/17/10	1157																			
-15	1738 GW03	9/18/10	1026																			
-16	1738 GW05L	9/18/10	1426																			
-17	1738 GW10	9/19/10	1006																			
-18	1738 GW09	9/19/10	1015	GW																		
-19	1738 ER04	9/17/10	1157	RI										1		rec'd 1-DRO AL broken 9/21/10						
-20	1738 ER05	9/18/10	1130									2		1	1	rec'd 1-DRO AL broken						
-21	1738 ER06	9/19/10	0830																			
-22	1738 ER07	9/20/10	0755	RI	7	5						3	✓	2	2							

Lab Use Only

- Sample Unpacked By: K. Manning
- Sample Order Entry By: [signature]
- Samples Received in Good Condition? Y or N (N circled)
- If no, explain: See comments
- Cyanide samples checked for sulfide & chlorine? Y or NA (NA circled)
- 625 & Phenol samples checked for chlorine? Y or NA (NA circled)
- 608 samples checked for pH between 5.0-9.0? Y or NA (NA circled)

Rec'd broken 9/21/10

Comments

* Rec'd. only 2 vials for 1738ER05 9.18.10 @ 1130 / BTEX+MTBE (1) broken upon rec't
* Rec'd. one vial for 1738ER05 9.18.10 @ 1130/GRO. (1) broken upon rec't

Sample Custody

Relinquished by:	Date/Time:	Received by:	Date/Time:
[signature]	9/20/10 1700	K. Manning	9.21.10 0920

Subcontact? Y or N (N circled) If yes, where?
Custody Seal(s) intact? Y (circled) or N
On Ice? Y (circled) or N
Cooler Temp: 3.8°C, 0.7, 2.4°C

Samples stored 60 days after date report mailed at no extra charge.

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SN0010

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CHAIN OF CUSTODY

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Phone: 919-379-4100 Fax 919-379-4040

Courier	FEDEX
Airbill No.	8617 8652 7156
Sampling Complete? Y or (N)	N

Client/Reporting Information	Project Information
Company Name: Michael Baker Jr., Inc.	Project Name: Site 1738 M+BE
Address: 100 Airside Drive	Sampling Location: NAPR – Puerto Rico
City: Moon Twp. State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or (N) If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other NaHSO4	BTEX (3-40ml) 2-NaHSO4 1-MeOH SOIL	M+BE	TPH DRO (1-8oz.)	TPH GRO (1-2oz.)	~~TCLP Volatiles~~ TOC (1-4oz)	~~TCLP Metals~~		pH / Sample Info (Lab Use) 9/21/10
1009153-23	1738 TB02	9/17/10		TB	5	5						3	✓	KH 9.21.10	2		~~vials have 1738 TB03~~		
1009220-01	1738 SB101-01	9/20/10	0920	SO	6					1	2	3	✓	1 2	1 2	1			
-02	1738 SB101-01 D	9/20/10	0920	SO	5					1	2	3	✓	1	1				
1009220-01	1738 SB101-01 MS/MSD	9/20/10	0920	SO	9					2	4	6	✓	1	2		6 NaHSO4, 3 MeOH, 3-2oz, 2-8oz, 1-4oz		
1009155-08	1738 SB101-04	9/20/10	0940	SO	5					1	2	3	✓	1	1				
~~1009220-03~~ -09	1738 SB101-06	9/20/10	0950	SO	6					1	2	3	✓	1	1	1			
1009155-10	1738 SB101-08	9/20/10	1000	SO	5					1	2	3	✓	1	1				
1009155-11	1738 SB102-01	9/20/10	1015	SO	5					1	2	3	✓	1	1				
~~1009220-04~~ -12	1738 SB102-04	9/20/10	1030	SO	6					1	2	3	✓	1	1	1			
~~1009220-05~~ -13	1738 SB102-08	9/20/10	1035	SO	6					1	2	3	✓	1	1	1			

Lab Use Only

Sample Unpacked By: K. Manning	Cyanide samples checked for sulfide & chlorine? Y or (NA)	Comments: *No sample ID given on label for: 1738SB101-06 9/20/10 @ 0950. *No sample time given on label for ID: 1738SB102 9.20.10 @ 1035; has incomplete ID, on NaHSO4.
Sample Order Entry By: [signature]	625 & Phenol samples checked for chlorine? Y or (NA)	
Samples Received in Good Condition? (Y) or N	608 samples checked for pH between 5.0-9.0? Y or (NA)	
If no, explain:		

Sample Custody

Relinquished by: [signature]	Date/Time: 9/17/10 1700	Received by: K. Manning	Date/Time: 9.21.10 0920
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 3.8, 2.4, 4.2 °C

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Courier: FEDEX
Airbill No. 8617 8652 7156
Sampling Complete? Y or N (N circled)

Client/Reporting Information

Company Name: Michael Baker Jr., Inc.
Address: 100 Airside Drive
City: Moon Twp. State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: Site 1738 ~~M+BE~~
Sampling Location: NAPR - Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Matrices

GW - Ground water
WW - Waste water
SW - Surface water
SO - Soil/Sediment
TB - Trip Blank
RI - Rinsate
WP - Wipe
O - Other

pH / Sample Info (Lab Use)

Requested Analysis (include method and bottle type)

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other NAHSO4	BTEX (2-NaHSO4, 1-MeOH) (3-40ml)	M+BE	TPH DRO (1-8oz.)	TPH GRO (1-2oz.)	TOC (1-4oz.) ~~TCLP Volatiles~~	~~TCLP Metals~~	~~[illegible]~~	~~[illegible]~~			
1009155-14	1738SB103-01	9/20/10	1100	SO	5					1	2	3*	✓	1	1	*rec'd MeOH vial w/crooked top						
-15	1738SB103-04		1110		5					1	2	3	✓	1	1	& no Methanol left in container JD 9/21/10						
-16	1738SB104-01		1115		5					1	2	3	✓	1	1							
-17	1738SB104-04		1150		5					1	2	3	✓	1	1							
1009220-01 ~~18~~	1738SB104-06		1200		6					1	2	3	✓	1	1	1						
1009220-02 ~~19~~	1738SB104-08		1215		6					1	2	3	✓	1	1	1						
1009155-10	1738SB105-01		1305		5					1	2	3	✓	1	1							
1009155-09	1738SB105-01D		1305		5					1	2	3	✓	1	1							
-12	1738SB105-04		1315		5					1	2	3	✓	1	1							
-13	1738SB105-07	9/20/10	1325	SO	5					1	2	3	✓	1	1							

Lab Use Only

Sample Unpacked By: K-Manning
Sample Order Entry By:
Samples Received in Good Condition? Y or N (Y circled)
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA (NA circled) KM 9-21-10
625 & Phenol samples checked for chlorine? Y or NA (NA circled)
608 samples checked for pH between 5.0-9.0? Y or NA (NA circled)

Comments

*one 40ml SOIL vial NaHSO4 has incomplete ID 1738SB10[illegible] 9-20-10 @ 1315.
* 2oz. for 1738SB103-04 has incomplete ID (9.20.10 @ 1110)
* 2oz. for 1738SB105-04 has incomplete ID (9.20.10 @ 1315)

Sample Custody

Relinquished by: [signature]	Date/Time: 9/20/10 1700	Received by: K-Manning	Date/Time: 9-21-10 0920
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N (N circled) If yes, where?
Custody Seal(s) intact? Y or N (Y circled)
On Ice? Y or N (Y circled)
Cooler Temp: 3.8, 4.2, 2.4 °C

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Courier: FEDEX
Airbill No. 8617 8652 7156
Sampling Complete? Y or N (N circled)

Client/Reporting Information

Company Name: Michael Baker Jr., Inc.
Address: 100 Airside Drive
City: Moon Twp. State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: Site 1738 M+BE
Sampling Location: NAPR - Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N (N circled) If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	BTEX (3-40ml)	M+BE (3-40ml)	TPH DRO (2-AL)	TPH GRO (2-40ml)	~~TCLP Volatiles~~ (1-500ml) TOTAL Fe+MN (6010C)	~~TCLP Metals~~ (1-500ml) Dissolved Fe+Mn (6010C)	~~TPH~~ COD (1-250ml)	~~PCB~~ (1-125ml) Nitrate Analysis (IC 300)	SUB COD		pH / Sample Info (Lab Use) Total Metals	Diss. Metals	COD	
~~1009222-01~~ 1009223-01	1738GW05R	9/20/10	1411	GW	11	5		2	1			3	✓	2	2	1	1	1	1	1009224-01		<2	<2	<2	
~~1009222-02~~ 1009223-02	1738GW12	9/20/10	1157	GW	11	5		2	1			3	✓	2	2	1	1	1	1	↓ -02		<2	<2	<2	

Lab Use Only

Sample Unpacked By: K Manung
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N (Y circled)
If no, explain:
JD 9/21/10

Cyanide samples checked for sulfide & chlorine? Y or NA (NA circled)
625 & Phenol samples checked for chlorine? Y or NA (NA circled)
608 samples checked for pH between 5.0-9.0? Y or NA (NA circled)

Comments

Sample Custody

Relinquished by: [signature] Date/Time: 9/20/10 1700 Received by: K. Manung Date/Time: 9.21.10 0920
Relinquished by: Date/Time: Received by: Date/Time:
Subcontact? Y or N (Y circled) If yes, where? COD to ENCO
Custody Seal(s) intact? Y or N (Y circled)
On Ice? Y or N (Y circled)
Cooler Temp: 2.6, 3.8 °C

Samples stored 60 days after date report mailed at no extra charge.
9/22/10

White & Yellow copy to lab • Pink copy for customer

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Page 1 of 1

Courier FEDEX
Airbill No. 8617 8652 7167
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Michael Baker Jr., Inc.
Address: 100 Airside
City: Moon Twp. State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius/ D. Hupe

Project Information

Project Name: Site 1738 M+BE
Sampling Location: NAPR – Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N If yes, which ID(s)?

Requested Analysis (include method and bottle type)

BTEX, M+BE (3-40ml); TPH DRO *1L (2-AL); TPH GRO *2oz (2-40ml); TCLP Volatiles (1-4oz.); TCLP Metals (1-16oz.); TPH (N/A); RIC (1-16oz.) * is for RIC+DRO KM 9.22.10

Matrices: GW - Ground water, WW - Waste water, SW - Surface water, SO - Soil/Sediment, TB - Trip Blank, RI - Rinsate, WP - Wipe, O - Other

CompuChem No. (Lab Use)	Field ID	Date	Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	BTEX	M+BE	TPH DRO	TPH GRO	TCLP Volatiles	TCLP Metals	TPH	RIC			pH / Sample Info (Lab Use)
1009222-06	1738TB03	9/21/10		TB	5	5						3	✓		2							
1009222-03	1738 ER08	9/21/10	0825	RI	7	5						3	✓	2	2							
1009240-01	1738 IDW01	9/21/10	0930	O	4	2								2	2							
~~1009241-01~~ 1009241-02	1738 IDW02	9/21/10	0940	O	4									*✓	*1	1	1		1			
1009222-04	1738 GW07	9/21/10	1145	GW	7	5						3	✓	2	2							
-05	1738 GW08	9/21/10	0954	GW	7	5						3	✓	2	2							

Lab Use Only

Sample Unpacked By: K. Manning
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 9/21/10 1600	Received by: K. Manning		Date/Time: 9.22.10 0858	
Relinquished by:	Date/Time:	Received by:		Date/Time:	

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N KM 9.22.10
On Ice? Y or N
Cooler Temp: 3.2, 2.7 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SN0010

IDW Transportation/Acceptance Document

NON - HAZARDOUS WASTE TRANSPORTATION/ACCEPTANCE DOCUMENT

DATE March 31, 2011

TO:	FROM:
PEÑUELAS VALLEY LANDFILL	NAVAL ACTIVITY PR
Carr. 385 KM 4.5 Barrio Tallaboa	ROOSEVELT ROADS,
Peñuelas, Puerto Rico 00624	CEIBA, PR
1-787-836-3535 — FACILITY PERMIT NO. IDF-57-0020	P.O. NO. OPR-11-14

No. of Units & Container Type	DESCRIPTION AND CLASSIFICATION OF WASTE MATERIAL	Waste Profile Sheet Code	TOTAL QUANTITY (Weight, Volume, Gallons, etc.)	WEIGHT (Subject to Correction)	RATE	CHARGES (For Carrier Use Only)
22-55 DM	SOIL CUTTING FROM BOREHOLE	10324 5DE	210 Gal			
7-55 DM	WELL DEVELOPMENT WATER	10324 2PR	385 Gal			

GENERATOR'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the Commonwealth of P.R. The waste described above were consigned to the Transporter named. The Treatment, Storage or Disposal Facility can and will accept the shipment of waste, and has a valid permit to do so. I certify that the loregoing is true and correct to the best of my knowledge.

GENERATOR'S SIGNATURE	TITLE	DATE SHIPPED	EXPECTED ARRIVAL DATE
[signature]	Env Eng	MO. 03 DAY 31 YR. 11	MO. 03 DAY 31 YR. 11
TRANSPORTE SIGNATURE	COMPANY NAME	VEHICLE ID. NO.	DATE RECEIVED
[signature]	AQUA CLEAN	HP12114	MO. 03 DAY 31 YR. 11
FACILITY SIGNATURE			DATE RECEIVED
[signature]			MO. DAY YR.

CARRIER

2012 FIELD ACTIVITIES

Site Photographs

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH **1**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: Geoprobe 7822DT Rig Used for Soil Sampling and Monitoring Well Installation

PHOTOGRAPH **2**	
VIEW **Southwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Reichdrill 650-WII Rig Used for Soil Sampling and Monitoring Well Installation

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH **3**	
VIEW **Down**	
PHOTOGRAPHS BY **Baker**	

Comments: Example of Clay Residuum With Mineralization of Diagonal Fractures

PHOTOGRAPH **4**	
VIEW **Down**	
PHOTOGRAPHS BY **Baker**	

Comments: Example of Saprolite

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH

5

VIEW

North

PHOTOGRAPHS BY

Baker

Comments: Augering for Monitoring Well Installation

PHOTOGRAPH

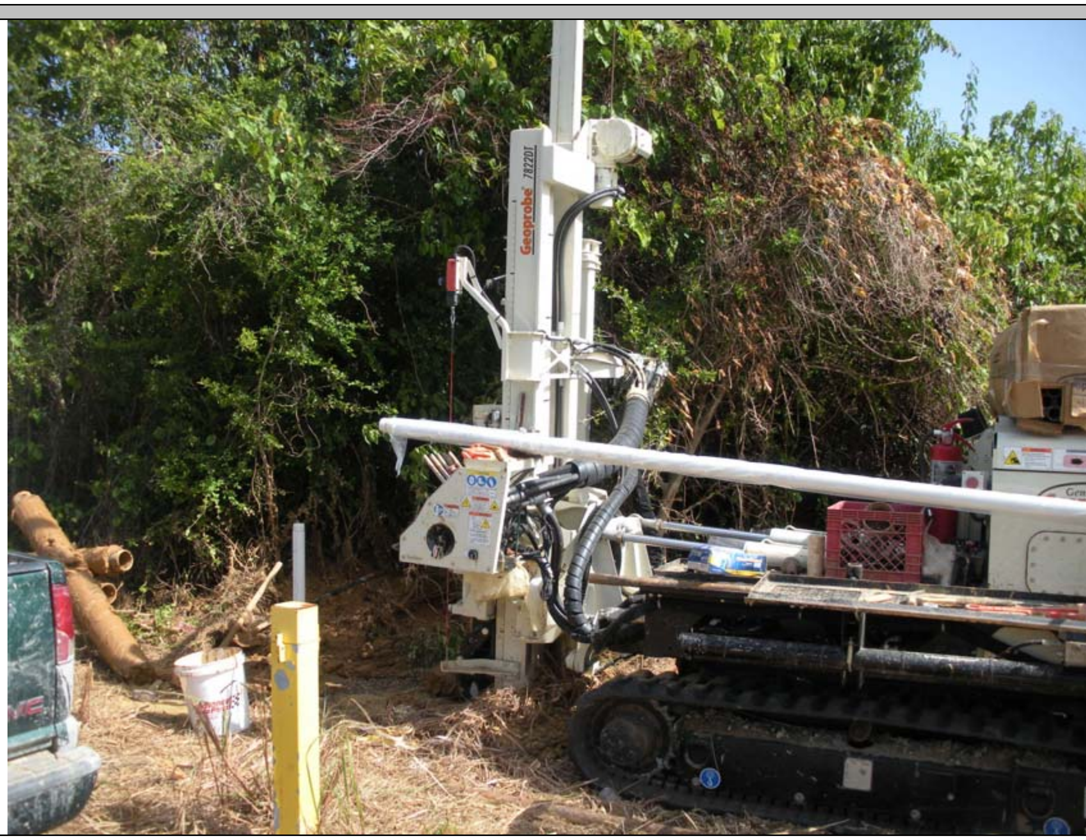
6

VIEW

Northeast

PHOTOGRAPHS BY

Baker



Comments: Monitoring Well Installation Process

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH **7**	
VIEW **Southeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring Well Surface Completion

PHOTOGRAPH **8**	
VIEW **Southeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Completed Monitoring Well

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH	
PHOTOGRAPH **9**	
VIEW **Northeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Well Development Equipment (Surge Block)

PHOTOGRAPH **10**	
VIEW **East**	
PHOTOGRAPHS BY **Baker**	

Comments: Well Development Using the Surge Block

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Site 1738 MtBE Investigation

PHOTOGRAPH **11** **VIEW** **West** **PHOTOGRAPHS BY** **Baker**	

Comments: Groundwater Sampling Setup

PHOTOGRAPH **12** **VIEW** **North** **PHOTOGRAPHS BY** **Baker**	

Comments: Ancillary Activities - Clearing for Soil Sampling and Monitoring Well Installation

Field Log Book Notes

CONTENTS

PAGE NO.	REFERENCE	DATE
	[illegible] Final	
	If Found, please return to:	
	Mark DeJohn	
	Michael Baker Corp.	
	100 Airside Drive	
	Moon Twp., PA 15108	
	Postage ~~Gu~~aranteed	

Mon. June 11, 2012. Todays Tasks - Mobilization

0715 Arrive at PIT for travel to SJU via CLT.

0900 Depart PIT

1515 Arrive at SJU. Get luggage and SUV rental (Nat'l)

1600 Depart for base. Will stop for groceries along the way

1800 Arrive at Base (Bldg 31) for GPS equip - Coolers (from TA) already at office

1845 Depart Base for Condo at Palmas Del Mar (Cresent Cove) - Done for the day

[illegible]
6/11/2012

Tue. June 12, 2012. Today's Tasks -
clearing / boring location
Weather Conditions -
AM: Sunny, E wind, low 80°s
PM: Sunny, E wind, near 90°
0700 DMG: I arrive at Bldg 31 to prepare for the day. All Baker's equip and supplies moved back to this bldg. It is very disorganized
0740 Carlos (Brown) told us that we need to move at the end of this event. He says to the Auto care bldg in frmr downtown.
0810 Right Way at Bldg 31.
0827 Relocate to Site 1738.
0905 Begin clearing (upper area)
1000 Begin clearing grassy / lower area
1157 Complete clearing at Site 1738.
1205 Rightway lunchbreak. DMG: I meet Nelson (JFA) in Ceiba
1233 Back at staging area. (at frmr. Post ofc). Nelson to unload supplies
1247 DMG: I relocate to Bldg 31 to meet Rightway.
1256 Meet Rightway ; relocate to

~~(SWMU~~
(~~East~~) SWMU 29. Mark out SS03 - SS05 w/ GPS at error of ~20'; however, the entire map seems to be about 5-6' off from GPS location (consistently to the north). Will need to adjust by hand.
1539 cutting rig is overheating Rightway done for the day DMG: I map out remaining locations using tape ; bearings (GPS inaccurate now)
1621 Relocate to Bldg 31.
1623 Stop at sewer line area instead
1637 very thick grass ; vine ground cover. Cannot find manhole covers May need a metal detector. DMG divining approximate line for now
1645 Able to locate southern manhole but doesn't correspond to aerial map. Also, not sure where former intake cross road ; sewer. If we need to chase back to source heavy woods will need to be cleared, but large uncertainty exists

1738

1702 Depart site; return to condo.

1920 Notes on today:

- Visited drum storage are by Power plant. No Baker drums are located here. All drums are empty (including labeled ones). No indication of company (Hill or TetraTech).
- GPS error at site 1739 not significant.
- Talk to Kimes:
  - Spot tunnel by looking for concrete manway stick ups
  - Need to scope SWMU 27 ; 28 to plan for sampling

MKD 6/12

MKD 6/12/2012

6/12 MKD

Wed. June 13 2012. Todays Tasks -
Complete clearing / 1738 well install
Weather Conditions -
AM: P Sunny, lt E wind, low 80°s
PM: M. Cloudy, gusty E wind, near 90°

0702 DMG: I arrive at NAPR. Prep for soil sampling & well installation

0804 Attempted to locate cooling water intake using concrete man-holes, but couldn't find any. Rightway on site. Prep for remaining clearing at SWMU 29.

0815 I drop off DMG at SWMU 29 for clearing (w/ Rightway). I relocate to drilling staging area where JFA are preparing for drilling.

0855 JFA: I relocate to Site 1738.

0911 Set up rig at MW01B.

0956 Begin direct push soil sampling at MW01B using Geoprobe® 7720 DT w/ 1.5" x 4' long Macrocore Sampler w/ Acetate liner

1030 Scott & Rick called. They would like to do SPLP DRO/GRO analyses on soil from 1738 or sewer line

(Cont.) whichever has soil contamination. I mentioned running 73 to develop line to compare to GW standard. They will think. They will have bottles ordered & shipped.

1020 Collect 1738MW01B-00 for BTEX, MtBE TPH GRO and TPH-DRO.
Bottles: Terracore (w Na bisulfate) (2)
8-oz glass (1)
direct sample for BTEX/MtBE & GRO homo. in pie pan for DRO. This will apply to all soil samples.

1030 Collect 1738MW01B-01

1114 ~~Pedo~~ Pedro Ruiz stopped by to check site progress.

1130 Collect 1738MW01B-06 (11-13') just above 1st GW

1145 Collect 1738MW01B-11 (21-23') in a zone of staining & petro odor

1230 Lunch break. I relocate to SWMU 29 for lunch for DMG

1250 Relocate to NAPR security for ice. and check out new office location

1458 Drilling is going slow due to collapsing sand & gravel fill near (cont.) surface. JFA has to use Piston sampler. Also have to clear hole with drive point.

1330 [late entry] I picked DMG up at SWMU 29; clearing is complete. Relocate to Site 1738

1340 [late entry] resume drilling at MW01B.

1521 PID headspace readings: Depth/PID

1-3 / 0	~~26-28/0~~
4-6 / 0	32-34/0
7-8 / 0	36-40/2.3
8-10 / 1	40-44 / 7.4
10-12 / 0.1	
11-13 / 0.5	
18-20 / 0	
20-21 / 0	
21-22 / 0	
22-23 / 5.2	
23-24 / 3.9	
24-26 / 0	
26-28 / 0	
32-34 / 0	

1526 Collected 44-48 foot interval, but something is blocking further

(cont.) DPT (not competent rock though). Will switch to auger, but tomorrow given the time. Will have to attempt deeper boring elsewhere.

1550 DMG: I depart 1738 to scope out SWMU 27: 28 (wetland water) DMG recording notes on findings

1650 Depart SWMU 28. DMG: I are done for the day.

1440 PID at 16-20 0/1/59/123

1442 PID at 20-24 2026/1953 w/ 2' recovery

1430 [late entry] Collect 1738MW13-01 (@ 1-3')

1450 Collect 1738MW13-12 (22-24') soil staining; slt petro odor

1533 30-36 interval is wet PID = 35/32/19/0. Instruct Driller to install the well to 36' bgs.

1545 Begin augering at MW13.

1600 Conference call related to another project

1650 Augered to 15' bgs; stop for the day. Clean up time.

1710 Depart Site 1738

Thur. June 14, 2012 Todays Tasks - Well installation / Weathe Conditions -
AM: P Sunny, lt E wind, low 80's
PM: P. Sunny, mod E wind, low 90's

0720 Arrive at Bldg 31. JFA is at staging area.

0723 PID calibration
Fresh air 0 ppm = 0 ppm
100 ppm isobutylene = 101 ppm

0740 Relocate to Site 1738. JFA is setting up. I ask about collecting soil samples from proposed screened interval (50-60') at MW01B

0815 DMG leaves site to start moving equip and supplies to "Autoport". Driller attempt to break bridge in existing borehole.

0832 Cannot break bridge. Driller to move over and ~~app~~ attempt drive point to 48'

0931 Probe refusal at 46.5' bgs; cannot collect samples from second bore-hole location. Will have to attempt augering w/o sampling in screen interval.

1001 Begin augering for MW01B.

1030 Gravel in the fill material is impenetrable at MW01B w/ augers. Move to MW01A location to see if same conditions exist.

1148 Stopped augering at 3 feet bgs; very slow drilling through fill. Called Nelson for alternate drill methods and cost difference. In the meantime we will try other locations at top portion of site to see if augering is viable

1200 Driller lunch break. Pedro and DMG on site

1215 DMG; I go for soil sampling supplies Pedro off site.

1310 Setup rig at MW13.

1329 Begin soil sampling at MW13

1350 Collect 1738MW13-03 (5-7') just above water @ 8'
(Notes accidently completed for today on p. 9)

6/14/2012

Fri. June 15, 2012. Today's Tasks -
soil sampling / well installation
Weather Conditions -
AM: P. sunny, lt E wind, low 80's
PM: M. sunny, mod E wind, near 90°

0710 DMG: I arrive at Bldg 31. JFA is at staging area.

0800 Collect 1738MW13-00 (0-1')

0805 MEK called to discuss results at MW13. Plan is to revisit SB104 (20-30') to look for source. Maybe the use SB106 - SB109 over broader are to delineate source.

0815 JFA begins augering at MW13

0830 I take DMG to SWMU 29 so he can begin surface soil sampling.

0900 Collect 1738ER09 for BTEX, MtBE, GRO & DRO from pie pan.

0916 Calibrate PID (Mini RAE2000)
Fresh Air = 0 ppm
100 ppm Isobut = 100 ppm

0933 Augered to 25'; rig is over heating. Need a break to cool down.

1015 I relocated to Autoport for sampling supplies. Back at 1738; rig is still

(cont.) down (cooling).

1020 Resume augering

1045 Collect 1738FB03 for BTEX, MtBE GRO & DRO from tailgate at Site 1738

1200 I pickup DMG from SWMU29; help w/ sample mgmt

1215 MW13 at 36'. JFA lunchbreak, DMG: I go to SWMU29 to locate samples inside the fenced area

1326 I'm back at Site 1738. DMG to collect remaining surface soils

1333 Begin installation of 1738MW13

1423 Pickup DMG at SWMU 29.

1555 MW13 completed to bentonite seal. Cleanup time.

1710 JFA departs site 1738

1718 DMG: I depart site - done for the day

6/15/2012

Sat. June 16, 2012. Todays Tasks -
Soil sampling
Weather Conditions -
AM: M. sunny, lt E wind, mid 80's
PM: P. sunny, mod E wind, near 90°
0715 DMG: I arrive at staging area.
JFA on site preparing for the day
0722 Relocate to site 1738.
0730 Setup at MW15 for soil sampling
0744 PID (Mini RAE2000) Calibration
Fresh air: 0 ppm
100 ppm Isobutyl: = 101 ppm
0753 Begin soil sampling at 1738MW15
0805 DMG collects 1738MW15-00 (0-1')
0815 DMG collects 1738MW15-01 (1-3')
0839 Macrocore sampler refusal at 20';
liner stuck in sampler.
0845 DMG collects 1738MW15-05 (9-11')
0915 DMG leaves for sampling supplies while
JFA still trying to salvage sample/liner
0934 Sampler cannot be salvaged. Setup
at 1738MW02R.
0944 Begin 1738MW02R soil sampling.
1000 For DMG, I collect 1738MW02R-00 (0-1)
1010 For DMG, I collect 1738MW02R-01 (1-3')

1040 DMG back on site
1045 I collect 1738MW02R-07 (13-15')
1055 20 (1) 16-20 2.6' recovery
635 (2)
1068 (3)
1107 20-24 (2.6') 174
702
~~468~~ 102
1125 DMG collects 1738MW02R-10 (19-20')
1144 24-28 (2.4') 886
1900
1202 28-32 (2.8') 1321
(JFA lunch) 250
22
1341 Resume soil sampling.
1352 32-35.7 109
1400 DMG collects 1738MW02R-17
from 35-33' for vertical delineation
1417 Setup rig at 1738MW14.
1430 DMG collects 1738MW14-00 (0-1')
1445 DMG collects 1738MW14-01 & 01D
(1-3')
1545 DMG collects 1738MW14-09 (17-19')
1610 DMG collects 1738ER10 from
acetate liner.

1620 DMG collects 1738MW14-11 (21-23')
JFA relocates to Staging area
1625 Cleanup time.
1710 DMG & I depart site - Done for the day.
Notes on the day:
I spoke w/ Nelson this morning. We need air rotary rig for MW02R, MW14, MW15 and MW01A/B. Total of about 160 LF. Nelson said that the rig will be available beginning Tuesday. Still need cost difference
1900 General notes:
Air rotary rig should be on site Tuesday for drilling out five well boreholes

MKD
6/16/2012

Sun. June 17, 2012. Today's Tasks -
Soil borings / well installation
Weather Conditions -
AM: M cloudy, occ shower, E wind, 80's
PM: Cloudy, Lt E wind, near 90°
0713 Arrive at Autoport for sampling supplies. Ice at security
0738 Relocate to Site 1738
0756 Relocate to staging area where JFA, it turns out, is.
0830 JFA & I scope out lower grassland well sites
0852 MiniRA 2000 PID calibration
Fresh air = 0 ppm
100 ppm Isobutyl = 102 ppm
0909 setup at cluster 1738MW09A/B
0925 Begin boring for MW09B
0940 DMG collects from 0-1':
1738MW09B-00 3 T.core / 1 8-oz
1738MW09B-00 MS } 6 T.core / 1 8oz
1738MW09B-00 MSD }
1015 DMG collects 1738MW09B-01 (1-3')
1040 DMG collects 1738MW09B-03 (5-7') above first water. Also collects dup.
1221 Complete Macrocore sampling.

(cont.) Lunch and prep. for augering.
1500 Begin augering for MW09B
1525 DMG collects 1738ER11 from a stainless steel spoon.
1655 Augered to 39' bgs, but there is ~10' of mud in the augers.
1718 More mud is entering augers. This probably means the bottom plug broke. Will have to pull augers and redrill. JFA will have to do this tomorrow. Cleanup time
1742 DMG & I relocate to Autoport
1810 Depart Autoport. Done for the day
2100 General notes:
- Jaime sent costs for air rotary MEK to evaluate costs.
- We are behind schedule on well installation. Not sure of impacts to schedule; not sure of production rate for air rotary (should be high?).

MK [signature]
6/17/2012

Mon. Jun 18, 2012. Todays tasks-
Well installation
Weather Conditions-
AM: M cloudy, lt E wind, low 80's
PM: M cloudy, lt E wind, near 90°

0710 Arrive at Autoport. Prepare for sample shipping.
0732 Relocate to Site 1738.
0748 JFA was at the drill site. Mud/water in augers to ~4 ft bgs. Prep to pull augers.
0757 DMG to collect SWMU 29 MS/MSD and prep for sample shipping while JFA pulls augers.
1030 DMG & I pack samples and ship. JFA to decon lead auger and redrill
1255 DMG & I are back at Site 1738.
1332 JFA at 25 ft for reaugering at 1738MW09B.
1400 Begin well installation, but plug not releasing. Auger down to 43 ft to seat augers in a damp zon to see if plug can be release
1448 Begin well Installation after releasing plug. Well screen will be 30-40'

1630 Well installation complete. Cleanup time
1652 JFA departs site.
1350 Nelson Feliciano on site [late entry]
1500 Nelson off site [late entry]
1700 DMG & I depart site.

MKO 6/18/2012

Tue. June 19, 2012. Todays Tasks -
Well installation
Weather Conditions -
AM: P. sunny, lt E wind, low 80's
PM: P sunny, lt E wind, near 90°

0710 DMG: I arrive on site. JFA already there (staging area). CWPS (air driller) is nearby. JFA is going to escort them to the site.

0759 JFA: CWPS on site. T-650-WII

0815 Setup at MW14. 5 3/4" Air hammer using a ~~Right 652~~ Reichdrill drill rig

0838 Begin drilling at MW14

0912 Air hammered to 42' bgs water on rods

0924 Blew out a couple gallons of water. Driller believes this zone is around 28' bgs

0935 Evidence suggest water is lower depth. Begin well installation.

1029 1738MW14 completed (30.6 - 40.6')
Move rig to MW01 cluster.

1050 Begin air hammer at 1738MW01B

1116 Installed steel casing to ~8' bgs to prevent gravel sloughing.

MKD

1125 Air pressure blew lid; cap off of MW01 then water.

1310 MW01B cleaned out to ~62' water in hole; not sure of interval cuttings not blown out due to short circuiting at MW01. So, it took extra time to assure clean hole.

1330 The borehole collapsed to ~25'. Cannot install well. I recommended installing the 25' well. After some thought, CWPS will bring in 4" casing. Use it to cleanout hole to 60', then install well to ~~25~~ 60' through 4" casing. This will be done tomorrow

1425 Cleanup time. JFA doesn't have time for MW01A due to ~~personal~~ paperwork obligations and laundry. Its best for CWPS to stay at borehole; very hard to ~~realign~~ realign once moved off hole.
CWPS off site. JFA cleans up.

1440 JFA ready to leave site.
DMG: I relocate to the

(cont.) sewerline investigation area.

1500 Attempt to locate cooling water intake line. We located the pier and a concrete manhole box and project the line those two points make to the sewerline. That seems reasonable compared with the aerial photo that MEK provided

1833 Examining NAPR GIS website:
The 1958 aerial photo shows the cooling water intake pier and a line of objects that lead toward Bldg 38. These maybe the concrete manholes. The line of these objects intersect the W edge of the road approx 134 ft north of a line extending due east from the corner of Bldg 38.

1900 Done for the day
JFA time:
~ 1 hr clearing support
~ 1 hr well install
JFA off site early

MKD 6/19/2012

Wed. June 20, 2012. Today's tasks-
Well installation
Weather Conditions-
AM: M. Sunny, lt NE wind, low 80's
PM: Var clouds, mod NE wind, near 90°

0710 DMG & I arrive on site. Drill crews not yet here (1738).
0758 JFA on site. Prep to grout MW13 & 14
0802 CWPS on site. Setup to install casing.
0835 Begin 4" casing installation in the borehole for 1738 MW01B.
0900 Nelson Feliciano on site.
0930 The casing did not work; mud could not be kept out. Will try air hammer in original borehole to 60'. If it can't stay open, the 25' well (MW01A) will be installed
0949 Nelson F. leaves site 1738.
1017 Well borehole collapsed to 25'. Will set MW01A.
1027 Begin installation of MW01A.
1100 Well complete to bentonite seal. Decon airhammer.
1120 Pull temp casing

MKD

1157 Setup at 1738 MW15.
1215 Driller lunch break (CWPS)
1230 Grout placed at MW13
1300 Grouting completed at MW14
1305 CWPS back on site and preparing to air hammer at MW15.
1310 Begin borehole for MW15.
1328 Borehole to ~26'
1330 Grouting complete at MW01A.
1337 Begin installing well MW15.
1353 MW15 completed to bentonite seal. Rig set up at MW02R.
1429 Begin MW02R after decon of hammer. Note the CWPS brought enough rods so decon would not be necessary
1445 Dye shake test on soil cuttings from ~ 25' bgs is negative.
1452 Dye shake test at ~ 26' bgs is weakly positive (pink bead)
1505 ~~Hydraulic~~ lube oil leak on rig. Sorbent pad used to soak up oil. Chain link broke.
1521 Chain broke and fell on a hydraulic ~~line~~ line, causing it to break

MKD

(cont.) and leak oil. The driller thinks that he has the parts at the shop to fix the chain, but needs to check. At best, this can be repaired tomorrow morning. This incident occurred at borehole completion to ~~40~~ 41' bgs. Driller said that he will be onsite tomorrow mid-morning and hopefully operational by early afternoon.

1540 CWPS departs site.

1545 JFA relocates to MW09 cluster.

1608 Begin augering for MW09A

1627 Augered to 10-ft bgs., Begin well installation in open borehole

1636 MW09A completed to bentonite seal. Cleanup time.

1656 JFA at MW15 for grouting

1710 Grouting completed at MW15.

1724 JFA departs site 1738.

1730 DMA & I depart site 1738.

1830 Notes from today:

- JFA will likely bill some OT for today as they exceed their 10-hr day

MKD 6/20

(cont.) JFA will be charging well const. time, incl grouting. CWPS will charge strickly drilling footage

- All my boring logs are being recorded on a iPAQ (HP) using FIT 8.2. The data is transferred to a laptop and processed using LogDraft. Log forms are printed to PDF for QC check

1.5 ~ 2 hrs decon

~ 2 hr well install

~ 1 hr decon

MKD 6/20/2012

6/20 MKD

Thu. June 21, 2012. Today's tasks -
soil sampling / well installation
Weather Conditions -
AM: M. sunny, mod NE wind, low 80's
PM: P. sunny, var NE wind, mid 90's

0716 Arrive at Site 1738. JFA already on site. Edwin is filling in swale along trail w/ Geoprobe to make access to MW09 cluster and MW16. Emanuel is cleaning augers (mud by hand)

0830 Pedro Ruiz on site

0905 Pedro off site.

0915 DMG got a call from PJDC surveying; they are at SWMU29 DMG: I relocate there.

0924 Meet Pedro & Alex (PJDC) at SWMU29, DMG shows Pedro locations. Meanwhile, JFA is steam cleaning augers.

0947 Relocate to staging area. JFA is ~~finishing decon.~~ starting decon

0958 Emanuel said that the Police stopped by and suggested they move because the area is not

(cont.) secure. They recommended a location

1037 Scoped out location and it doesn't seem to be a good area. Relocate to Security to find other options and stop by Autopart for supplies.

1150 Meet PJDC to show Site 1738

1230 Lunch break & supply run

1330 Back at Site 1738.

1345 CWPs on site and at decon area preparing chain for replacement. JFA decon'ing

1355 DMG relocate to Site 1738 for well development. 1230 was time for grout completion at MW13

1404 Calibrate YSI 556 MPS

Sp Cond 1,409 µS = 1,409 from 1452

pH 4.00 = 4.01 → 4.00

7.00 = 7.07 → 7.00

10.00 = 9.88 → 9.98

DO 750 mm Hg

6.52 mg/L →

Turb 9.63 → 10.0 (10 std)

1440 PMG begins development.
1501 I check on JFA; seems like a long time to decon augers and rods
1515 JFA relocates to 1738MW16; clearing the trail along the way.
1555 Begin soil boring for MW16 (target depth of 25' bgs)
1600 MKD collects 1738MW16-00 & 1738MW16-00D (0-1')
1620 MKD collects 1738MW16-01 (1-3')
1657 CWPS installed MW02R to 40' bgs and placed screen & riser. Driller thinks that 30' of casing is appropriate to avoid slough at 25' (like MW01 & almost MW02R). This would at ~$1,500 to price. Work would be best done on Monday with time to decide and time to buy casing.
1700 MKD collects ~~MI~~ 1738MW16-03, MS & MSD (5-7'). JFA left about 15-min ago to complete 1738MW02R.
1606 MKD back at BUV. JFA waiting

(cont.) for me. Well MW02R collapsed to 4' bgs; cannot install well. They pull casing.
1815 Collect 1738ER12 from a pie pan.
1830 PMG: I depart site - Done for the day.

MKD 6/21/2012

Fri: June 22, 2012. Today's Tasks -
well installation / soil sampling
Weather Conditions
AM: P. sunny, lt E wind, mid 80's
PM: M sunny, lt E wind, low 90's

0710 DMG: I arrive at decon area. JFA on site preparing for the day

0725 Relocate to site 1738

0734 Assist w/ meter calibration used in development

Turb: 10 > 10.08
Cond: 1,409 = 1,381 → 1,409
pH: 4.0 = 3.96 → 4.00
7.0 : 7.06 → 7.00
10.0 : 9.94 → 10.00
DO: 760mmHg 6.86 → 7.88

0751 I relocate to MW16. JFA is augering for well installation.

0908 Begin installation of 1738MW16

0923 JFA is having difficulty removin the bottom plug. Also mud in aug

0927 Well removed; screen caked in

~~0927~~ ~~We~~ mud. Pulling augers.

0954 Auger pulled, borehole open to 26' with muddy water. Install well

(cont.) in borehole. Cleaned off screen before re-install

1031 Sand at 16' bgs. JFA to get more sand and grouting materials to grout MW16, MW09A/09B

1115 JFA mixing grout on top and haul w/ pickup truck to grassy area wells below.

1237 Complete grouting at MW16.

1257 JFA lunch break

1305 DMG: I relocate to Autopart and security for ice & supplies.

1336 Back at Site 1738.

1357 JFA back on site. Review daily logs w/ Emanual

1415 Grouting of MW09 cluster.

1447 Grouting of MW09B completed.

1512 Grouting of MW09A completed.

1525 Prepare to move rods, augers & rig

1732 JFA sets up rig at cluster MW07 (by mistake). Augers & rods loaded up

1737 JFA relocate to decon area to off load augers and rods

1740 DMG: I depart the site - done for the day.

1830 Notes on today:

- I talked w/ MEK regarding extra casing at MW01B (20 ft / $55 per foot = $1,100 more). MEK is okay with it to do the work technically soundly.
- I called JFA (Nelson) to authorize CWPS to purchase casing and install the well. I will follow up w/ an e-mail
- I e-mailed Nelson later about schedule versus budget; we will be exceeding number of rig days. Need to address sooner than later.

MKD 6/22/2012

Sat. June 23, 2012. Todays tasks -
Well cluster MW08
Weather Conditions:
AM: M. sunny lt NE wind, mid 80's
PM: M. sunny, mod NE wind, low 90's
0708 Arrive at decon area. JFA is on site. Prep for decon
0715 PID calibration
Fresh air = 0.0 ppm
100 ppm Isobutyl. = 102 ppm
0721 Turb calibration
10 NTU = 9.69 → 10.0
0729 YSI 556 MPS calibration
DO@760 mmHg : 7.50 → 7.71
Sp. Cond. 1,382 → 1,409
pH 4.00 : 4.00 → 4.00
7.00 : 7.03 → 7.00
10.00 : 9.92 → 9.99
0740 Prep. for sampling, while JFA decon.'s.
0924 Relocate to Site 1738.
0940 Setup at 1738MW08B.
0951 Begin DPT soil sampling.
1000 DMG collects 1738MW08B-00 (0
1010 DMG collects 1738MW08B-01 (1-3')

MKD

1020 DMG collects 1738MW08B-03 and 03D (5-7')
1110 Soil sampling completed. Prepare to auger.
1135 Begin augering for MW08B
1252 Augered to ~39'; ~10' of mud in augers.
1305 Augered to ~42.5' bgs. About 20' of mud in augers; pull augers.
1322 Note: DMG assisted with soil sampling this morning. Now he is developing wells.
1350 Borehole open to 33-34' bgs
I instructed JFA to install the well because the formation is damp from 34-40' bgs anyway.
Begin well installation.
1510 JFA is still constructing the well; sand was falling and filling down to 42.5' and mixing w/ mud.
1519 1738MW08B completed to bentonite seal. (1' sand above screen)
1529 Driller break time (since they skipped lunch).
1639 Drill crew back on site.

MKD

1656 Begin augering for 1738MW08A
1705 Begin well installation
1730 Well complete. Emanual and I review well ID's and dates
1805 JFA departs Site 1738.
1810 DMG; I leave Site 1738
1900 General notes for today:

- Engaged in discussions w/ MEK and JFA regarding remaining work vs. budget.
- Need to follow up w/ Rightway on clearing for the sewer line investigation
- Need to schedule JFA for sewer line investigation
- I gave DMG to develop well 1738MW08A eventhough it has not been grouted. The well is shallow and with the bentonite seal in place, there is only ~1.5' of annular space remaining for grout. Much of that space will be occupied by the concrete pad.
- Notes on JFA - Emanuel is doing

(cont.) most of the decon work (mud removal)

- One Macrocore available 6/16 PM 6/17 and 6/18
- Crew left early on 6/19 (2:30 pm)
- Decon is time consuming

MK
6/23/2012

Sun. June 24, 2012. Todays tasks -
Decon / cluster 1738MW07B
Weather Conditions
AM: M. sunny lt. E wind, mid 80°
PM: M. sunny, mod E wind, low 90

0715 DMG: I arrive on site (1738). JFA on site picking up augers & rods.

0726 ▫ Turb meter calibration
10 NTU = 10.04 NTU
▫ YSI 556 MPS calibration
DO: 762 mmHg 9.48 mg/L
7.89
Sp Cond 1,409: 1,381 → 1,409
pH 4.00: 4.00 → 4.00
7.00: 7.05 → 7.00
10.00: 9.91 → 9.99
▫ PID Calibration
Fresh air = 0 ppm
100 ppm Isobutyl = 100 ppm

0800 DMG to continue w/ development. I relocate to security & Autoport for ice & sampling supplies.

0854 Return to Site 1738. JFA still in decon mode.

1020 JFA relocates to the decon area

(cont.) I assist DMG w/ development

1115 Prep for soil sampling and update logs.

1216 I check on JFA at decon area. They still have four augers to steam clean. They also are generating decon water that has to be managed.

1326 JFA relocates to Site 1738.

1335 Clear and setup at MW07 cluster

1401 Begin soil sampling at MW07B.

1410 DMG collects 1738MW07B-00 and 00D; 0-1'

1440 DMG collects 1738MW07B-01 (1-3')

1455 DMG collects 1738MW07B-03 (5-7')

1500 JFA leaves site early to do laundry. DMG: I finish sampling and logging to 20' bgs.

1512 Cleanup time.

1530 Collect 1738ER13 from a SS spoon.

1549 Relocate to Autoport & security for shipping supplies and ice.

1615 DMG: I depart (Navy area)

Mon. June 25, 2012. Todays Tasks -
Well installation:
Weather Conditions -
AM: M sunny lt E wind, mid 80's
PM: Var clouds, occ rain, E wind near 9
0716 DMG; I arrive at decon area.
JFA already on site.
0725 All relocate to Site 1738
0740 JFA resumes soil sampling at
1738MW07B w/ the 20-24' interval
0746 PID calibration (MiniRAE 2000)
Fresh air = 0 ppm
100 ppm Isobutyl. = 101 ppm
0752 DMG to prepare samples for shipping
while waiting on CWPS
0940 Soil sampling completed. Prepare
to auger.
0956 Begin augering for 1738MW07B
1055 MW07B augers at 30'. I talked
with Nelson this morning. CWPS
cannot be on site today due to
problems at another site. CWPS will
be on site tomorrow between 7-8
Nelson; I discussed his support
on site. Wednesday would be a

(cont.) good time for him to support IDW
mgmt and well completions.
1141 Augered to 43' bgs. Prepare for
well installation.
1150 Call from MEK. He'd like actual
costs for lodging, vehicle; per diem.
1205 JFA begins pulling augers.
1251 Borehole open to ~ 40' bgs.
Begin well installation.
1357 Well complete to bentonite seal.
Note: sand settled slowly through
muddy water, and too much was
added. Sand settled to 18 ft bgs
This is probably too high, but
can make that evaluation during
GW sampling. If results are
similar to 1738MW07, then high
sand pack could be resulting in
sample being collected from 15-25'
interval. Need to evaluate vertical
flow as well. Low-flow sampling
could isolate deeper conductive
zones.
1400 JFA lunch break. DMG went to
SWMU 29 to inspect drying beds

1522 JFA not back from lunch yet. Rain showers pass through area
1525 JFA back at MW07 cluster
1535 Begin augering for 1738MW07A
1548 Pull augers
1557 Begin well installation.
1610 17MW07A completed to bentonite seal
1615 I talked to JFA about MW07B and high sand pack. The best solution is to pull well and re-drill borehole. They will do this tomorrow.
1655 Well screen and casing pulled. JFA will re-drill tomorrow. Heavy rain shower starts.
1715 Review JFA daily logs
1730 Relocate to security bldg to get coolers (FedEx didn't pick them up).
1735 ~~Mee~~ Depart NACR to meet FedEx in Ceiba.
1740 FedEx gave us some instructions
- Call after requesting a pickup to get an ETA

(cont.)
- Use our Ceiba address
- Place airbill pouch opening upward
- Don't attach MSP stickers to airbill.

1745 DMG & I depart for Condo - Done for the day.

6/29/2012

Tue. June 26, 2012. Today's Tasks -
Well installation
Weather Conditions -
AM: M. cloudy, gusty NE wind, mid 80
PM: M. cloudy, mod NE wind, near 90

0713 DMG & I arrive on site (decon area). JFA already here.
0730 Relocate to Site 1738.
0740 JFA sets up at 1738MW07B to redrill the well borehole.
0750 Begin augering at MW07B.
0917 Augering complete. Begin well installation.
0951 CWPS crew is on site.
1015 Begin clean out of MW02R. JFA is prepared to install the well immediately upon completion
1031 Begin well installation.
1054 1738MW02R installed to the bentonite seal.
1100 JFA to steam clean air hammer
1124 JFA returns. Move air rig to new 1738MW01B.
1135 JFA works on finishing MW07B while CWPS begins casing

(cont.) installation at MW01B
1210 CWPS & JFA lunch break
1224 DMG & I relocate to security area.
1305 Back at Site 1738. CWPS is resuming drilling. JFA finishing up MW07B. I observe.
1350 CWPS at 40' bgs. Prep to install casing. DMG observing
1526 Talked w/ MEK & RAA about MW07B. The second installation attempt also failed; cave in at ~15' bgs w/ sand pack at ~34-35' bgs. Talked about options - redrill again w/ augers
- use as a TW
- Drill w/ prepack
- Have no data point.

Right now the best option is prepack. JFA looking at stock (either 1.5" or 2"). Note: either DMG or myself observed JFA during installation process.

1535 I asked JFA to start grouting. They said that there isn't time between now & MW01B installation

1400 [late entry] JFA says that formation around MW07B has collapsed. We discussed problems; I thought they may have pulled the augers too fast (perhaps last 15' of augers. Thru Emanuel, Edwin didn't think so; that slough was coming in even w/ augers. Prehaps it happen during lunch; JFA wanted to wait for sand to settle.

1549 CWPS installed 40' of casing and begin air hammering to 60' bgs. DMG is primary observer.

1627 I talked w/ Jeanne @ JFA. He'd like Edwin to try augering again but ~~[illegible]~~ lift augers slowly to 28', then add bentonite after lifting auger 1 or 2 add't feet.

1635 Begin installation of MW01B

1715 17MW01B completed to bentonite seal. Cleanup time. I decided to

(cont.) leave the steel casing in place. There is no benefit in removing it and there is no add't'l cost for leaving it.

1751 CWPS departs site; Their work here is done. JFA continues cleanup and paperwork

1810 All depart site. Done for the day

[signature] 6/26/2012

Wed. June 27 2012 : Today's tasks -
Soil borings
Weather Conditions:
AM: M. sunny, lt E wind, mid 80's
PM:
0715 DMG & I arrive at Site 1738.
JFA is setting up ~~to~~ grout wells.
MW01B and MW02R
0746 Mini RAE 2000 PID
Fresh air : 0 ppm
100 ppm Isobutyl = 102 ppm
0753 YSI 556 ~~MPS~~ MPS calibration
DO @ 762 mmHg : 5.68 → 7.76 mg/L
Sp Cond: 1,409 : 1,428 → 1,409
pH 4.00: 4.03 → 4.00
7.00: 7.01 → 7.00
10.00: 9.93 → 9.99
0831 Emanuel reports that their tremie
pump is malfunctioning; asked if
they could gravity pour grout. I
gave approval.
0900 MEK called to talk about budget
for this project and had questions
about projects for completion. The
sewerline investigation will be one

(cont.) to confirm reports of contamination
if we have time to chase to a
source that is a bonus
0908 JFA nearly out of cement for
grout. They ordered some, but
have to go to the store to pay.
Should be delivered today. JFA
has about six bags left. This could
possibly slow us down more.
1002 JFA back on site. They picked
up the cement whilest they
were there.
1050 1738MW01B grouting completed.
1100 1738MW02R grouting completed.
1125 DMG & I relocate to Autoport
JFA prepares for Soil borings
1145 Back at Site 1738. JFA is locating
the rig to SB104. JFA was
going to decon rods, then take
a lunch break
1330 JFA still not back on site. I
worked on getting some drilling
quantities for MEK budget
analysis
1355 Still no JFA; 7 hours on site

(cont.) and only two wells have been grouted

1426 JFA back on site ready to sample

1432 Begin at SB104

1530 Liner stuck in the 24-28' interval

PID Readings / Dye shake results

Depth	SB104	SB106	SB107	SB108	SB109
16					
17	6				
18	512				
19	801/+				
20	361				
21	500				
22	1044/-		Didn't complete		
23	919				
24	1470/-				
25	Liner stuck				
26					
27					
28					
29	1				
30	25				
31	3				
32	-				

1540 DMG collects 1738SB104-10 (19-20')

1550 DMG collects 1738SB104-10 (19-21') for SPLP BTEX, MTBE, TPH GRO; DRO

1624 Try a 3-ft drive (28-31 ft)

1653 ~~Wetnzane~~ setup at SB106

1710 DMG collects 1738SB106-01, MS; MSD (1-3')

1725 1738SB106 refusal at 11' bgs due to gravel

1730 5' offset yield refusal at 6' cleanup time

1750 Collect 1738ER14 from acetate liner

1807 All off site - Done for the day

1900 General notes - due to slow/ poor performance I, with MEK's okay, decide to end field project w/ Finishing well tasks only

MKD 6/27/2012

Thu. June 28, 2012. Todays Tasks-
Well install (MW07B)/ completions
Weather Conditions-
AM: M. sunny, lt E wind, mid 80's
PM: M. sunny, mod E wind, low 90's

0713 PMG: I arrive on site (1738). JFA already on site.

0723 JFA relocates the Geoprobe rig back to MW07B for 3rd attempt.

0737 More on the decision to cut off the field program. JFA did not meet yesterdays task objectives of sampling SB104, SB106-SB109. This will add another day to the program. That missed objective, along with all ~~them~~ other missed objectives led to the conclusion to terminate this field effort of well completion. The soil borings at Site 1738, SWMU 29, and the sewerline will be done at the beginning of the groundwater sampling event. / JFA removed well screen & casing and cleaning up augers.

0829 MEK called. We discussed the plan for Thurs & Fri and also possible

(cont.) drilling methods for source zone investigation at 1738 given problems w/ DPT drilling/sampling.

0840 DMG: I ship samples and manage equipment while JFA decons.

0932 DMG: I return to Site 1738.

0940 JFA relocates to decon area. Pedro Ruiz on site

0953 Pedro off site.

1007 YSI 556 MPS calibration
D.O. @ 762 mmHg: 9.82 → 7.53
Sp. Cond (1,409): 1396 → 1,409
pH 4.00: 3.97 → 4.00
7.00: 7.05 → 7.00
10.00: 9.96 → 9.99

1031 Both Jaime and I discussed today's schedule w/ JFA (1/2 day MW07B install / 1/2 day well completion). JFA understood and said that they would try. They don't seem to be picking up the pace.

1042 JFA still at decon area. I instructed to clean only ~~what you~~ they need. They concurred.

1134 JFA still not finished deconing
1142 At decon pad. JFA is finished.
Nelson Feliciano is on site.
1158 JFA left a few minutes ago for
1738. Nelson: I talked about
how he can best help. I said that
pad form construction would be
a good start.
1210 I'm back at 1738. JFA is at
new borehole for MW07B. DMG
started development at ~1130.
1247 JFA driller is around 15' bgs at
a different location from original
MW07B. Nelson is building forms
for well pads
1337 Down at 25' bgs; there is ~4'
of mud in augers.
1437 Augers advanced to 41.5' bgs w/
~12' of mud. Prep to install well
(JFA talking to Jiame about it).
That is ~4' of harder mud / 8' of
muddy water
1516 Auger deeper into dryer zone to
drop out mud
1556 JFA augered to refusal at 46' bgs
MKD

(cont.) The plan is to use that 5 extra
feet to drop the mud into allowing
for well installation
1600 MEK called for an update. He
also wants us to look at two
UST sites to see if the fill valves
have been properly secured
1605 Begin well installation
1820 Well installation complete -
Remove augers
1830 Cleanup time
1845 JFA departs site 1738
1850 DMG: I departe site 1738

MKD

MKD

Fri. June 29, 2012. Today's tasks -
Well completions / development
Weather Conditions -
AM: M. sunny, lt E wind, mid 80's
PM: M. sunny, lt E wind, near 90°

0713 DMG & I arrive at Site 1738.
JFA is probably at decon area.
0727 Relocate to decon area. JFA is
preparing for grouting : well
completion.
0800 JFA relocates to Site 1738.
0852 Grout pump is not working; will
have to gravity feed remaining
wells (3).
0855 Grouting at 1738MW08B complete
0901 JFA crew is completing grouting
and Nelson is working on surface
completions.
0902 Grouting at 1738MW07B completed
0904 Grouting at 1738MW07A completed*
1030 JFA takes lunch at Nelson's
direction
1103 Nelson departs NAPR
1130 ~~DMG~~ JFA back on site. Emanuel
begins mixing concrete and

(cont.) Edwin prepare to drill holes for
bollards
1230 Difficult installing bollards thru
gravel fill. JFA will try the
3-1/4" HSA
1454 HSA is time consuming and
can get bollards in 1-foot.
We will push where we can and
auger where we ~~can~~ must
1530 JFA building pads; DMG & I
collect DTW measurements
1638 DTW measurements complete
JFA starts MW16. MW13 bollards
were pushed into the ground
~1ft
1735 JFA cleanup time, Bollards and
pads built for MW13, MW14, MW15
and MW02R. Due to coarse gravel
fill at MW01 cluster, it might be
impractical to install bollards,
They will try however. MW16 & 01A
in grassy area were completed.

*Note: Well grouted w/ surface completion
since less than 2' annual space above
bentonite seal

DTW Measurements

Time	ID	DTW	Time	ID	DTW
1617	MW01	19.29	1607	MW15	18.52
1620	MW01A	21.78	1535	MW16	7.08
1615	MW01B	21.92	1551	MW05R	7.08
1613	MW02	18.03	1550	MW05L	7.93
1609	MW02R	20.73			
1628	MW03	19.30			
1626	MW04	20.07			
1552	MW05	8.35			
1554	MW06	10.10			
1154	MW07	6.27			
1155	MW07A	6.34			
1156	MW07B	6.40			
1545	MW08	6.68			
1546	MW08A	6.84			
1547	MW08B	6.55			
1541	MW09	6.69			
1543	MW09A	7.70			
1542	MW09B	6.05			
1538	MW10	7.77			
1603	MW11	17.83			
1633	MW12	23.16			
1632	MW13	21.98			
1557	MW14	19.08			

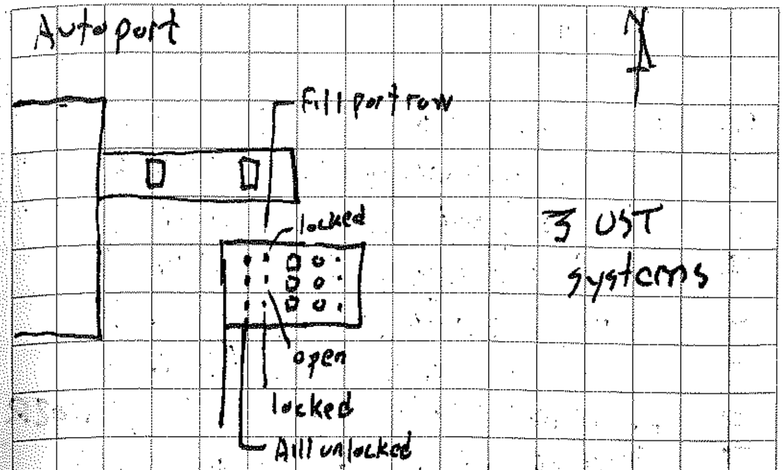
(cont.) but no others. Due to limited access in grassy area, bollards will not be installed (discussed w/ and approved by MEK)

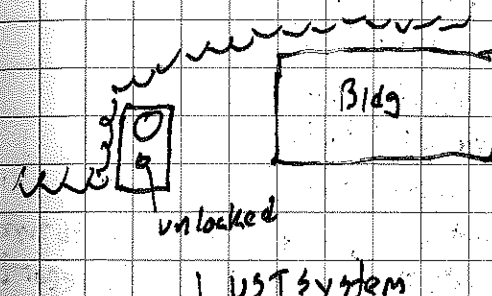
1745 DMG: I depart site; JFA to leave shortly. Done for the day

MKD 6/29/2012

Sat, June 30, 2012. Todays tasks
Well completion/development
Weather Conditions.
AM: M. sunny, lt E wind, mid 80's
PM: M. sunny, lt E wind, low 90's

0720 Arrive at Autoport
0850 Relocate to Security office
0801 Relocate to Site 1738.
0825 JFA on site (they called earlier to say thay they'ed be late getting o
0850 DMG prepares to decon MW08B and I do drum inventory
0920 JFA focuses on well completion on top portion of the site (MW01 cluster
1126 Emanuel experiencing some heat stress and needs to take a break. They are nearly finished w/ MW01B. DMG at MW07B for development. JFA will move to grassy area and comple other wells. I relocate to Autopor to examine UST fill ports.
1158 Three fill ports at Autoport. The north and south ports are locked and secured. The middle port is unlocke and top cap/flange are broken.





Drum Inventory

Drum #	Contents	Source
1	Soil cuttings (full)	MW15
2	Soil cuttings (full)	MW14
3	Soil cuttings (full)	MW13
4	Soil cuttings (full)	MW13
5	Soil cuttings (full)	MW13
6	Develop. water (full)	MW01, MW02R
7	Develop. water (1/3)	and MW13
8	Soil cuttings (full)	MW02R
9	Soil cuttings (full)	MW02R
10	Soil cuttings (full)	MW01B/A
11	Decon water (full)	—
12	Decon water (full)	—
13	Decon water (full)	—
14	Decon water (full)	—
15	Decon water (full)	—
16	Decon water (full)	—
17	Decon water (full)	—
18	Decon water	reserved for future
19	Decon water	use; JFA to report

1214 Bldg 2293 has one UST. The fill port is in good condition, but unlocked. Emanuel called; they are going to break for lunch and get more cement

1231 I return to Site 1738.

1330 DMG completes well development and I assist. Emanuel builds pads in grassy area. Edwin loading drums on flatbed

1532 Edwin off loaded several drums at the drum staging area by the former Power Plant.

1559 JFA is still building pads in the grassy area. I presigned the daily logs for 6/29 & 6/30 so they can continued work and DMG & I can drop off equip and do inventory.

1602 Relocate to Autoport.

1655 JFA called to ask if drums can be moved on Tuesday. I said okay. He will document for me that they have been moved

1657 DMG & I depart NAPR

1820 Arrive at hotel in San Juan.
JFA plans:
- This afternoon complete well pads (sans filling bollards)
- Begin site cleanup
- Sunday - Day off
- Monday - Day off
- Tuesday - Back on site to:
  - Fill bollards
  - paint bollards
  - Fill pad settled spots
  - Move remaining IDW to Power Plant storage area (label any new drums)
  - Move & decon augers
  - Dispose trash
  - Send me daily sheets and photo documentation of drum storage and pad completion

MKD 6/30/2012

Sun. July 1, 2012. Today tasks - Travel to PIT

0445 Arrive at SJU for travel to PIT via CLT.

0630 Depart SJU.

1000 Arrive in CLT.

1200 In air. Send DMG the link to Oracle public access.

1300 Arrive at PIT - Done for the day.

MKD 7/1/2012

Mon. August 13, 2012. Today's tasks - Mobilization

0700 Arrive at PIT for travel to SJU via CLT. DMG; MKD crew

0900 Depart PIT

1525 Arrive at SJU. Get luggage and rental SUV

1630 Depart for NAPR

1710 Arrive at NAPR. Gate is locked (#3) No access to base today. Done for the day

MKD 8/13/2012

Tues. August 14, 2012. Today's tasks: setup/SWMU 29.

Weather Conditions:

AM - P. sunny, lt E wind low 80's

PM - M. sunny, lt E wind, low 90's

0730 DMG; I arrive at NAPR. Check in at Security Bldg

0750 At Autoport to prepare for the day.

0820 DMG; I relocate to staging area (old Post office)

0827 GeoEnviroTech arrives at staging area. Abraham and Nassar are their field crew

0857 Relocate to SWMU 29.

0916 Setup ~~DT~~ 6610DT at 29SS21.

0930 Collect 29SS21 (0-1') for App IV metals. Soil is: silty Fine Sand w/ f/c gravel; gray; dry (FILL).

0931 I collect soil samples while DMG locates add'l surface soil locations

0941 Setup at SB15

0946 Luis (Right Way) on site. Probe refusal at 2 feet. Will move

(cont.) and try again
0951 Clearing rig arrives.
1000 collect 29SB15-01 (1-3') for App IX metals. ~~silt~~ silty F SAND, with f/c gravel (sub ang.), clayey 2.5-3'; gray; damp; FILL
1005 collect 29SS25 (0-1') for App IX metals. silty F SAND, some f/c (subang) gravel; ~~gray~~ gray; dry (FILL
1010 Prep for boring outside the fence area
1108 slow going to boring area. Found alternate road over swale; ~~sag~~ significant brush/grass growth since June; clearing rig needed a jump start.
1143 setup at 29SB20.
1150 Collect 29SB20-01 (1-3') for App IX metals. silty F SAND, some f/c gravel, trace clay; subang.; grayish-brown; damp (FILL)
1156 Driller lunchbreak.
1300 Continue soil sampling, but first clearing rig needs another jump start
1303 setup at SB19

1315 Collect 29SB19-01, 0.1D + MS/MSD for App IX Metals from 1-3'. silty F/M SAND, some f/c subang gravel, trace plastic; clay; grayish-brown; dry (FILL)
1334 Setup at SB18
1340 collect 29SB18-01 (1-3') for App IX metals, silty F SAND, trace shell frag; light tan; damp (MARINE) becoming ~~ng~~ SILT, trace clay; gray; damp @ 2.9'
1344 Setup at 29SB17.
1350 Collect 29SB17-01 (1-3') for App IX Metals
0-1.2 silty F SAND, some f/c gravel; gray; damp
1.2-3 F SAND, some silt; light tan; damp
1401 Setup at 29SB16
1410 Collect 29SB16-01 (1-3') for App IX metals. silty F/M SAND, some subang. f/c gravel; gray; damp
1431 Rightway still has more clearing at SWMU 29. So, we

(cont.) cannot begin Sewer Line borings. I will have driller collect surface soil borings

1440 collect 29SS27 (0-1') for App IX metals. silty F SAND, little f/c gravel, glass; ceramic (subang.); light brown; dry

1450 collect 29SS28 (0-1') for App IX metals. silty F SAND, little f gravel and plastic; lt brown; dry

1526 Directed GeoEnviroTech to be on site 0830 tomorrow; Rightway at 0700 for Sewerline work. DMG: I will collect last two surface soil samples by hand.

1545 DMG collects 29SS26 (0-1') for App IX metals. silty F SAND, little f/c gravel (subang); light-brown; dry

1555 DMG collects 29SS29 (0-1') for App IX Metals. silty F SAND, little f/c gravel (sub ang.); light-brown; damp

1605 collect 29ER02 for App IX Metals from an aluminum pie pan at the

(cont.) site.

1608 Relocate to the Autoport.

1650 DMG: I at culvert (Bkgnd) location at Airfield for recon for MEK.

1710 Leave airport area.

1802 Talked to Luis at RightWay. A hydraulic line broke on the rig. They will be on site at 0700, but will need several hours to repair.

1830 I called Juan about clearing. They will mobilize the auger rig tomorrow and be on site around 0930-1000. will work 1730 until completion.

MKD 8/14/2012

Wed. August 15, 2012. Today's tasks- Site 1738 characterization
Weather Conditions:
AM: P. sunny, E wind 80's
PM: shower early, the p sunny near 90'

0710 Arrive at SWMU29. Right Way is not there, but at TWFF beginning rig repair. It may be around noon before operational.

0749 DMG: I at Autoport to prepare for site 1739 GW sampling

0825 DMG: I relocate to Site 1738. setup to sample 1738MW13 together to learn the system.

0925 Start purging at MW13 using the bladder pump setup.

1005 Pedro Ruiz on site

1014 YSI meter cable wiring loose; meter malfunctioning. Stop purge

1030 Pedro & I look at sewer line site for best starting point. The source may be an old fuel line originally supplying the power plant. Location of this line is not known.

1056 Auger rig on site. Pedro & I visit

(cont.) Right Way before escorting driller to Site 1738.

1104 Back at Site 1738.

1128 Driller setsup at SB108. They will take a lunch break as a rain shower moves in. DMG to resume purging at MW13.

1234 PID at MW12 well head = 0 ppm

1235 Driller back on site

1236 PID at MW14 = 0 ppm

1238 PID at MW15 = 0 ppm

1239 PID at MW02R = 283 ppm

1240 PID at MW01B = 4.0 ppm

1241 PID at MW01A = 595 ppm

1335 Begin augering at 1738SB108 Right Way rig repaired and at 1738 to clear to SB107.

1403 Path to SB107 complete. Right Way moves w/ DMG to Sewer Line area.

1415 Difficult augering at SB108 below 2-ft bgs. Will offset ~5' east

1435 Collect 1738SB108-01 for DRO only. The sample is too gravelly to collect Terracores for BTEX/MTBE or GRO.

1738SB107				
Time	ID	Depth (ft-bgs)	Recovery (ft)	Blow Counts
1433	S-1	1-~~3~~2.5	1.0	Not recorded
1502	A-N	2.5-9	—	— —
1517	S-2	9-~~10~~.511	1.5	8-11-17-17
1543	S-3	14-16	1.9	14-15-40-1[illegible]
— 8/16/12				
0913	S-4	16-18	1.2	25-26-24-7[illegible]
0924	S-5	18-19	0.8	25-50/6"
0950	A-N	19-20		
1015	S-6	20-20.6	0.4	50/7"
1044	A-N	20.6-22		
1059	S-7	22-~~23~~23	1.5	22-30-30-
1115	A-N	~~23~~-24		
12~~4~~55	S-8	24-26	1.~~4~~	moderate count
1300	S-9	26-28	~~1.6~~ 2.0	moderate count
1330	S-10	28-30	1.3	" "
~~1332~~	~~S-11~~	~~30-32~~		

MKD 8/15

Depth	PID	Description
1	0.0	F/C GRAVEL, little silt: clay; gray-
2		ish brown; v. dense; dry
	0 / 0.3	clayey SILT w/ F sand; dk gray;
	2.7	dense; damp; no odor
14	3	silty CLAY (SAPROLITE); brown;
	8	gray; H gray; damp
15 / 16	108	08 petro odor @ 15.5'
16 / 17	>9999	clayey SILT (SAPROLITE);
18	>9999	09 green staining; damp; v. dense;
	1340	petro* odor, then brown w/ green
19		staining
20	79999	clay SAPROLITE; v. dense
21		dye - negative
22	9100	
23	5200	olive drab; odor; dye weakly +
24	3250	
	93	brown, gray : tan; damp; petro odor
25	175	wet @ 27.8' dye = negative
26	25	13
27		
28	186	
29	25	moist, no staining; faint odor
30	28	

dye - weak +

* Petro odor is very sweet petro odor, not quite like gasoline

8/15 MKD

1442 Drilling method; 3 1/4" HSA driven by an Acker II trailer mounted rig. Samples collected in a 1 1/2" ID, 18" long split barrel sampler.

1457 I spoke w/ MEK about MW13. Based on PID reading at well head & no ~~res~~ 0ppm readings at MW12 & MW as well as fuel odor in purge water, I recommend well installation of MW17 across road from MW13 as upgradient well. MEK concurs

1600 Collect 1730SB108-08 (15-16') for BTEX, MtBE, GRO & DRO. Drillers cleanup while I sample.

1614 Driller departs site. Done for the day.

1629 DMG picks me up and relocates to Sewer Line Site.

1800 Right Way completes clearing a Sewer Line. They depart the site

1805 Baker off site. Notes on today

- DMG called surveyor yesterday for add'l work at SWMU29 an 1738. I prepared a SOW and ma for surveyor.

(cont.) JFA called today. They will be on site to pickup extra drums and move garbage (tomorrow or Friday.)

- Did not have FIT on PDA yet; recorded borehole log in notebook

MKD 8/15/2012

Thurs. August 16 2012. Today's tasks - site 1738 sampling.
Weather Conditions -
AM: M. sunny, mod gusty E wind, low 80s
PM: M sunny, mod gusty E wind, near 90s

0730 Arrive at Security for ice
0740 Relocate to Autoport for supplies
0805 Relocate to site 1738. Driller not on site yet.
0825 GeoEnviroTech crew on site. Prep for drilling and sampling. DMG begins sample shipment prep
0950 Collect 1738SB108-09 (17-18') for BTEX, MtBE, GRO & DRO
1050 Pedro Ruiz on site. Drilling at SB108 continues
1119 Pedro Ruiz off site
1158 Lunchbreak for drillers
~~PM~~1213 Assist DMG w/ GW sampling setup
1255 Drillers are back on site.
1320 Collect 1738SB108-13 (26-27') for BTEX, MtBE & GRO (no DRO)
1337 SB108 complete, Pull augers
1444 Setup at SB111
1459 Drillers to decon.

1551 Driller returns to the site. The auger head is broken from the hard gravel in fill and the spare head doesn't fit properly. Cannot begin SB111 today. Cleanup time
1604 Driller leaves the site. I help DMG w/ GW sampling
1608 1738MW12-12C collected for BTEX, MtBE, GRO & DRO.
1610 Cleanup/decon time
1651 Relocate to Autoport
1703 Relocate to Security Bldg
1710 Depart Security Bldg - Done for the day.

8/16/2012

Fri. August 17, 2012. Todays tasks -
Site 1738 SB; GW sampling
Weather Conditions -
AM: P. sunny, mod gusty E wind, mid 8
PM: occ rain, p cloudy, E wind, near 90°

0739 Arrive at Autoport. Prepare for the day's sampling

0808 Relocate to Site 1738. Setup at MW14. I assist DMG w/ ground water sampling while waiting on GeoEnviroTech

0832 We discovered that FedEx didn't pickup coolers yesterday. DMG needs to repack.

0839 Driller on site. Prepare for augering

0859 Begin augering at SB111

1015 I assist DMG in the collection of 1738ER15 for BTEX, MtBE, GRO; DRO from bladder pump and tubing.

1030 Collect 1738SB111-08 (17-18') for BTEX, MtBE, GRO; DRO

1140 collect 1738SB111-11 (21-22') for BTEX, MtBE, GRO; DRO

1158 Driller lunch break. I take a quick lunch, then help DMG.

1305 Resume SB111. I break away from DMG (now at MW15).

1415 Complete boring at 30.5'; sampler refusal ~~me~~ on top of competent bedrock. Cleanup and prep for SB107

1430 I relocate to Autoport to replace PID while Driller decon's

1503 Back on site. I assist DMG w/ equip cleanup Driller drum soil ~~[illegible]~~ cuttings from SB111. No more drilling today. Cleanup time

1530 Conference call

1558 Drillers depart site done for the day.

1600 DMG; I relocate to Autoport.

1615 Relocate to Security Bldg

1625 Depart NAPR - Done for the day.

1355 [late entries] collect 1738SB111-14 (28-29') for BTEX, MtBE, GRO; DRO

1515 Collect 1738ER16 for pie pan for BTEX, MtBE, GRO; DRO

8/17/2012

Sat. August 18, 2012. Todays Tasks -
Site 1738 GW sampling
Weather Conditions -
AM: P. Sunny, lt E wind, mid 80's
PM: P. sunny, mod E wind, low 90's

0739 Arrive at Security Bldg for ice
0750 At Autoport to prep. for the day.
0822 Relocate to Site 1738. Set up at MW01A & MW01. Also collect rinsate blank
1001 Begin purging MW01A / DMG @ MW01
1115 Collect 1738MW01A-12C for BTEX MtBE, GRO & DRO
1140 Sampling complete after letting well recharge (purged dry even at 100 mL/min)
1150 Cleanup / setup at MW02.
1242 I begin purging MW02. DMG has already started MW01B.
1400 Collect 1738MW02-12C for BTEX, MtBE, GRO & DRO
1410 Cleanup/decon. Prep for MW04.
1500 Begin purging MW04. DMG @ MW03
1555 Collect 1738MW04-12C for BTEX, MtBE, GRO & DRO

MMG 8/18

1602 Cleanup ~~/decon~~ time. Perform daily decon on pump
1710 Relocate to Autoport
1732 Relocate to Security Bldg.
1749 Depart Security Bldg - done for the day

MMG
8/18/2012

8/18 MMG

Sun.	August 19, 2012. Today's tasks
	Site 1738 GW sampling
	Weather conditions:
	AM: P. sunny, mod E wind, mid 80's
	PM: M. sunny, lt E wind, near 90°
0741	Arrive at Autoport to prepare for today's sampling and maintain yesterdays samples.
0821	Relocate to Site 1738.
0845	Collect 1738ER18 from bladder pump; tubing for BTEX, MtBE, GRO and DRO.
0958	Begin purging 1738MW11
1035	Collect 1738MW11-12C for BTEX MtBE, GRO; DRO (left off "-12C" on label).
1145	Cleanup and interwell decon.
1100	Assist DMG w/ dup, MS; MSD bottle prep. I also start hauling equip to MW16.
1306	Relocate to MW16 (in grassland)
1327	Begin purging MW16
1450	Collect 1738MW16-12C; Duplicate For BTEX, MtBE, GRO; DRO
1458	Cleanup/daily decon, haul equip

MKD 8/19

(cont.)	out of grasslands.
1608	Too late to start another well. I assist w/cleanup and pullout. We leave tubing and one set of equip by MW09 cluster for tomorrow.
1701	Depart Site for Autoport and security Bldg
1724	Depart NAPR done for the day.

MKD 8/19/2012

8/19 MKD

Mon. August 20, 2012. Todays tasks
Soil & GW sampling
Weather Conditions -
AM: M. cloudy, lt E wind, mid 80's
PM: P. sunny, lt E wind, near 90°

0738 Arrive at Autoport. Prep. for the day.
0749 Relocate to Site 1738.
0810 Meter calibration while waiting on GeoEnviroTech.
0852 Driller on site after preparing at the decon area.
0902 Setup at SB107. DMG to pack and ship samples. Rafi replaces Nasser today.
1100 Collect 1738SB107-~~08~~ 09 ; ~~08D~~ 09D (~~16-17'~~ 17-18') for BTEX, MtBE GRO, PRO
1140 Collect 1738SB107-11 (21-22') for BTEX, MtBE, GRO & DRO. DMG is back on site
1205 Driller lunch break
1259 Driller back on site.
1304 Resume 1738SB107.
1352 SB107. Driller pulls augers.
1330 [late entry] Collect 1738~~[illegible]~~SB107-14

MKD 8/20

(cont.) (27-28') for BTEX, MtBE, GRO & DRO
1421 Setup rig at MW17 (south of Forrestal, near MW13.
1440 Begin augering at MW17.
1525 Cleanup time. (I help DMG
1535 Driller to decon area.
1617 Driller returns to the site w/ clean augers. Final cleanup
1623 Driller departs site - done for the day. I return to help DMG w/ GW sampling.
1700 Move from grassland / cleanup / daily decon of pumps
1716 Relocate to Autoport / Security
1735 Depart NAPR - done for the day

[signature] 8/20/2012

8/20 MKD

Tues. August 21, 2012: Today's tasks -
Site 1738 soil ; GW sampling
Weather Conditions -
AM: M. Cloudy, occ rain, windy 80's
PM: Cloudy, occ rain, windy, high 80
0735 Arrive at Auto Port. Prep for the day
0804 Relocate to Site 1738. Calibrate meters / collect rinsate sample
0833 Driller on site (Nassar returns)
0858 Resume drilling at MW17.
0945 Collect 1738MW17-10 (19-20') for BTEX, MtBE, GRO ; DRO
1007. Heavy rain starts - shuts down drilling
1040 Resume drilling
1108 Begin well installation
1206 MW17 completed to bentonite seal. Top of sand 16' / Top of bentonite 13.5.
1214 PID readings at MW08 cluster
MW08 : 0 ppm
MW08A : 0.7 ppm / DTW : 7.48
MW08B : 3.0 ppm
1220 Driller to decon area and take

(cont.) lunch break
1328 Driller returns to the Site.
1335 Rig sets up at 1738SB106 to continue where JFA couldn't complete
1353 Begin augering at SB106
1444 Resume drilling after heavy shower.
1454 Lightning in area stops drilling
1507 Given the time and persistent thunder in area, drilling is suspended for the day. Driller relocates to the decon area to prepare for tomorrow. Groundwater sampling on hold too.
1515 DMG decides to continue GW sampling. I support.
1653 Sampling complete. Cleanup time
1710 Depart Site for Autoport / security Bldg
1723 Depart NAPR - Done for the day

8/21/2012

Wed. August 22, 2012. Todays tasks-
Site 1738 soil & GW sampling
Weather Conditions:
AM: M. cloudy, lt E wind, low 80's
PM: Incr clouds & wind, rain late 80's

0802 Arrive at Autoport to prepare for the day.
0814 Relocate to Site 1738.
0818 GeoEnviroTech crew on site.
0828 Resume drilling at SB106.
1000 Auger refusal just below 16'
1016 Augers pulled; off set rig ~8' to the east and try again.
1049 DMG is back on site after leaving to prepare samples for FedEx. He is now going to sample the wells
1148 Very hard bedrock in the area of SB106. Auger refusal at ~18' Will attempt a split spoon sample
1155 Could not drive a spoon. Abandon bore hole.
1204 Driller lunch break. I assist DMG with setup at MW05 cluster
1253 Driller returns to the site. Begin grouting of MW17 and install

(cont.) protective casing. They will also grout SB107 & SB111
1423 Driller ran out of cement at SB107. Will switch to augering at SB109 (west of SB108)
1432 Move rig to SB109.
1448 Begin SB109
1500 Collect 1738SB109-01 (1-3') for BTEX, MtBE, GRO & DRO
1514 Thunderstorm in the area. Stop work & clean up. DMG move equip from grassland area.
1530 Relocate to Autoport.
1545 Depart NAPR - done for the day. Tropical Storm Isaac in Leeward Islands and beginning to impact PR

MKD 8/22/2012

Thu. August 23, 2012. Todays tasks-
SWMU 29 sampling
Weather Conditions-
AM: var. cloudy, str winds, low 80
PM: cloudy, occ rain, windy, low 80s

0805 DMG: I arrive at Autoport. Prep for sampling.
0835 Relocate to SWMU 29.
0852 Collect 29SB20-00 for App IX Metals
0900 Collect 29SB19-00 for App IX metals
0908 Collect 29SB18-00, 00D & 00MS/MSD for App IX metals
0912 Collect 29SB17-00 for App IX metals
0915 Collect 29SB16-00 for App IX metals
0929 Collect 29SS23 for ~~mercury~~ App IX metals
0932 Collect 29SS24 for ~~mercury~~. Soil is clay (brown) w/ f/c gravel & cobbles
0940 Collect 29SS30 for ~~mercury~~ App IX metals. Soil is silty clay w/ palm tree roots; brown. very difficult to dig through
1007 Collect 29SB15-00 for App IX Metals. Soil is clayey silt w/ fk gravel; brown
1020 Return to Autoport to manage samples

1100 Collect equipment rinsate (29ER03) from stainless steel spoon for App IX metals
1109 Return to SWMU 29 to collect a field blank.
1111 Collect 29FB05 at SWMU29 for App IX metals
MKD
1120 Depart NAPR. Return to hotel to wait out TS Isaac and plan/schedule remaining tasks. Also complete field forms.
1500 Done for the day

MKD KDG

Fri. August 24, 2012. Todays tasks
Site 1738
Weather Conditions -
AM: Cloudy, mod E wind, low 80's
PM: Cloudy, rainy w/ E wind, mid 80's

0830 Arrive at Autoport / Security Bldg to prepare for the day.
0805 Relocate to Site 1738
0838 GeoEnviroTech on site.
0850 Resume drilling at SB109 (at 15')
0915 collect 1738SB109-10 (19-20') for BTEX/MtBE, GRO ~~DRO~~, foc & TOD
0945 Collect 1738SB109-12 (23-24') for BTEX/MtBE, GRO ~~DRO~~ & foc
1025 Setup at 1738SB110
1038 Begin augering at SB110.
1130 Collect 1738SB110-08 (16-17') for BTEX, MtBE, foc & TOD (moisture)
1145 Collect 1738SB110-10 (20-21') for BTEX, MtBE & GRO (moisture
1215 collect 1738SB110-12 (24-25') for BTEX, MtBE & GRO (moisture)
1220 Collect 1738SB110-13 for foc
1229 Boring work completed
1245 Heavy rain shower starts

1302 Driller to take lunch. I relocate to the Autoport
1339 I return to Site 1738. Raining on & off. Nassar called DMG to say he & Abraham are returning the auger rig this afternoon.
1425 Collect 1738ER21 from split spoon barrel half for BTEX, MtBE, GRO and DRO.
1502 PID at MW07 Cluster
MW07 - 0.4 / 0.4 ppm
MW07A - 1.6 / 0 ppm
MW07B - 0 / 0 ppm
1505 I assist DMG w/ setup at MW07A
1627 DMG completes sampling. Cleanup time.
1647 Relocate to Autoport / security Bldg.
1710 Depart NAPR. Wait for FedEx by Gate 3.
1735 Get package from FedEx

8/24/2012

Sat. August 25, 2012. Todays tasks -
sewerline / 1738 GW samples
Weather Conditions -
AM: Cloudy, lt SE wind, low 80's
PM: Cloudy, lt SE wind, high 80's

0736 Arrive at NAPR. Prepare for the day

0825 Relocate to decon area. Meet GeoEnviroTech there

0832 Relocate to the sewerline area.

0839 Meter Calibration
- HI 98703 (08390705)
15 NTU Initial 15.5 / final 15.4
- YSI 556 MPS (11F100176)
- DO (759) I: 9.47 / F: 7.80
- Sp Cond (1.409) I: 0.722 / F: 1.410
pH 4: 4.00 → 4.00
7: 7.01 → 7.00
10: 10.05 → 10.01

0840 DMG marks out utilities

0903 Driller starts SEW01 while I take DMG to Site 1738

0940 Collect SEW01-05 (9-10') for ~~BTEX, MTBE~~ GRO : DRO

1000 collect SEW01-04 (7-8') for ~~BTEX~~

(cont.) ~~MTBE~~, GRO : DRO 10-11'

1020 collect SEW02-05 (~~9-10~~) for ~~BTEX~~, ~~MTBE~~, GRO : DRO Also Duplicate

1030 Collect SEW02-06 (11-12') for ~~BTEX, MTBE~~ GRO : DRO

1052 Set up at SEW03. Note - presence of free product changes the nature of this investigation; that of soil contamination delineate, to a free product delineation w/ soil samples to support. The Free product appears to be a heavy fuel oil

1100 Collect SEW03-06 (11-12') for GRO and DRO

1128 Soil to soupy to sample at SEW04

1145 Collect SEW05-06 (11-12') for GRO : DRO

1200 Collect SEW06-06 (11-12') for GRO : DRO (MS/MSD)

1224 I take a lunch break ~~while~~ and visit DMG, while Driller takes lunch.

1249 Return to the Sewer Line area.

1315 Collect SEW07-06 (11-12') for DRO : GRO

1340 Collect SEW08-05 (10-11') for DRO & GRO
1345 Collect SEW08-06 (11-12') for DRO & GRO
free product present. This boring is ~~west of~~ east of sewer, just into the woodline. Due to dense vegetation, cannot place borings farther east without clearing.
1415 Collect SEW09-06 (11-12') for DRO & GRO
1440 Collect SEW10-06 & 06D (11-12') for DRO & GRO.
1450 Back at SEW01 to find a vertical boundary. Due to coarse coral fragments between 12 and 16 feet, could not advance sampler and ~~the~~ deeper. Cleanup time.
1518 GeoEnviroTech crew (William Rodrigez & Hardy) depart site. I relocate to site 1738.
1540 Relocate to the Autoport. Prep for QA/QC sampling.
1620 Collect SEWER01 from pie pan for DRO & GRO
1625 Collect SEWFB01 from site for DRO & GRO.
1631 GPS survey (GeoHX) for sewer

(cont.) line soil borings.
1644 Return to Autoport for sample mgmt.
1715 Depart Security Bldg - done for the day
0915 [late entry] calibrate PID initial 9.1 Final 100 ppm

MKD 8/25/2012

Sun. August 26 2012. Todays tasks -
MKD DTWs & slug tests
Weather Conditions -
AM: Cloudy, lt & wind, low 80's
PM: M cloudy, lt-mod E wind mid 80
0732 Arrive at Autoport/Security Bldg to prepare for the day.
0758 Relocate to Site 1738. Decon pumps; prep for blank samples
0830 Collect 1738ER22 from bladder pump and tubing for BTEX/MTBE, GRO & DRO
0850 Collect 1738FB03 (DI water) at ambient conditions at site 1738
0856 Meter Calibration
□ YSI (11F100176)
- DO (761) 7.42 → 7.71 mg/L
- Sp Cond (1.409)
2.560 → 1.409
- pH (4.00) 4.06 → 4.00
(7.00) 6.94 → 7.00
(10.00) 9.96 → 10.00
□ Hanna HI98703 (08390705)
(15) 14.9 → 15.0
0909 DMG preps MW06 for sampling, I prep for round of DTWs

0921 PID calibration ( )
fresh air 0.0 ppm
Isobut (100 ppm) 93 → 104 ppm
0920 PID at MW17 well head: 1.7 ppm
0925 Begin DTW measurements
1032 Complete DTW measurements. Prepare for slug testing
1239 Begin falling head test at MW13.
1250 Begin rising head test at MW13. 5-ft slug (decon'ed) used. Started and stopped ~~#~~ tests at WL equilibrium
1310 Setup at MW09B.
1322 Begin falling head test at MW09B reading: 54.892
1344 Stopped test ~~54~~.957; stable
1345 Begin rising head test 54.957
1408 Complete test 54.850
1410 Setup at MW09A. Head: 40.761 Using 3-ft slug
1416 Start falling head test @ MW09A
1442 Appears to be stable @ 41.765
1444 Start rising head test.
1455 Appears to be stable @ 40.538
1505 Setup at MW08B; head = 55.377
1507 Start falling head test at MW08B

DTW Measurements 8/26/12

Time	ID	DTW	Time	ID	DTW
1011	MW01	19.68	1026	MW13	22.47
1009	MW01A	22.26	0929	MW14	19.58
1013	MW01B	22.43	1031	MW15	19.03
1015	MW02	18.69	0943	MW16	7.60
1017	MW02R	21.20	0930	MW17	22.51
1021	MW03	19.79			
1023	MW04	20.60			
0957	MW05	8.86			
0958	MW05R	7.55			
1000	MW05L	8.38			
0935	MW06	10.56			
1002	MW07	6.61			
1004	MW07A	6.85			
1005	MW07B	6.58			
0952	MW08	6.78			
0953	MW08A	6.92			
0954	MW08B	6.63			
0947	MW09	9.93			
0948	MW09A	6.52			
0950	MW09B	6.49			
0945	MW10	8.25			
1028	MW11	18.30			
0926	MW 12	25.68			

1508 I am able to download and plot the data on the fly and graphically view stabilization. Using Schlumberger Diver transducer and Diver-Pocket software loaded onto a TDS Nomad mobile device.

1520 Stopped test. Head: 55.387

1523 Started rising head @ MW08B

1543 stopped test. Head = 55.338. Setup for MW08A.

1553 Start falling head test @ MW08A

1615 Stopped test; flat line; DTW 6.90' compared w/ 6.92' start

1617 Started rising head test @ MW08A

1638 stopped test; flat line; DTW: 6.92' cleanup time.

1708 Relocate to Autoport/Security

1746 Depart Autoport - Done for the day

MKD

8/26/2012

Mon. August 27, 2012. Today's tasks - shipping / slug tests
Weather Conditions -
AM: ~~Kwld~~ Cloudy E wind low 80's
PM: Var. clouds, occ shower E wind 80
0750 Arrive at Autoport to pack & ship samples & equipment.
1100 14 packages for labs and FEI
1114 Relocate to Site 1738. The GeoEnviroTech crew is on site moving drums & cleaning up. They will also build pad at MW17.
1202 I assist DMG w/ sampling at MW17. Now prep for slug tests
1208 MW07B DTW = 7.10
1215 Now DTW is 6.61. Install Diver
1235 Started MW07B falling head test after earlier false start.
1313 Start MW07B rising head test; flat line plot. Heavy rain shower passed through (let test run during rain).
1334 Stopped test; flat line.
1342 Started MW07A falling head test pressure = 40.902
1349 DMG setup 2nd Diver and prep'ed

(cont.) a slug at MW15. Started rising head test. DTW = 19.08
1419 Stopped falling head test at MW07A. Begun rising head test; flat line plot
1429 Begin MW15 rising head test; flat line plot
1431 Drill crew departs site. Their tasks are complete.
1502 Stop test at MW07A; flat line plot
1516 Stop test at MW15
1521 MW02R DTW = 21.13'
1537 Started falling head test. MW02R
1542 MW01B DTW = 22.39'
1550 MW02R back to DTW; flat line Start rising head test.
1604 Start MW01B falling head test
1615 Stopped MW01B; flat line same DTW
1616 Start MW01B rising head test
1622 Stopped test; flat line; DTW
Cleanup time.
1632 Relocate to Autoport / Security
1724 Depart NAPR - done for the day

MKD
8/27/2012

Tue. August 28, 2012.. Today's tasks
Demobilization
Weather conditions -
AM: P. sunny, gusty NE wind, low 80's
PM: M. sunny, lt NE wind, high 80's

0735 Arrive at the Autoport. Prepare for IDW sampling

0802 Relocate to IDW storage area for composite sampling.

0830 DMG collects 1738IDW03. ~~For~~ A composite from the liquid drums. for DRO, GRO, BTEX & MTBE

0840 Collect 1738IDW04 from composite of soil cuttings drums for GRO, TCLP metals/Hg, DRO, TCLP VOCs and ignitability/corrosivity/reactivity

0900 Drum Inventory (cont. from p. 66).
~~Drw~~ Drums 18 & 19 were not used

Drum#	Contents	Source
18	Soil cuttings	SB109, 110 & 111
19	↓	↓ also 1[illegible]
20		
21	Soil cuttings	SB109, 110 & 111
22	decon water	all SBs & MW

0921 Relocate to Autoport.

1059 Packed and shipped remaining samples & equip. Also shipped empty coolers

1108 DMG & I explore wetland areas at SWMUs 27 & 28

1217 Return to Autoport for inventory

1330 Depart NAPR. Return to condo to finish demob tasks.

1500 Done for the day.

Wednesday August 29, 2012. Todays tasks - Travel

0456 Depart condo for SJU

0845 Depart SJU for PIT via PHL

1228 Arrive in PHL

1430 Arrive in PIT. Get luggage and car - end of trip

MK

8/29/2012

CONTENTS

PAGE NO.	REFERENCE	DATE
	Dave Gaviglia	
	Michael Baker Jr., Inc.	
	100 Airside Drive	
	Moon Twp., PA 15108	
	412-269-6017	
	Site 1738	
	SWMU 29	
	Sewer Line	

6/11/12 Sun, 90s ①

0630- Arrive @ PIT for flight to PR

1515- Arrive in PR

1800- Arrive @ Bldg 31 for GPS + Camera - Lab coolers already @ 31.

1845 - Depart 31

DMG 6/11/12

6/12/12 1738/29 Sun, 90s ②

0700- Arrive @ Bld, 31 w/ MKD to gather equip & organize lab bottles,
- Carlos Brown stated Baker needs to move equip by end of event. Move to former autocare

0810 - Rightway @ 31

0827- Go to 1738 to clear & locate sample pts.

1300- Go to swmu 29 to clear & locate sample pts.

1540- Rig overheated - Rightway off site

1620- Go to sewer line area to locate line, Use dowsing rods & flags.
- No Baker drums @ Power plant staging area. Drums there are empty

1702 - off site

6/12/12
DMG

6/13/12 1738/29 Sun, 90s ③

0702- Arrive @ Bld, 31, load supplies

0730- Go to Sewer line are to locate concrete pads, can't find. Rightway can be available next week if needed.

0800- Rightway on-site, cont. clearing @ swmu 29

1215- Rightway breaks for lunch DMG place location pin flags

1245- Rightway on-site

1320- Rightway finishes clearing DMG stake remaining locations

1340- Leave 29 w/ MKD to 1738

1510 - Get equip @ 31, including PID- Calibrate PID
Fresh air - Cal. to 0.0
Isobutylene gas Cal. original - 99.8
Cal to 100ppm

1530 - leave 1738 w/ MKD, go to Swmus 27 & 28

1610 - Arrive @ swmu 27
27 dry, appears dryer than in Feb

Photo 1 South end of Wetland

Photo 2 North end of Wetland

6/13/12 Sun, 90s (4)

1625- Leave 27, go to 28
1640- Arrive @ swmu 28, wetland
dryer than in Feb.
Photo 3 - 28 wetland
1650- leave 28
- No Baker drum @ 27

6/13/12
DMG

6/14/12 Sun, 90s (5)

0720 - Arrive @ Bldg 31 to gather
equip & cal. PID (See MKD Notes)
0745- Go to 1738 w MKD
0817- leave 1738 to start moving
equip. from 31 to Autoport.
1610- Finish moving equip.
go to 1738
1705 - leave 1738, go to Wall
Mart for supplies

6/14/12
DMG

6/15/12 SWMU 29 Sun, 90s (6)

0710 - Arrive @ driller staging area
0730 - Go to Autoport for sampling equip to do surface soil sampling @ SWMU 29
Will collect 0-1' samples using new stainless steel spoon & homogenize in new pie pans
*0842 - Collect SS05
Soil - silt & fine to coarse rock frags. lt. brown, damp-dry
*0900 - Collect SS04 + Dup SS04D. Soil same as SS05
*0910 - Collect SS03
Soil - SILT & COARSE SAND w/ Fine to Coarse Rock frags.; damp to dry; lt. brown.
*0925 - Collect SS17
Soil - Silt + f. to coarse rock frags to 8", then ~~f~~ fine silty sand; damp-dry, tan
*0935 - Collect SS16
Soil - Silt & fine to coarse sand some fine to coarse rock frags, lt. brown damp-dry
trace shells

6/15/12 SWMU 29 Sun, 90s (7)

*0995 - Collect SS15
Soil same as SS16, trace glass frags
*1006 - Collect SS14
Soil same as SS16, little cobble sized rock frags.
*1020 - Collect SS13
Soil same as SS16
*1038 - Collect SS12
Soil - Silt and Fine to COARSE ROCK FRAGS., some shell & coral frags., trace plastic & cloth.; damp-dry, lt brown
*1054 - Collect SS11
Soil same as SS12, trace to little glass frags.
*1107 - Collect SS10
Soil - Same as SS11
*1116 - Collect SS09
Soil - Sandy silt ~~and~~ with crushed shell & coral frags (fine) damp-dry lt. brown
*1136 - Collect SS08
Soil - Same As SS09, w/ larger shell frags, trace plastic + wire
*1230 - Collect Equip. Rinsate from S.S. Spoon (29ER01)

6/15/12 SWMU 29 (8)

1245 - locate SS & boring locations inside fence @ 29
*1336 - Collect SS07
Soil - Sandy Silt and Fine to Coarse Rock Frags to 10"
Hard Material @ 10" (Concrete?)
Can't sample to 12"
*1354 - Collect SS06
Soil Sandy Silt & Fine to Coarse Rock Frags, little cobble sized rocks; damp-dry; brown
▶ 29SS22 was moved ~~4'~~ 5' SE to adjust off of asphalt & concrete sidewalk
* 1412 - Collect SS22
Soil same as ~~SS~~ SS06

▶ 1420 - Can't get past 4" @ 29SS21 - Will use Geoprobe
1440 - MKD returns to 29 to pick me up, return to 1738
- finish labeling SWMU 29 samples
1718 - off site

DMG 6/15/12

6/16/12 Site 1738 Sun, 90s (9)

0715 - Arrive @ drill staging area drillers loading sampling supplies
0718 - leave for 1738
Assist MKD in sampling
0920 - leave 1738 to get supplies @ Autoport & pickup ice @ security
Wait @ gate from 0925 - 1005.
security arrives; security stated that the gate will permanently close June 17th - Sunday.
1640 - Return to 1738, cont. sampling (See MKD notes)
1710 - off site

DMG 6/16/12

6/17/12 Pt. Cloudy, 80-90s (10)
Site 1738

0713 - Arrive @ Autoport to gather equip. Go to Security bldg for ice
0745 - Wait @ gate. Gate to close tomorrow.
0752 - Go to 1738. Drillers @ staging area cleaning equip. Collect soil samples @ MW09B (See MKD Notes)
1742 - Go to Autoport to pick up shipping supplies
1805 - leave Autoport

6/17/12 DMG

6/18/12 Sun, 90s (11)

0710 - Arrive @ Autoport to gather equipmt
0730 - Arrive @ 1738, drop off MKD, go to Swmu 25 to collect MS/MSD
0815 - Collect MS/MSD - 2 plastic - 2 jars @ SS09 (0-1')
0845 - Return to 1738.
0900 - Begin packing samples, labels etc.
Go to Autoport for supplies
Dropoff coolers @ Security office
1255 - Return to 1738 to assist MKD
1200 - off site.

6/18/12 DMG

6/19/12 Sun, 90s (12)

0710 - Arrive @ staging area & Drillers leave to meet w/ air rotary crew to lead them to 1738.

0800 - Air rotary rig on site
H&S briefing, setup

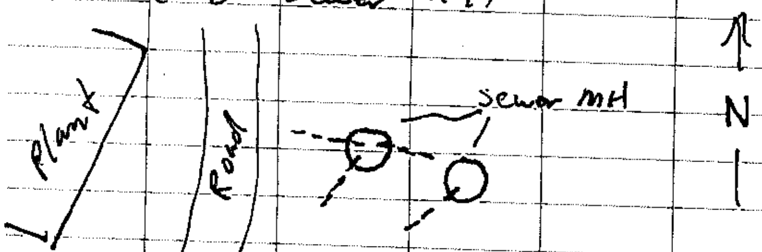
0820 - JFA to staging area for well supplies + clean augers for 10' well - MW09A

0850 - JFA will clear access for air-rig before well const.

0930 - JFA to perform well const. @ MW14 after air-rig pulls off

1015 - Go to Autoport to pick up supplies

1054 - Arrive @ sewer line to try to locate intake pipe
Locate N MH (Sewer) set back in heavy veg. Readjust sewer line to the S. Sewer MH

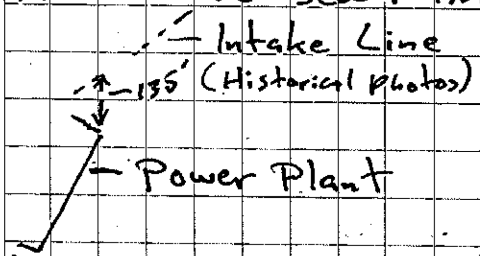


6/19/12 Sun, 90s (13)

1432 - Return to 1738
Help MKD located MW02
well located

1445 - Go w/ MKD to locate intake line

1630 - leave sewer line



6/19/12
DMG

6/20/12 Pt. Cloudy, 90s (14)

0710 - Arrive @ Site 1738
0758 - JFA on site to grout wells
0801 - CWPS on site
0809 - Call Rightway (Luis), leave message for clearing @ sewer line today.
Call Pedro Tejada - leave message
Call Pedro's cell - Machine is broke down. Rig won't be ready until next Tues. @ earliest.
0825 - Go to Autoport for water. Go to Security for ice + key for SWMU29 Gate was locked yesterday.
0908 - Return to 1738
1000 - Go to Autoport for drum labels, then go to sewer line to cont. search for intake line
- Find location of intake line based on aerial, use compass for bearings go straight to concrete pads N of main road. Cont. search can only find large concrete chunk ~ 4' x 5' w/ steel framing.
1250 - Do same search west of plant access road. Two monitoring wells observed last week appear to be just N of where line should be.

6/20/12 Pt. Cloudy, 90s (15)

Cannot locate concrete pads between plant + access road
1340 - Return to 1738. Label drums and take inventory.

Soil	Well Dev. H_2O	Decon
卌 I	I	

Labels: Michael Baker Corp POC: Mark DeJon 412-269-6007

1505 - Air hammer rig breaks down
1545 - Go to install MW09A
1655 - Finish bent @ MW09A
1700 - Grout MW15
1710 - Finished grout MW15
Drum cuttings @ MW15
1724 - Drillers leave
1726 - leave 1738

DMG 6/20/12

6/21/12 Pt. Sun, 90s (16)

0715- Arrive @ 1738
Prep for sampling @ MW16
0910- ~~Right of way~~ Survey called - they are @ SWMU29 for ~~clearing~~ surveying locations. Show all locations - will do today and maybe in to tomorrow. Will then show PJDC all locations @ 1738.
0950- Meet w/ drillers @ decon pad
Local police stopped by warning of possible theft if materials + equip are left @ current staging area. Drillers decision. Look @ area suggested by cops - no water
1038- Go to Security to find optional areas. Need to talk to Carlos Brown. (@ funeral)
1110- Stop @ Autoport for dev. supplies
1150- Show PJDC Surveyor 1738 and give map
1230- lunch break, supply run
1345- Arrive @ staging area. Decon supplies. CWPS on site

6/21/12 Pt. Sun, 90s (17)

1353- Go to 1738 to develop 1738MW13
Well Depth (G.S.) - 36.5
" " (Top of PVC) - 38.85'
Water Level (Top of PVC) - 21.53'
1440- Begin purging using surge block + tubing + bail
Borehole volume $V = \pi r^2 h$
8 in borehole = 0.35 ft³
× 7.48 gal/ft³
≈ 2.6 gal
5 well vol = ~13 gal/ft
~~Bail~~ Initially surge, bail 5 gals. + surge again (surge every 5 gals.
Water Highly Turbid - light brown
1617- Purged 35 gal
- CWPS setting well @ MW02R
Set 10' of screen to 40'
- let MKD crew know to place sand pack + bentonite
1646- Start develop again
1712- Finish developing MW13
bottom hard - med. turbid lt. brown
Bailed 45 gals OVER

6/21/12 1738 Pt. Sun, 90s (18)

MW13

Field meas. after development

Temp 29.6 °C

Cond - 3726 us/cm²

DO - 2.22

pH - 6.70

ORP - 129.4

Turb - ~~7~~ 575

1720 - Water Level - 21.71'

Decon Bailer w/ Soap & Distilled H_2O & surge block

- Help MKD @ MW16 (See MKD Notes)

1815 - Collect Equip Rin 1738EB12 from pie pan

1830 - leave 1738

DMG 6/21/12

6/22/12 1738 Sun, 90s (19)

0710 - Arrive @ staging area, drillers loading well supplies.

0730 - Set up on MW14 to develop

Well Depth (G.S.) - 41.21

Well Depth (Top of PVC) - 43.49

Water Level (Top of PVC) - 18.71

~~0740~~

0740 - Begin Surging w/ Surge Block, then bail.

Surge after bailing every 5 gals.

Med. Turbidity, lt brown w/ fines

↑ Initial

0940 - Bailed 46 gals

Med. Turbidity, less fines

Field Measurements

Temp °C - 29.5

Cond us/cm² - 1914

DO - 8.7 mg/L

pH - 7.35

ORP 135.0

Turb > 575

0941 Water Level (Top of PVC) - 19.17'

Decon

DMG 6/22/12

6/22/12 1738 Sun, 90s (20)

1010 - Setup on MW01A

Well Depth (G.S.) - 25.35'

Well Depth (Top of PVC) - 27.53'

Water Level (Top of PVC) - 21.64'

1022 - Begin Surging + purging

Surge after bailing every 5 gals.

~~1022~~ Highly Turbid, lt gray, sed. on bottom

1048 - Dry @ 6.5 gals, let recharge

1103 - checked Water Level (Top of PVC) - 25.89'

1107 - Dry @ 7 gals, let recharge

1137 - Water Level (Top of PVC) - 24.93'

- Surge, then purge

1148 - Dry @ 7.2 gals., let recharge

1222 - Water Level (Top of PVC) - 25.5'

Surge + Purge

1230 - Dry @ 7.4 gals.

Field Meas.

Temp °C - 30.2

Cond us/cm² - 2154

DO mg/L - 7.32

pH - 7.62

ORP - 139.7

Turb. - >575

Decon Equipment w/ Soap + DI water

1738 Sun, 90s (21)

6/22/12

1300 - Get supplies @ Airport + ice @ Security

1335 - Go to MW15 for develop.

Well Depth (G.S.) - 25.70'

Well Depth (Top of PVC) - 27.75

Water Level (Top of PVC) - 18.18

1340 - Begin ~~Su~~ Surging + Purging. Surge after every 5 gals.

1403 - Dry @ 5 gals., let recharge

1418 - Water level (Top of PVC) - 24.55'

- Surge + Purge

1432 - Dry @ 6.5 gals, let recharge

1502 - Water Level (Top of PVC) - 23.88'

Surge + Purge

1514 - Dry @ 8 gals, let recharge

1543 - Water Level (Top of PVC) - 24.05'

Surge + Purge

1553 - Dry @ 11 gals.

Field Meas.

Temp °C - 27.5

Cond us/cm² - 8000

DO - 7.65

pH - 7.24

ORP - 147.3

Turb. >575

6/22/12 1738 Sun, 90s 22

1600- Decon development equip.
- Drillers picking up augers @ MW16 for decon.
1740- leave 1738

DMG 6/22/12

6/23/12 1738 Pt. Cloudy, 90s 23

0708 - Arrive @ staging area, decon augers loading augers + supplies to sample + set wells @ MW08 A+B
0925 - Arrive @ 1738 to sample @ well cluster MW08 A+B
1100 Pack samples + go to Security bldg for fresh ice.
1150- Take Develop. equip to MW16
1236 - Setup up on MW16 to Develop
Well Depth (G.S.) - 25.10'
Well Depth (Top of PVC) - 27.70'
Water Level (Top of PVC) - 6.87'
1245 - Begin Surging + Purging. Purge w/ Purge Block Initially then after every 5 gals purged. Highly Turbid, lt. br.
1445- Purged 55 gals. Med. Turbid lt. brown

Field Meas.

Temp °C -	27.8
Cond us/cm² -	7145
DO mg/L -	4.42
pH -	6.37
ORP	140
Turb	> 575

~~Water level (TOC)~~ DMG

Pt. Cloudy, 90s 1738

6/23/12 MW16 (24)

1446 DTW = 14.07 ft (T/PVC)

Decon equip. w/ soap + distilled H_2O.

1511 - Set up on MW09A to Develop

Well Depth (G.S.) - 10.67

Well Depth (TOC) - 13.26

Water Level (TOC) - 5.97'

1535 - Begin Surging + Pursing

Initially Surge, then surge every 5 gals. purged.

1552 - Dry @ 4.2 gals, let recharge

1622 11.68' (TOC) is the DTW. Begin surge

1628 Dry at 4.5 gallons; let recharge

1702 - Water Level (TOC) - 12.26'

Surge then purge

1709 - Dry @ 4.6 gals, let ~~drecha~~

1733 Water Level (TOC) - 12.45

Surge + Purge

1737 - Dry @ 4.7 gals.

Finish Develop.

Decon equipment

1810 - Leave 1738

DMG 6/23/12

1738 Sun, 90s (25)

6/24/12

0717 - Arrive @ 1738

0801 - Set up on MW09B to Develop.

Well Depth (G.S.) - 40.93

Well Depth (TOC) - ~~43.43~~ 43.51

Water Level (TOC) - 6.07'

0808 - Begin Surging + Pursing

Initially Surge, then surge every 5 gals purged. Highly Turbid, lt br.

0905 - Purged 20 gals, only ~ 0.5' of water in well. Let recharge to surge

0935 - Water Level (TOC) 22.15' and rising, Surge

0954 - Purged 26.5 gals, ~ 1' of water in well, let recharge to surge

1009 - Water Level (TOC) - 36.60'

Surge then purge

1024 - Purged 30 gals Med Turb. less fines

Field Meas.

Temp = 22.5 °C ORP = 167.7 mV

Sp. Cond = 20,760 mS/cm

D.O. = 4.45 mg/L Turb = >575 NTU

pH = 6.32 su

Decon Equip.

6/24/12 1738 Sun, 90s (26)

1100 - Setup on MW08A
Well Depth (G.S.) - 11.04
Well Depth (TOC) - 13.63
Water Level (TOC) - 6.83
1110 - Begin Surging + Purge
Initially Surge, then Surge every
5 gals purged.
1127 - Dry @ 7 gals., let
recharge to surge
1139 - Water Level (TOC) - 8.52
Surge then purge
1155 - Dry @ 12 gals, let recharge
to surge
1213 - Water Level (TOC) - 7.90'
Surge + Purge
1225 - Dry @ 17 gals. let recharge
to surge
1245 - Water Level (TOC) - 7.61'
Surge + Purge
1258 - Dry @ 22 gals, let recharge
to surge
1320 - Water Level (TOC) - 7.91'
Surge + Purge
1330 - Dry @ 27 - Finish

DMG 6/24/12

6/24/12 Sun, 90s 1738 6.83 7.61 (27)

MW08A Field Meas.
Temp °C - 26.9
Cond us/cm - 18367
DO mg/L - 7.09
pH - 6.59
ORP - 142.0
Turb - >575
1340 - Go w/ MKD to collect
soil Samples (see MKD notes)
1512 - Return to MW08A to
Decon equip.
1540 - Help MKD w/ equip rinsate
1550 - Go to Autoport for supplies
- pickup ice @ Security
1613 - leave Security + return
to 1738

DMG 6/24/12

6/25/12 Rain Afternoon ~ Pt. Cloudy, 90s 1738/SWMU 29 (28)

0716 - Arrive @ staging area
Pack samples, go to security bldg. to ice + stage for Fed Ex Pickup
0911 - Return to 1738
1354 - Go to SWMU 29 to inspect drying beds.
• Sandy material removed from the northern drying bed the week of June 11th. Appears to be filter bed mat.
Photo 1 - Drying beds looking S/SE
Photo 2 - Northern drying bed concrete vault. Minor crack above outflow pipe (~4' below ground surface) (LK N)
Photo 3 - Pitting + cracking along Northern drying bed wall.
Photo 4 - Hole on Northern Drying bed wall (LK E)
Photo 5 - Minor cracking on Northern Drying Bed Walls (LK N). Minor cracking observed throughout walls
Photo 6 - Holes in the floor of the Northern Drying Bed, next to the filtering beds

SWMU 29
6/25/12 Pt. Cloudy, Rain, 90s (29)

Photo 7 - Northern Drying Bed (LK SE)
Photo 8 - North Central Drying Bed (LK SE)
Photo 9 - Central Drying Bed (LK SE)
Photo 10 - South Central Drying Bed (LK SE)
Photo 11 - Southern Drying Bed (LK SE)
1500 - leave SWMU 29, heavy rain
pick up MKD
1530 - Return to 29 for inspection
Photo 12 - Deteriorating Concrete along the NE corner of Northern drying bed
Photo 13 - Minor cracking throughout floor of North Central Bed.
Photo 14 - Cracking along eastern wall of North Central Bed (LK E)
Photo 15 - Cracking + Deteriorating Concrete along eastern wall of North Central Bed (LK E)
Photo 16 - Minor cracking throughout floor of Central Bed
Photo 17 - Deteriorating concrete, cracks + holes in Central Bed Vault
Photo 18 - Cracks + Deteriorating Concrete along eastern wall of Central Bed (LK E)
Photo 19 - Deteriorating walls along the SW Corner of South Central Bed (LK S)
Walls deteriorating throughout bed. (south central)

6/25/12 Pt. Cloudy, Rain, 90s
SWMU 29
(30)

Photo 20 - Some deterioration of concrete around South Central Bed Vault outflow pipe (LKN)
Photo 21 - Minor cracking on floor of South Central Bed (LKE)
Photo 22 - Deteriorating walls in the NW Corner of the Southern Bed (LKE)
Photo 23 - Minor cracking on floor of Southern Bed (LKE)
Photo 24 - No cracks or Holes in Southern Bed Vault (LKN)
Photo 25 - Eastern walls of South Central & Southern Beds in relatively good condition (LKE), some minor pitting or cracking.
Photo 26 - Southern wall of Southern bed in relatively good condition, only minor cracks, ~~or~~ some deteriorating concrete along the tops of the wall. (LKS)
1615 - Leave 29. Go to Security, coolers still there call Fed Ex. Fed Ex went to gate (called Security #) ~~Ball~~ Phone disconnected. Fed Ex left

Pt. Cloudy, Rain, 90s
(31)
6/25/12
1630 Called Fed Ex. Driver will return in ~1 hr. and call cell so we can be @ gate
1730 - Fed Ex calls. We need to get coolers & take to him @ Burger King in Ceiba
1800 - Drop off coolers w/ Fed Ex in Ceiba

Reminder for Shipment
Use Ceiba, PR for sending Address
No MPS on Fed Ex copy
Fed Ex label sheet opening towards the cooler.

DMG 6/25/12

6/26/12 Pt. Cloudy, 90s
1738 (32)

0713 - Arrive @ staging area
0730 - Arrive @ site 1738 to redrill MW07B
Well Const. @ MW07B
Well Depth - ~~40.4~~
~~to' Screen~~
~~Sand to~~
~~Bent. to~~
Redo
Need New well (DMG)

0957 - Carlos Brown called. He talked to the Commander (Dan) about leaving the swing gate in place and letting the env. contractors place a lock on the gate for entrance. Carlos will get me a key.
1205 CWPS breaks for lunch
1752 - Air hammer off site
1811 - Leave 1738

6/26/12 DMG

Pt. Cloudy, 90s
6/27/12 1738 (33)

0715 - Arrive @ 1738
Drillers grouting MW01B + 2R
prep bottles + labels for borings
0930 - Go to Security to get ice + get SWMU 29 gate unlocked
1015 - Return to 1738, cont. prep. bottles
1332 - Setup on MW07A to Begin Develop. Need to cut PVC riser to length first. Drillers have hack saw and wrench not on site yet.
1432 - Start Soil Sampling (See MKD notes)
1808 - Off Site

6/27/12 DMG

Sun, 90s

6/28/12 1738 (34)

0713 - Arrive @ 1738
- Move development equip. to MW01B
- Pack Samples for Shipment
- Go to Security to refresh ice & pack samples for shipment
- drop off equip @ Autoport

0930 - Arrive back @ 1738

1105 - Setup on MW01B to Develop.
Well Depth (G.S.) - 62.90' Med. Turb, lt. brown
Well Depth (TOC) - 65.40'
Water Level (TOC) - 21.88

1118 - Begin Surge & Purge
Surge Initially, then Surge every 10 gallons.

1319 - Finish - Purged 37 gals
less fines

1320 - Water level (TOC) - 21.96'

Field Meas.
Temp °C - 32
Cond us/cm² - 3319
DO mg/L 5.35
pH 7.29
ORP 123
Turb. >575

Sun, 90s

6/28/12 1738 (35)

1355 - Setup on MW02R to Develop. Highly Turbid, fuel odor lt. gray
Well Depth (G.S.) - 39.90'
Well Depth (TOC) - 42.32'
Water Level (TOC) - 20.62'

1401 - Begin Surge & Purge, Surge initially, then every 5 gals.

1456 - Go to gate to meet FedEx

1525 - Cont. purging. Surge Block broke; will have to purge w/o surging.

1636 - Finish bailing - 53 gals total
Med. Turbidity lt. gray, fuel odor sheen, less fines, Hard bottom

1641 - Water Level (TOC) - 20.92'

Field Meas.
Temp °C - 29.3
Cond us/cm² - 3371
DO mg/L - 4.81
pH - 6.79
ORP - 149.6
Turb >575

Decon w/ Soap & Water

1850 - leave 1738

6/29/12 Pt. Cloudy, 90s 1738 (36)

0715 - Arrive @ 1738
- Go to staging area, driller loading supplies to finish grouting wells.
- Cut PVC Riser to length @ remaining wells
0900 - Go to Airport to pack FEI + Jay Oliver equip for shipping.

1 small box (10lbs) to Jay Oliver
206 Dawson Ave
Seaford VA 23696
757-570-3855

3 boxs to FEI (50 lbs)
1100 - Return to 1738
1155 - Setup on MW07A to develop
Well Depth (G.S.) - 10.92'
Well Depth (TOC) - 13.46'
Water Level (TOC) 6.34'
MW07B water Level (TOC) 6.48'
MW07 water Level (TOC) 6.27'
1209 - Begin purging MW07A w/ bailer Slightly turbid - orange - brown, no fines

Pt. Cloudy, 90s 1738 (37)
6/29/12 MW07A

1225 - Dry @ 5.0 gals, let recharge
1240 - Water Level (TOC) - 11.53
- Cont. to bail
1248 - Dry @ 6 gals water clearing
1319 - Water Level (TOC) 11.33'
- Cont to bail
1325 - Dry @ 7 gals, let recharge
1356 - Water Level (TOC) - 11.57
1403 - Dry @ 8, let recharge
1430 - water level (TOC) - 11.82'
1433 - leave to meet Fed Ex @ gate.
1506 - return to finish devel. MW07A
1513 - Finish - Dry @ 9.5 gals
Decon w/ Soap + Water Bailer
- Collect a round of gw levels (see MKD notes)
1640 - finish water levels
1745 - leave 1738

6/29/12
DMG

6/30/12 1238 Sun, 90s (38)

0720- Arrive @ Autoport to unload equip. Get ice for water @ Security
0807- Arrive @ 1238
0845- Set up on MW08B to develop
Well Depth (G.S.) - 31.83' - 32.7 after Dev.
Well Depth (TOC) - 34.30' - 35.2 after Dev.
Water Level (TOC) - 6.53'
0855- Begin purging w/ bailer
Highly turbid ~1' of sed. on bottom. lt. brown
1055- Finish purging 56 gals.
Med. Turbid, less fines
Water level - 9.72 (TOC)
1112- Setup on MW07B to develop
Well Depth (G.S.) - ~~[illegible]~~ 45.63'
Well Depth (TOC) - ~~[illegible]~~ 48.2'
Water Level (TOC) - 6.30' Highly Turbid sed. on bottom
1125- Begin purging w/ bailer
1326- Finish purging 46 gals
Med. Turb. lt brown, hard bottom
Water Level (TOC) - 14.43
Well Depth (TOC) - 48.93
Well Depth (G.S.) 46.43
After Dev.
1603- leave 1238 for Autoport
1700- leave staging area for San Juan
Will fly home on 7/1/12

6/30/12 1738 Sun, 90s (38)

0720 - Arrive @ Autoport to unload equip. Get ice for water @ security
0807 - Arrive @ 1738
0845 - Set up on MW08B to develop
Well Depth (G.S.) - 31.83' - 32.7 after Dev.
Well Depth (TOC) - 34.30' - 35.2 after Dev.
Water Level (TOC) - 6.53'
0855 - Begin purging w/ bailer
Highly turbid ~1' of sed. on bottom. lt. brown
1055 - Finish purging 56 gals.
Med. Turbid, less fines
Water level - 9.72 (TOC)
1112 - Setup on MW 07B to develop
Well Depth (G.S.) - ~~[illegible]~~ 45.63'
Well Depth (TOC) - ~~[illegible]~~ 48.2'
Water Level (TOC) - 6.30' Highly Turbid sed. on bottom
1125 - Begin purging w/ bailer
1326 - Finish purging 46 gals
Med. Turb. lt brown, hard bottom
Water Level (TOC) - 14.43
Well Depth (TOC) - 48.93
Well Depth (G.S.) 46.43
After Dev.
1603 - leave 1738 for Autoport
1700 - leave staging area for San Juan
Will fly home on 7/1/12

8/13/12 (39)

0600 - Arrive @ PIT airport.
1525 - Arrive @ San Juan
1630 - Depart for NAPR
1710 - Arrive @ Gate 3. Gate is locked - no access. Leave NAPR.

8/13/12 DMG

8/14/12 SWMU 29 Pt. Cloudy, 80s-90s (40)

~~0600 - Arrive @ PIT airport~~
~~1525 - Arrive @ San Juan~~
~~1630 - Depart for NAPR~~
~~1710 - Arrive @ Gate 3. Locked~~
~~No access. Leave NAPR.~~
DMG

0730 - Arrive @ NAPR, go to security bldg.
0750 - Arrive @ Autoport to gather equip.
0820 - Arrive @ staging area to meet w/ GeoEnvirotech.
0830 - GeoEnvirotech arrives. Setup decon pad.
0857 - Go to SWMU 29.
locate new SS samples w/ plant
0950 - Rightway on-site
- locate & clear SS outside fence
- clear old path - overgrown
1230 - ~~Rig~~ clearing rig broke down
1323 - clearing rig working again
1430 - Rightway taking a 30 min. lunch break. Rig running rough
1610 - leave SWMU 29 finish borings & SS outside fence
1608 - Go to Autoport

8/14/12 (41)

Gate 1 to guard shack - go straight group of bldgs - Old American Airlines jet - go to bldgs go in couple old bldgs on left take road go to back of old bldgs - single road to start culvert @ road - is there water in ditches.
Call Kimeson cell phone
1644 - leave Autoport, go to Airport Area
1654 - Found Culvert area w/ SW/SED Bkgd flagging.
- Upper Culvert dry
- Swale leading to lower culvert dry
- Ponded water around lower culvert (approx ~~10'~~ 15' x 7') - 1.5-2' deep @ culvert, no flow

South of single lane road
North of single lane road
- Ponded water (no flow) @ culvert North of single lane Rd. (approx. 15' x 15' & ~2.5' deep) to 3' @ culvert
1710 - leave Airport

~~8/14/12 DMG~~

8/15/12 Sunny, 90s (42)

0710 - Arrive @ summ 29, looking for Rightway. Rightway Rig being fixed.
0745 - Arrive @ Autoport to pick GW Sampling equip.
0825 - Arrive @ 1738 to set up on well MW-13 for sampling
- Perform "Daily" decon on pump
- See field data sheets for purge/sample details (1738MW-13)
- Cal. Meters. See Cal. Record.
1014 - YSI broke - Shut down purge @ MW-13. Go to Autoport + get other YSI + Calibrate.
1250 - Decon sampling pump + place new liner. - Begin setup on MW-12.
1320 - Rightway ready to clear. Will do clearing instead while MKD does 1738 borings.
1333 - Rightway arrives @ 1738 for clearing
1403 - leave w/ Rightway to sewer line
1450 - Rig broke down

Sunny, 90s (43)

8/15/12

1540 - Rig working again
1640 - Rig broke down.
1650 - Rig running again
1801 - Rightway finished clearing sewer line. Leave sewer line.

DMG 8/15/12

8/16/12 1738 Pt. Sun, 90s (44)

0728- Arrive @ Security bldg. Check in and get ice. Go to Autoport for supplies.
0810- Arrive @ 1738. Pack samples for shipment.
1215- Set-up on 1738MW-12 to sample. Perform "Daily" Decon on pump
- See field data sheets for purge/sample details.
- Cal. Meters - See Cal. Sheet
- Equipment problems. The inner liner of sampling tube crimped not allowing water to flow through
1608 - Sample MW-12
1651- Go to Autoport
1706- leave Security Bldg.

DMG 8/16/12

8/17/12 1738 Pt. Sun, 90s (45)

0739- Arrive @ Autoport to pick up supplies
0810- Arrive @ 1738. Do rinsate sample of gw pump. - See MKD notes - First perform "daily" decon on pump - Cal. Meters
0846- Go to security bldg to see if coolers were sent. Shannon can't find tracking number. Coolers still @ Sec. bldg. - repack coolers & change for Sat. delivery
0953- Return to 1738 - collect equip rinsate of GW pump & tubing - See MKD Notes
1037- Setup to sample MW-14
- See field data sheets for purge/sample details.
* 1208- Sample 1738MW14-12C
1254- Move to 1738MW-15 to sample
Decon pump. - See data sheets for purge/sample details
* 1432- Samp 1738MW15-12C
1510- break down. Decon sampling pump
1609- leave 1738, go to Autoport
1623 - leave Security bldg.

8/18/12 Clouds + Sun, 90s
1738 (46)

0739 - Arrive @ Sec. bldg. for ice
0750 - Arrive @ Autoport for supplies
0822 - Arrive @ 1738
* ~~Sample equipment~~ "Daily" Decon pump
0840 - Sample equip rinsate from pump + tubing (1738ER17)
0900 - Cal. Meters
0930 - Set up on MW-01 to sample
- See field data sheets for purge/sample details
*1050 - Sample MW-01. Breakdown + Decon pump.
1130 - Set up on MW-01B to sample GW
- See field data sheets for purge/sample details
* 1315 Sample MW-01B
1738MW01B-12C
- Break down + decon pump
1403 - Set up on MW-03 to sample - See field data sheets for purge/sample details.
* 1620 - Sample MW-03
Break down. Decon pump
1711 - leave 1738, go to Autoport

8/19/12 Clouds + Sun, 80s
1738 (47)

0741 - Arrive @ Autoport, go to Sec. bldg.
0825 - Arrive @ 1738
- Perform "Daily" decon on pumps
collect equipmt rinsate - see MKD Notes.
- Cal. Meters.
0930 - Set up on MW02R to Sample - See field data sheets for purge/sample details.
* 1205 - Sample MW02R
1738MW02R-12C
Dup - 1738MW02R-D-12C
MS - 1738MW02R-MS-12C
MSD - 1738MW02R-MSD-12C
1440 - Set up on MW-10 to sample had to carry all equip from up top.
- See field data sheets for purge/sample details
*1605 - Sample MW-10
Break down, decon
1702 - Leave 1738, go to Autoport + Sec. bldg for ice
1725 - leave Sec. bldg.
DMG 8/19/12

Clouds + Sun 90s
1738
(48)

8/20/12

0737- Arrive @ Autoport for supplies
0755- Arrive @ 1738. Begin Fed Ex + Packing coolers for shipment
0900- Go to Autoport + Sec Building for packing supplies
1145- Return to 1738
1242- Set up on MW09 ~~cluster~~ for sampling

PID readings (ppm)

	Bksd	Open
MW09-	0.0	0.0
MW09A-	0.0	0.3
MW09B-	0.0	1.9

- see field data sheets for purge/sampling details

1420- Sample MW09
1355 - Setup on MW09B to sample - see field data sheets for purge/sample details
1635 - Sample MW09B
Break down, decon
1716 - leave 1738, pick up cooler @ Autoport, go to Sec bldg.

8/20/12
DMG

Clouds + Sun 90s
1738 2 w/ Rain + lightning
(49)

8/21/12

0735- Arrive @ Autoport for supplies
0817- Cannot find the well purge water drum. It must have been dumped and stolen. At 1738.
Collect equip. rinsate from pump + tubing @ * 0850 (1738ER18)
Cal. Meters.
0930- Setup on MW09A to sample set up tent for rain
- See field data sheets for purge / sampling details
* 1107 Sample MW09A
1204- Setup on MW08 to sample
- See field data sheets for purge/sample details
* 1350 - Sample MW08
PID 08A - 0.7 ppm 7.19
PID 08B - 3.0 ppm
-Wait out lightning
1523- Set up on MW08B - See field data sheets
* 1640 - Sample MW08B
1710- leave 1738, go to Autoport then Sec. Blds for ice.
1720- leave Sec Blds.

8/22/12 Clouds + Sun, 80. w/ Rain 1738 (50)

0800 - Arrive to Autoport for supplies
0815 - Arrive @ 1738
- Do ~~xxx~~ Fed Ex labels + pack samples for shipment
1100 - Set up on MW08A to sample
- See field data sheets for purge/sample details
* 1230 - Sample MW08A
1315 - Set up on MW05 to sample
- See field measurement sheets for purge/sample details
PID readings (ppm)
MW05 0.0
05R 7.0
05L 7.3
* 1450 - Sample MW05
Breakdown, lightning + heavy rain. Carry out equip.
Go to Autoport + Sec. Bld.
1600 - leave site

DMG 8/22/12

8/23/12 Tropical Storm Isaac SWMU 29 (51)

0805 - Arrive @ Autoport. Grab supplies to gather SS @ SWMU29.
0835 - Arrive @ SWMU 29 - See MKD notes.

DMG 8/23/12

8/24/12 Cloudy, Rain, 80s 1738 (52)

0738- Go to Sec. Bldg pickup coolers & ice. Go to Autoport for equip.

0810- Arrive @ 1738, "Daily" Decon Pumps.

* 0850- Collect Equip Rinsate (1738ER20) from GW pump + tubing

- Carry equip to MW05 cluster & set up canopy

0944- Set up on MW05L to sample - See field data sheets for purge/sample details

* 1135 - Sample MW05L

1202- Setup on MW05R to sample - See field data sheets for purge/sample details

* 1330 - Sample MW05R

1504- Setup on MW07A to sample - See field data sheets for purge/sample details

* 1620 - Sample MW07A

PID- 7A- 1.6
7B- 0.0
7- 0.0

DMG 8/24/12

Clouds, Rain, 80s
8/24/12 1738 (53)

1700- Ice @ Sec Bldg. Go to Autoport.

1710- Leave Autoport, meet w/ FedEx @ Gate 3.

DMG 8/24/12

Clouds + Rain, 80s

8/25/12 1738 (54)

0736- Arrive @ Gate 3, wait for security
- to to Autoport for supplies
0832- Arrive @ Sewer line w/ GeoEnv.
to locate lines
0910- Arrive @ 1738. Setup on
MW07 to sample - See field
data sheets for purge/sample details
* 1105 - Sample MW07
Dup. + MS/MSD
1228- Setup on MW07B to sample
- See field data sheets for purge
/ sample details
* 1440 - Sample MW07B
Breakdown equipment - lightning
storm coming
1530- MKD to 1738 to get DMG
1600- Go to Sewer line to collect
equip. rinsate, field blank, + GPS
survey. See MKD notes.
1643- Leave Sewer line. Go to
Autoport + Sec. Blds. for ice.
1715- leave Sec. Blds.

8/25/12
DMG

Cloudy, 80s
w/ Rain

8/26/12 1738 (55)

0730- Arrive @ Sec. Blds for ice.
- Go to Autoport for supplies
0804- Arrive @ 1738
Collect equipment rinsate of
pump + tubing + field blank -
see MKD notes.
Cal. Meters
New Well PID- 1.7 ppm (MW17)
MW06- 0.0 ppm
Water level (TOC) - 10.56'
0930- Clear vegetation around MW06
+ move canopy + equip.
Setup on MW06 to sample - See
field data sheets for purge/sample details
* 1105 - Sample MW06
1247- Setup on MW17 to Develop
Well Depth (bgs) - 27.91'
Well Depth (TOC) - 30.81'
Water level (TOC) - 22.51'
Surge + Purge - Surge w/ block
initially. Then surge every 5 gals
purged w/ bailer.
1307- Begin develop. Heavy fines,
highly turbid - lt. brown - no odor
1327- Dry @ 2 gals
let recharge.

33.29

8/26/12 Cloudy, Rain 80s
1738

56

1347 Water level @ MW17
(TOC) - 32.55'
Removed sed. from bottom. Now
hard bottom. Well Depth
(TOC) - 33.29'
- let recharge more
1421 Water level (TOC) - 31.91'
1432 - " " " - 31.65'
Not enough water in column to
surge - cont. to let recharge
1511 - Water level (TOC) - 30.85'
Surge then purge
1520 - Dry @ 2.3 gals., let recharge
1636 - Water level (TOC) - 32.11'
surge / purge
1641 - Dry, total of 2.5 gals
purged
1700 - leave 1738
- drop off equip @ Autoport.
- re-ice 8 coolers
1750 - leave

8/26/12
DMG

1738

8/27/12 Cloudy, w/ Rain, 80s

57

0750 - Arrive @ Autoport to pack
samples & equip. for shipment
1120 - Arrive @ 1238, finished packing
coolers & equip for shipping
1144 - Go to MW17 to sample GW
MW17 Water level (TOC) - 23.85
* 1150 - Sample MW17
Do slug tests - See MKD Notes
MW15 Water level (TOC) - 19.03'
Total Depth (TOC) - 27.75'
1633 - leave 1738

8/27/12
DMG

8/28/12 Clouds + Sun, 80s

0736- Arrive @ Autoport, set supplies to collect IDW Samples

0803- Arrive @ drum area

0830- Sample Decon Water 17381DW03

0922- Arrive @ Autoport to pack samples + equip. for shipment

1110- Go to SWMU 28 to observe wetland conditions

- Shallow standing water in wetland area approx 5' to 25' from wetland edge. Standing water less than 1" to 3"

1150- Go to SWMU 27 to check wetland conditions

- Some ponded water in southern portion. (1-2" of water)
- More ponded water in central + Northern portion close to wetland boundary to ~ 20' from boundary. (2" to 1') - depth of water

1217- Go to Autoport to cleanup + do ~~[illegible]~~ inventory

Soil Boring and Monitoring Well Logs

LOG OF BORING NO.: 1738MW01A

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **4**
LATITUDE: LONGITUDE: GEO. DATUM: START: **6/13/2012** END: **6/19/2012**
NORTH: **804778.969** EAST: **936969.453** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**
STATION: OFFSET: BASELINE: DRILLER: **Maldonado/DeLong**
EQUIPMENT: **GeoProbe 7822 DT/Reichdrill 650-WII** DRILL CO.: **JFA/CWPS**

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **12.0** TIME: **11:00** DATE: **6/13/2012** DESCRIPTION: **First encountered** INCLINATION:
WATER DEPTH 2: **21.78** TIME: **16:20** DATE: **6/29/2012** DESCRIPTION: **Synoptic DTW** ELEV. DATUM: **MSL+100**
WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **124.13**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
0.0	DP-1	75%		**1738MW01-00(0.0-1.0)** PID=0 **1738MW01-01(1.0-3.0)** PID=0		0	0.0' - EL 124.1 GRAVEL, SANDY, with clay; (GP); gray and brown; dry; dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
4.0	DP-2	100%				4	4.0' - EL 120.1 GRAVEL, with clay; (GP); gray; dry; dense; gravel is fine to coarse, subangular, igneous.	FILL.
8.0	DP-3	80%		**1738MW01.06(11.0-13.0)** PID=0		8	8.0' - EL 116.1 SAND, GRAVELLY, with clay; (SP); gray; dry; medium dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
						11.5	11.5' - EL 112.6 CLAY, SILTY, with sand; (CL); dark brown; damp; stiff; sand is medium to coarse. wet zone from about 12-12.5.	RESIDUAL.
12.0	DP-4	75%				15	15.0' - EL 109.1 CLAY; (CL); gray, greenish; damp; medium stiff.	SAPROLITE.
16.0						16	As above, but brown and gray zones.	

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

LOG OF BORING NO.: 1738MW01A

PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	2 OF 4
LATITUDE:		LONGITUDE:		GEO. DATUM:	
START:	6/13/2012	END:	6/19/2012		
NORTH:	804778.969	EAST:	936969.453	COORD. DATUM:	PR/VI 5200
LOGGER:	Mark DeJohn				
STATION:		OFFSET:		BASELINE:	
DRILLER:	Maldonado/DeLong				
EQUIPMENT:	GeoProbe 7822 DT/Reichdrill 650-WII			DRILL CO.:	JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 12.0	TIME: 11:00	DATE: 6/13/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2: 21.78	TIME: 16:20	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	124.13

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-5	50%				18		
						19		
20.0	DP-6	100%		**S-1(20.0-21.0)** PID=0		20		
				1738MW01-11(21.0-22.0) PID=0		21	Green staining and petroleum odor.	
				1738MW01-11(22.0-23.0) PID=5.2		22	No odor or staining; Brown.	
				S-4(23.0-24.0) PID=3.9		23	Brown and orange-brown layering, w/ zones of rust.	
24.0	DP-7	85%		**S-5(24.0-28.0)** PID=0		24	Brown and orange-brown layering, w/ zones of rust.	
						25		
						26		
						27		
28.0	DP-8	80%		**S-6(28.0-32.0)** PID=0		28		
						29		
						30		
						31		
32.0	DP-9	75%		**S-7(32.0-36.0)** PID=0		32	Brown and orange-brown layering, w/ zones of rust.	
						33		
						34		
						35		
36.0	DP-10	100%		**S-8(36.0-40.0)** PID=0		36	Gray and orangish-brown layering.	
						37		
						38		

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

LOG OF BORING NO.: 1738MW01A

PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET:	**3** OF **4**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	**6/13/2012** END: **6/19/2012**
NORTH:	**804778.969**	EAST:	**936969.453**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Maldonado/DeLong**
EQUIPMENT:	**GeoProbe 7822 DT/Reichdrill 650-WII**					DRILL CO.:	**JFA/CWPS**

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	**12.0**	TIME:	**11:00**	DATE:	**6/13/2012**	DESCRIPTION:	**First encountered**	INCLINATION:	
WATER DEPTH 2:	**21.78**	TIME:	**16:20**	DATE:	**6/29/2012**	DESCRIPTION:	**Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	**124.13**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						39		
40.0	DP-11	100%		**S-9(40.0-44.0)** PID=0		40	Moist zone at 40.3 ft. Yellowish-brown layering.	
						41		
						42		
						43		
44.0	DP-12	8%				44	Soupy-wet clay; Water from above.	
						45		
						46		
						47		
48.0	H-N					48	Sampler refusal.	
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

LOG OF BORING NO.: 1738MW01A

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET: 4	OF 4
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/13/2012	END: 6/19/2012
NORTH:	804778.969	EAST:	936969.453	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Maldonado/DeLong
EQUIPMENT:	GeoProbe 7822 DT/Reichdrill 650-WII					DRILL CO.:	JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1:	12.0	TIME:	11:00	DATE:	6/13/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	21.78	TIME:	16:20	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	124.13

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
60.0						60	60.0' - EL 64.1 End of Boring at 60.0.	
						61		
						62		
						63		
						64		
						65		
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		
						80		

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

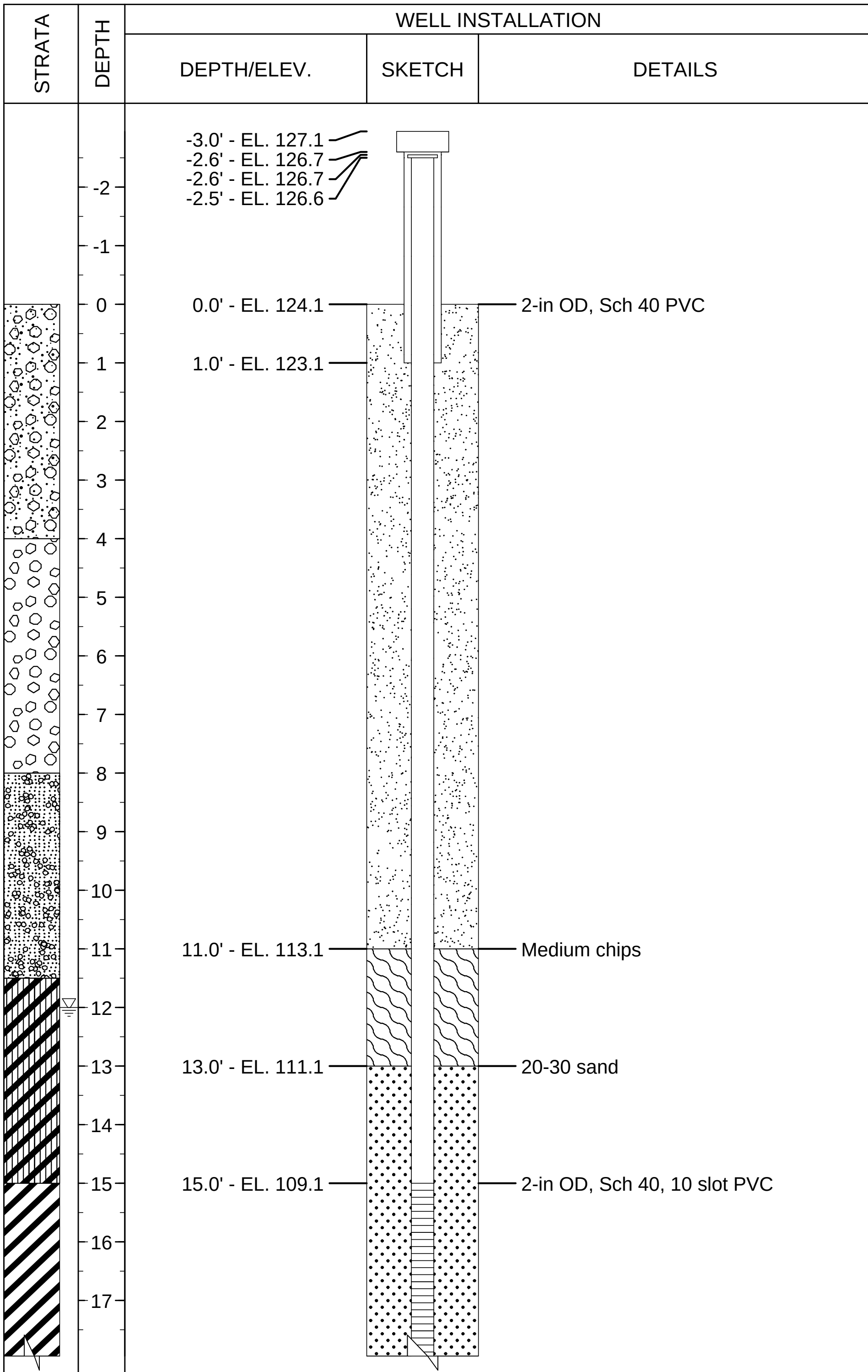
WELL INSTALLATION LOG NO.: 1738MW01A

Baker

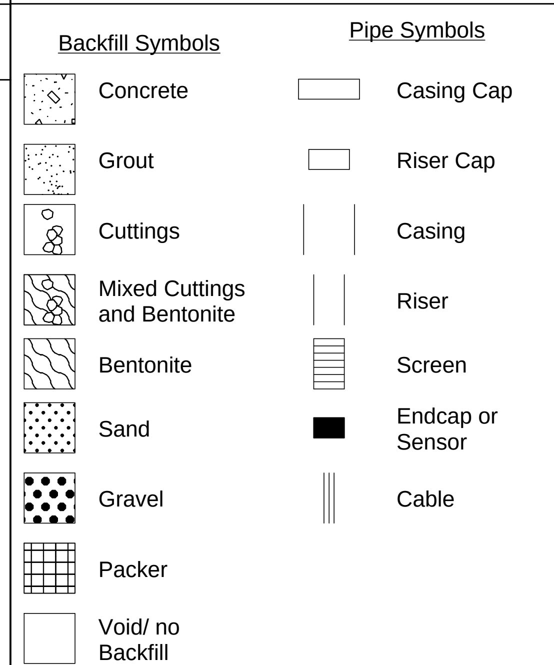
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 4
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/13/2012 END: 6/19/2012
NORTH:	804778.969	EAST:	936969.453	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Maldonado/DeLong
EQUIPMENT:	GeoProbe 7822 DT/Reichdrill 650-WII					DRILL CO.:	JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1:	12.0	TIME:	11:00	DATE:	6/13/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	21.78	TIME:	16:20	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	124.13



WELL LEGEND



For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

WELL INSTALLATION LOG NO.: 1738MW01A

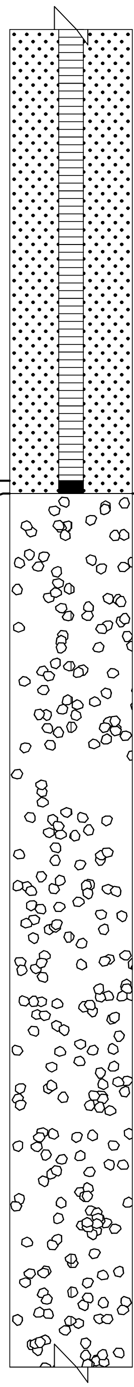
PROJECT: Site 1738 - Additional MtBE Investigation			SHEET: 2 OF 4
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 6/13/2012 END: 6/19/2012
NORTH: 804778.969	EAST: 936969.453	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Maldonado/DeLong
EQUIPMENT: GeoProbe 7822 DT/Reichdrill 650-WII			DRILL CO.: JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 12.0	TIME: 11:00	DATE: 6/13/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2: 21.78	TIME: 16:20	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 124.13

WELL INSTALLATION

STRATA	DEPTH	DEPTH/ELEV.	SKETCH	DETAILS
	18			
	19			
	20			
	21			
	22			
	23			
	24			
	25	25.0' - EL. 99.1		
		25.2' - EL. 98.9		Borehole collapse
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

WELL INSTALLATION LOG NO.: 1738MW01A

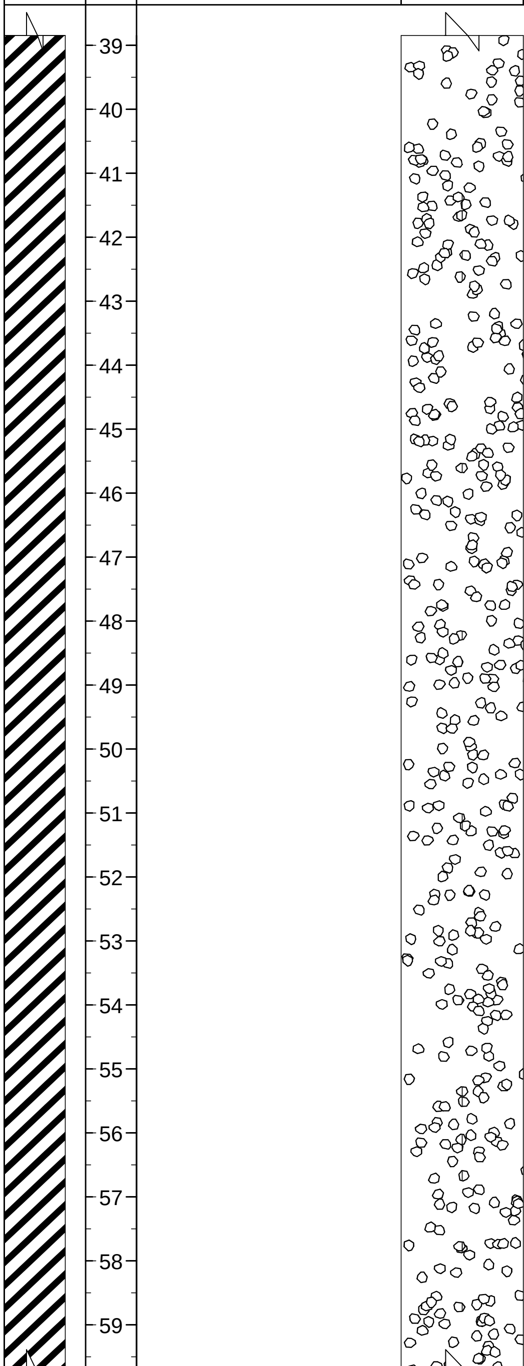
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	3 OF 4
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/13/2012 END: 6/19/2012
NORTH:	804778.969	EAST:	936969.453	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Maldonado/DeLong
EQUIPMENT:	GeoProbe 7822 DT/Reichdrill 650-WII					DRILL CO.:	JFA/CWPS

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	12.0	TIME:	11:00	DATE:	6/13/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	21.78	TIME:	16:20	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	124.13

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

WELL INSTALLATION LOG NO.: 1738MW01A

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 4 OF 4

LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 6/13/2012 END: 6/19/2012

NORTH: 804778.969 | EAST: 936969.453 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn

STATION: | OFFSET: | BASELINE: | DRILLER: Maldonado/DeLong

EQUIPMENT: GeoProbe 7822 DT/Reichdrill 650-WII | DRILL CO.: JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1:	12.0	TIME: 11:00	DATE: 6/13/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	21.78	TIME: 16:20	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	124.13

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS

Depth: 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80

End of Boring at 60.0

WELL LEGEND

Backfill Symbols
- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols
- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS due to auger refusal at 3-ft
This borehole was originally for well 1738MW01B, but due to collapsing formation this shallow well was installed.

Baker

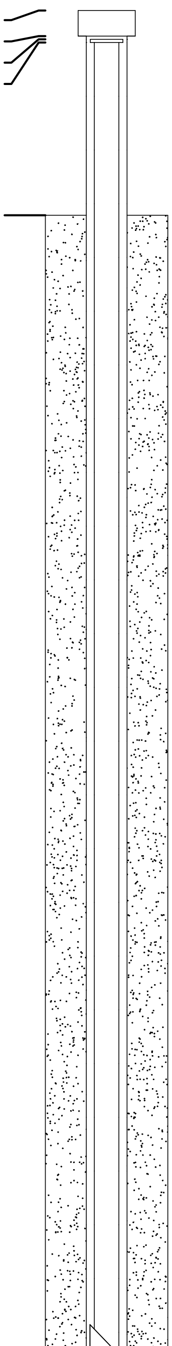
WELL INSTALLATION LOG NO.: 1738MW01B

PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	1 OF 4
LATITUDE:		LONGITUDE:	GEO. DATUM:	START:	6/26/2012 END: 6/26/2012
NORTH:	804780.259	EAST: 936932.84	COORD. DATUM: PA/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:	BASELINE:	DRILLER:	Ammon DeLong
EQUIPMENT:	Reichdrill 650-WII			DRILL CO.:	CWPS

METHOD DETAILS: **5-7/8 roller bit 5-3/4 downhole hammer**

WATER DEPTH 1:	12.0	TIME:	11:00	DATE:	6/13/2012	DESCRIPTION:	First encountered	INCLINATION:			
WATER DEPTH 2:	21.92	TIME:	16:15	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100		
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	124.03		

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	-3	-3.2' - EL. 127.2		
		-2.8' - EL. 126.8		
		-2.8' - EL. 126.8		
	-2	-2.7' - EL. 126.7		
	-1			
	0	0.0' - EL. 124.0		
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

The well borehole advanced by CWPS

WELL INSTALLATION LOG NO.: 1738MW01B

Baker

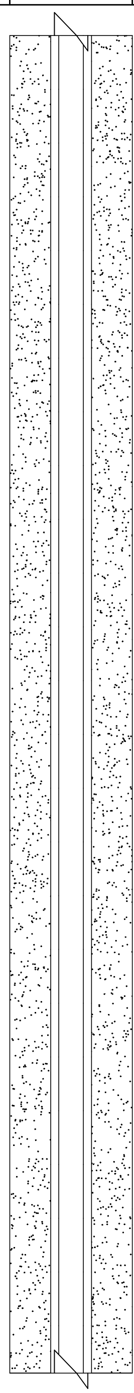
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	2 OF 4
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/26/2012 END: 6/26/2012
NORTH:	804780.259	EAST:	936932.84	COORD. DATUM:	PA/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Ammon DeLong
EQUIPMENT:	Reichdrill 650-WII					DRILL CO.:	CWPS

METHOD DETAILS: 5-7/8 roller bit 5-3/4 downhole hammer

WATER DEPTH 1: 12.0	TIME: 11:00	DATE: 6/13/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2: 21.92	TIME: 16:15	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	124.03

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS

DEPTH: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

The well borehole advanced by CWPS

Baker

WELL INSTALLATION LOG NO.: **1738MW01B**

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **3** OF **4**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/26/2012** END: **6/26/2012**

NORTH: **804780.259** EAST: **936932.84** COORD. DATUM: **PA/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Ammon DeLong**

EQUIPMENT: **Reichdrill 650-WII** DRILL CO.: **CWPS**

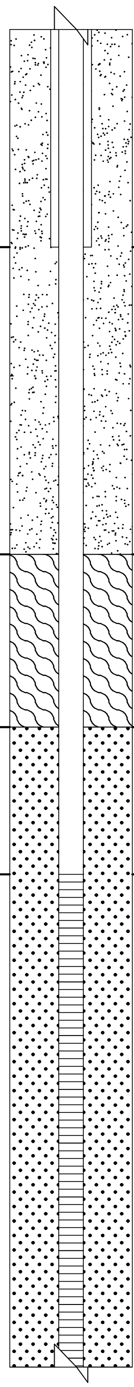
METHOD DETAILS: **5-7/8 roller bit 5-3/4 downhole hammer**

WATER DEPTH 1: **12.0**	TIME: **11:00**	DATE: **6/13/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **21.92**	TIME: **16:15**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **124.03**

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS

Depth scale: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59



DEPTH/ELEV.	DETAILS
42.0' - EL. 82.0	2-in OD, Sch 40 PVC
46.8' - EL. 77.2	Medium chips
49.5' - EL. 74.5	20-30 sand
51.8' - EL. 72.2	2-in OD, Sch 40, 10-slot PVC

WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

The well borehole advanced by CWPS

WELL INSTALLATION LOG NO.: **1738MW01B**

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **4** OF **4**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/26/2012** END: **6/26/2012**

NORTH: **804780.259** EAST: **936932.84** COORD. DATUM: **PA/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Ammon DeLong**

EQUIPMENT: **Reichdrill 650-WII** DRILL CO.: **CWPS**

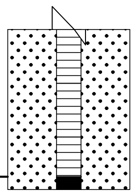
METHOD DETAILS: **5-7/8 roller bit 5-3/4 downhole hammer**

WATER DEPTH 1:	**12.0**	TIME: **11:00**	DATE: **6/13/2012**	DESCRIPTION:	**First encountered**	INCLINATION:	
WATER DEPTH 2:	**21.92**	TIME: **16:15**	DATE: **6/29/2012**	DESCRIPTION:	**Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:		TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	**124.03**

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS

DEPTH: 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80

61.8' - EL. 62.2



WELL LEGEND

Backfill Symbols: Concrete, Grout, Cuttings, Mixed Cuttings and Bentonite, Bentonite, Sand, Gravel, Packer, Void/ no Backfill

Pipe Symbols: Casing Cap, Riser Cap, Casing, Riser, Screen, Endcap or Sensor, Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

The well borehole advanced by CWPS

LOG OF BORING NO.: 1738MW02R

PROJECT: Site 1738 - Additional MtBE Investigation				SHEET: 1	OF 3
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: 6/16/2012	END: 6/26/2012
NORTH: 804782.572	EAST: 936882.282	COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn	
STATION:	OFFSET:	BASELINE:		DRILLER: Maldonado/DeLong	
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII				DRILL CO.: JFA/CWPS	

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 32.0	TIME: 12:00	DATE: 6/16/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 123.12

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						-2		
						-1		
0.0	DP-1	75%		**1738MW02R-00(0.0-1.0)** PID=0 **1738MW02R-01(1.0-4.0)** PID=0		0	0.0' - EL 123.1 GRAVEL, SANDY, with clay; (GP); gray; dry; dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
						3	3.0' - EL 120.1 CLAY, GRAVELLY, with silt; (CL); brown; damp; stiff; gravel is fine to coarse, subangular, igneous. Green at bottom.	FILL.
4.0	DP-2	78%		**S-1(4.0-8.0)** PID=0		4		
8.0	DP-3	68%		**S-2(8.0-12.0)** PID=0		8		
						11	11.0' - EL 112.1 CLAY, SILTY; (CL); dark brown; damp; stiff.	RESIDUAL.
12.0	DP-4	45%		**S-3(12.0-16.0)** PID=7 **1738MW02R-07(13.0-15.0)**		12	12.0' - EL 111.1 CLAY, with silt; (CL); brown and gray; damp; stiff; stratified; petroleum odor. Upper half green stained w/ fuel odor	SAPROLITE.
16.0				**S-4(16.0-17.0)** PID=20		16	Greenish-brown w/ staining and fuel odor.	
						17		

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=12/20/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW02R

PROJECT: Site 1738 - Additional MtBE Investigation			SHEET: 2 OF 3
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 6/16/2012 END: 6/26/2012
NORTH: 804782.572	EAST: 936882.282	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Maldonado/DeLong
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII			DRILL CO.: JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 32.0	TIME: 12:00	DATE: 6/16/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 123.12

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
	DP-5	68%		PID=635	18		
				1738MW02R-10(19.0-20.0) PID=1068	19		
20.0					20	Greenish-brown w/ white inclusions; staining and fuel odor.	
				S-5(21.0-22.0) PID=174	21		
	DP-6	68%		S-6(22.0-23.0) PID=702	22		
				S-7(23.0-24.0) PID=102	23	No NAPL.	
24.0				S-8(24.0-26.0) PID=886	24	Brown w/ white inclusions. Fuel odor, but no staining.	
					25		
	DP-7	60%		S-9(26.0-28.0) PID=1900	26	Residual-Phase NAPL.	
					27		
28.0					28	Green staining and fuel odor.	
				S-10(29.0-30.0) PID=1321	29		
	DP-8	70%		S-11(30.0-31.0) PID=250	30		
				S-12(31.0-32.0) PID=22	31		
32.0				S-13(32.0-33.0) PID=109	32	Green staining; Wet zone.	
				1738MW02R-17(33.0-35.0) PID=7	33	Brown and tan; Moist zone.	
	DP-9	75%			34		
				S-15(35.0-36.0) PID=0	35	Damp.	
36.0					36	End of sample boring at 36.0.	
					37		
	H-N				38		

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=12/20/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW02R

PROJECT: **Site 1738 - Additional MtBE Investigation**				SHEET: **3**	OF **3**
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: **6/16/2012**	END: **6/26/2012**
NORTH: **804782.572**	EAST: **936882.282**	COORD. DATUM: **PR/VI 5200**		LOGGER: **Mark DeJohn**	
STATION:	OFFSET:	BASELINE:		DRILLER: **Maldonado/DeLong**	
EQUIPMENT: **GeoProbe 7822DT/Reichdrill 650-WII**				DRILL CO.: **JFA/CWPS**	

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **32.0**	TIME: **12:00**	DATE: **6/16/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **20.73**	TIME: **16:09**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **123.12**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						39		
						40		
41.0						41	41.0' - EL 82.1 End of Boring at 41.0.	
						42		
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

WELL INSTALLATION LOG NO.: 1738MW02R

Baker

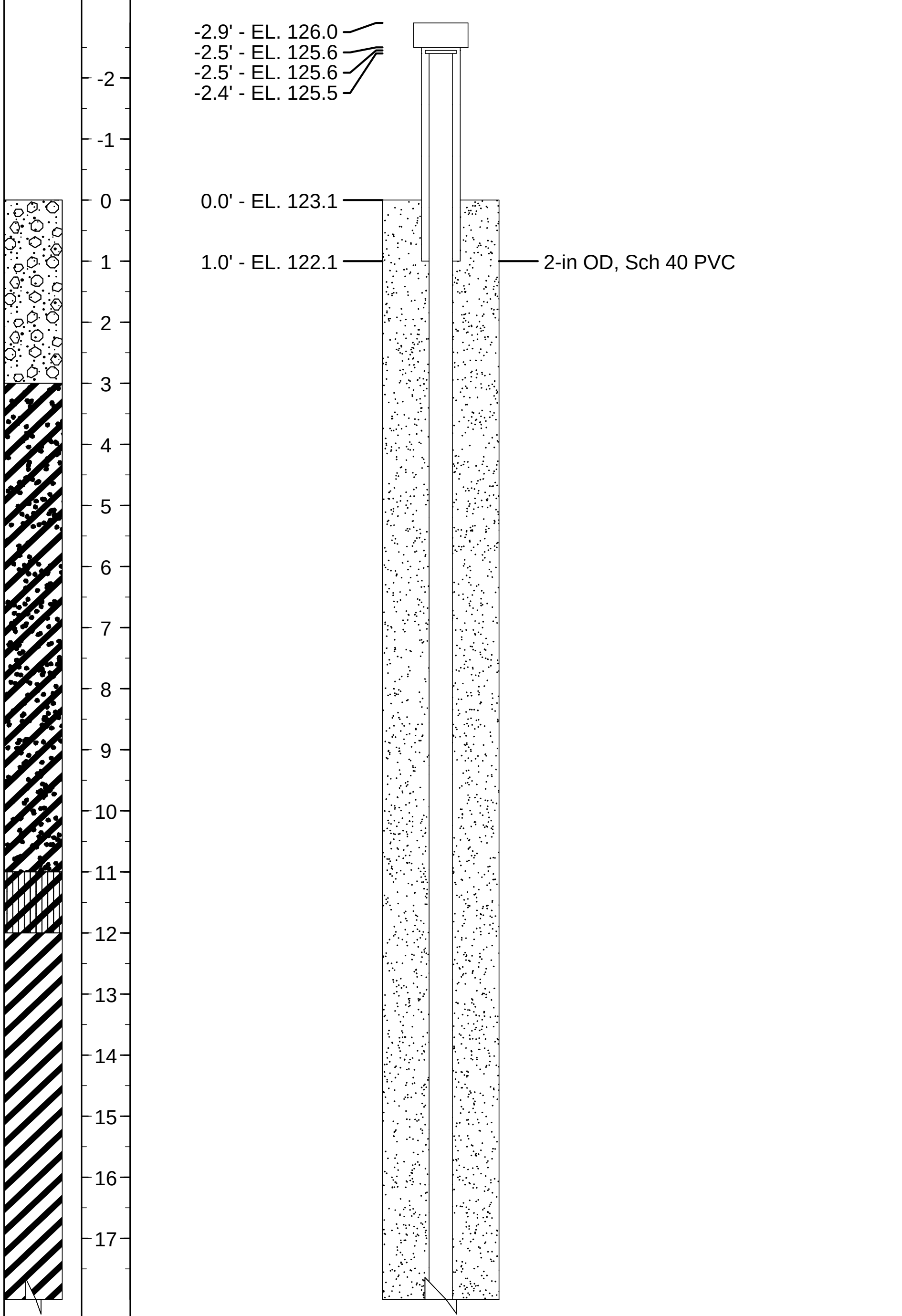
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/16/2012 END: 6/26/2012
NORTH:	804782.572	EAST:	936882.282	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Maldonado/DeLong
EQUIPMENT:	GeoProbe 7822DT/Reichdrill 650-WII					DRILL CO.:	JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 32.0	TIME: 12:00	DATE: 6/16/2012	DESCRIPTION:	First encountered		INCLINATION:	
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW		ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:			GROUND ELEV.:	123.12

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

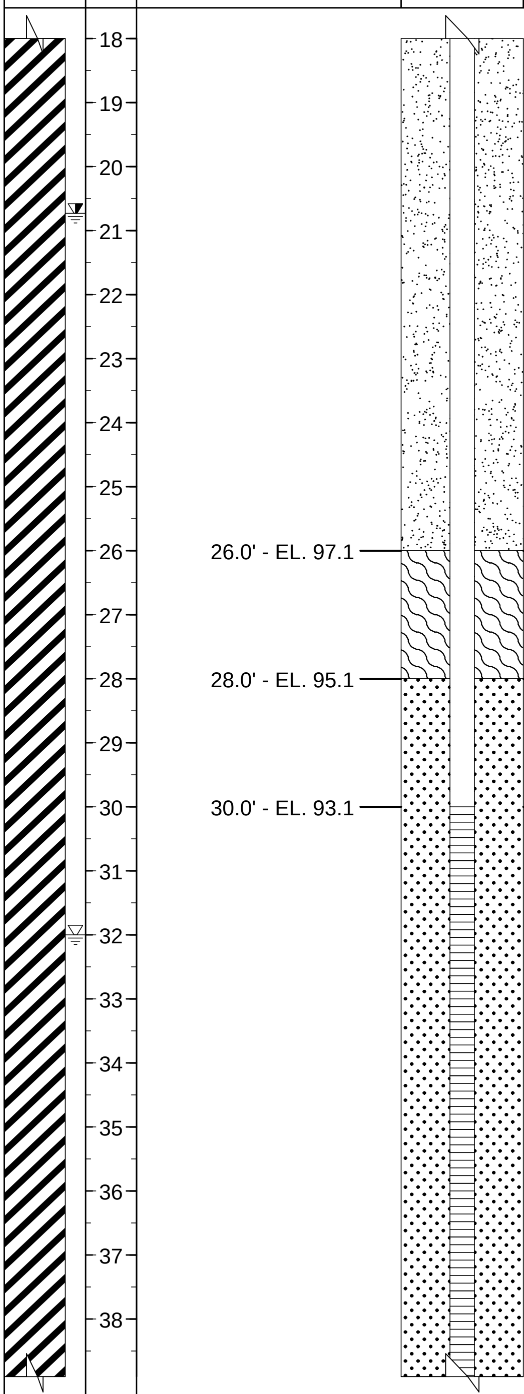
TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW02R

PROJECT: Site 1738 - Additional MtBE Investigation
SHEET: 2 OF 3
LATITUDE: LONGITUDE: GEO. DATUM:
START: 6/16/2012 END: 6/26/2012
NORTH: 804782.572 EAST: 936882.282 COORD. DATUM: PR/VI 5200
LOGGER: Mark DeJohn
STATION: OFFSET: BASELINE:
DRILLER: Maldonado/DeLong
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII
DRILL CO.: JFA/CWPS
METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 32.0 TIME: 12:00 DATE: 6/16/2012 DESCRIPTION: First encountered INCLINATION:
WATER DEPTH 2: 20.73 TIME: 16:09 DATE: 6/29/2012 DESCRIPTION: Synoptic DTW ELEV. DATUM: MSL+100
WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: 123.12

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	26	26.0' - EL. 97.1		Medium chips
	28	28.0' - EL. 95.1		20-30 sand
	30	30.0' - EL. 93.1		2-in OD, Sch 40, 10-slot PVC



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

Baker

WELL INSTALLATION LOG NO.: 1738MW02R

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **3** OF **3**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/16/2012** END: **6/26/2012**

NORTH: **804782.572** EAST: **936882.282** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Maldonado/DeLong**

EQUIPMENT: **GeoProbe 7822DT/Reichdrill 650-WII** DRILL CO.: **JFA/CWPS**

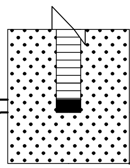
METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **32.0**	TIME: **12:00**	DATE: **6/16/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **20.73**	TIME: **16:09**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **123.12**

STRATA | DEPTH | WELL INSTALLATION (DEPTH/ELEV. | SKETCH | DETAILS) | WELL LEGEND

DEPTH: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59

40.0' - EL. 83.1
40.2' - EL. 82.9



End of Boring at 41.0.

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
JFA sampled soil/CWPS advanced the well borehole PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

Baker WELL INSTALLATION LOG NO.: 1738MW07A

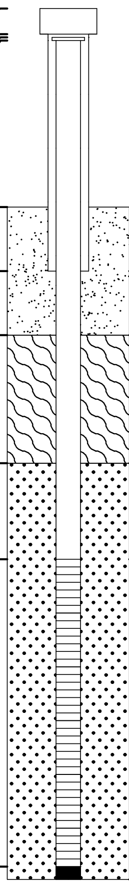
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 1
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/24/2012	END: 6/24/2012
NORTH:	804954.372	EAST:	936755.482	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: 8.0	TIME: 17:00	DATE: 6/24/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2: 6.34	TIME: 11:55	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	107.60

WELL INSTALLATION

STRATA	DEPTH	DEPTH/ELEV.	SKETCH	DETAILS
	-3	-3.1' - EL. 110.7		
		-2.7' - EL. 110.3		
		-2.7' - EL. 110.3		
	-2	-2.6' - EL. 110.2		
	-1			
	0	0.0' - EL. 107.6		
	1	1.0' - EL. 106.6		2-in OD, Sch 40 PVC
	2	2.0' - EL. 105.6		Medium chips
	3			
	4	4.0' - EL. 103.6		20-30 sand
	5	5.5' - EL. 102.1		2-in OD, Sch 40, 10-slot PVC
	6			
	7			
	8			
	9			
	10	10.3' - EL. 97.3		End of Boring at 10.5.
	11–17			



WELL LEGEND

Backfill Symbols
- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols
- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

Baker

LOG OF BORING NO.: 1738MW07B

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **3**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/24/2012** END: **6/26/2012**

NORTH: **804957.71** EAST: **936759.884** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado**

EQUIPMENT: **GeoProbe 7822DT** DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **8.0** TIME: **14:00** DATE: **6/24/2012** DESCRIPTION: **First encountered** INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **107.54**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
	DP-1	50%		**1738MW07B-00/D(0.0-1.0)** PID=0 **1738MW07B-01(1.0-3.0)** PID=0	0	CLAY, with gravel; (CL); dark brown; damp; stiff; gravel is fine, subangular, igneous.	RESIDUAL.
					3	Moist zone.	
4.0	DP-2	43%			4	4.0' - EL 103.5 CLAY, with silt; (CL); brown and rust; moist; medium stiff. Greenish-gray fracture traces.	RESIDUAL.
8.0	DP-3	100%		**S-1(8.0-12.0)** PID=0	8	Wet zone to 8.5.	
					9	Reddish-brown with black and white fracture traces.	
					10.5	Light brown with brown and tan mottles.	
12.0	DP-4	50%		**S-2(12.0-16.0)** PID=0	12	As above with dark gray silty clay wet zone near 16 ft.	
16.0	DP-5	100%			16	16.0' - EL 91.5 CLAY, with silt; (CL); dark gray; wet; very soft; Soupy wet.	RESIDUAL.
					17.2	17.2' - EL 90.3 CLAY, with silt; (CL); brown and tan; damp; medium stiff.	SAPROLITE.
20.0				**S-3(20.0-24.0)** PID=0	20	Soupy wet zone to 21.3.	

PID - MiniRAE 2000

The well was improperly installed and subsequently abandoned. A separate borehole was augered for well re-installation.

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW07B

PROJECT: Site 1738 - Additional MtBE Investigation			SHEET: 2 OF 3
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 6/24/2012 END: 6/26/2012
NORTH: 804957.71	EAST: 936759.884	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Edwin Maldonado
EQUIPMENT: GeoProbe 7822DT			DRILL CO.: JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 8.0	TIME: 14:00	DATE: 6/24/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 107.54

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-6	95%				21–24		
24.0	DP-7	88%				24–28	Soupy wet zone to 27.	
28.0	DP-8	80%		S-4(28.0-32.0) PID=0		28–32	Soupy wet zone to 29.6.	
32.0	DP-9	90%		S-5(32.0-36.0) PID=0		32–36	Soupy wet zone to 33.2.	
36.0	DP-10	100%		S-6(36.0-40.0) PID=0		36–40		
40.2	A-N					40–41		

PID - MiniRAE 2000
The well was improperly installed and subsequently abandoned. A separate borehole was augered for well re-installation.

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW07B

Baker

PROJECT: Site 1738 - Additional MtBE Investigation				SHEET: 3	OF 3		
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: 6/24/2012	END: 6/26/2012		
NORTH: 804957.71	EAST: 936759.884	COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn			
STATION:	OFFSET:	BASELINE:		DRILLER: Edwin Maldonado			
EQUIPMENT: GeoProbe 7822DT				DRILL CO.: JFA			

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 8.0	TIME: 14:00	DATE: 6/24/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 107.54

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
42.0						42	42.0' - EL 65.5 End of Boring at 42.0.	
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		
						60		
						61		
						62		

PID - MiniRAE 2000
The well was improperly installed and subsequently abandoned. A separate borehole was augered for well re-installation.

Baker

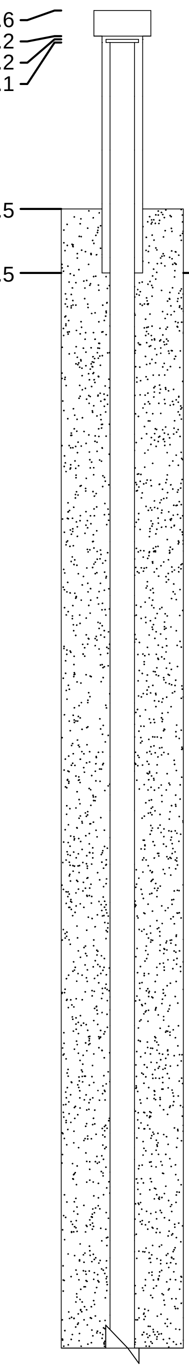
WELL INSTALLATION LOG NO.: 1738MW07B

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/27/2012 END: 6/27/2012
NORTH:	804957.71	EAST:	936759.884	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA.

WATER DEPTH 1:	8.0	TIME:	14:00	DATE:	6/24/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	6.48	TIME:	11:56	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	107.54

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	-3	-3.1' - EL. 110.6		
		-2.7' - EL. 110.2		
		-2.7' - EL. 110.2		
	-2	-2.6' - EL. 110.1		
	-1			
	0	0.0' - EL. 107.5		
	1	1.0' - EL. 106.5		2-in OD, Sch 40 PVC
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW07B

Baker

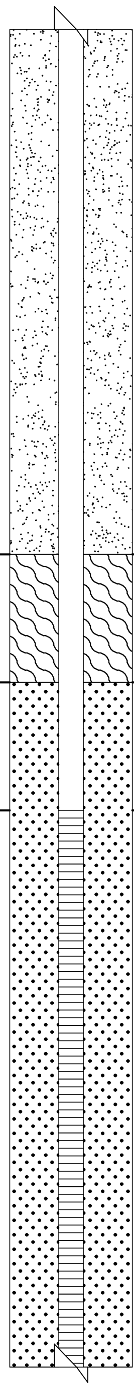
PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	2 OF 3
LATITUDE:		LONGITUDE:	GEO. DATUM:	START: 6/27/2012	END: 6/27/2012
NORTH:	804957.71	EAST: 936759.884	COORD. DATUM: PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:	BASELINE:	DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT			DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA.

WATER DEPTH 1: 8.0	TIME: 14:00	DATE: 6/24/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2: 6.48	TIME: 11:56	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	107.54

WELL INSTALLATION

STRATA	DEPTH	DEPTH/ELEV.	SKETCH	DETAILS
	18			
	19			
	20			
	21			
	22			
	23			
	24			
	25			
	26	26.0' - EL. 81.5		Medium chips
	27			
	28	28.0' - EL. 79.5		20-30 sand
	29			
	30	30.0' - EL. 77.5		2-in OD, Sch 40, 10 slot PVC
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW07B

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **3** OF **3**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/27/2012** END: **6/27/2012**

NORTH: **804957.71** EAST: **936759.884** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado**

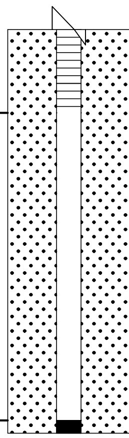
EQUIPMENT: **GeoProbe 7822DT** DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA.**

WATER DEPTH 1: **8.0**	TIME: **14:00**	DATE: **6/24/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **6.48**	TIME: **11:56**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **107.54**

WELL INSTALLATION

STRATA	DEPTH	DEPTH/ELEV.	SKETCH	DETAILS
	39			
	40	40.0' - EL. 67.5		
	41			
	42			
	43			
	44			
	45	44.8' - EL. 62.7		Auger refusal at 45-ft; hard saprolite
	46			
	47			
	48			
	49			
	50			
	51			
	52			
	53			
	54			
	55			
	56			
	57			
	58			
	59			



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

WELL INSTALLATION LOG NO.: 1738MW08A

Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 1
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/23/2012 END: 6/23/2012
NORTH:	804992.321	EAST:	936880.031	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

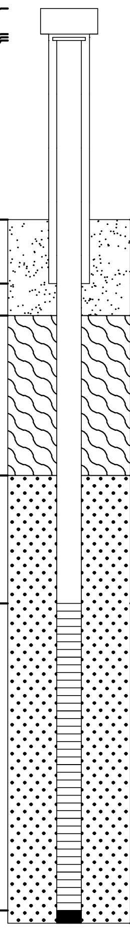
METHOD DETAILS: 4.25 in ID HSA. None

WATER DEPTH 1: 8.0	TIME: 17:00	DATE: 6/23/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2: 6.68	TIME: 15:45	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	106.88

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS

DEPTH/ELEV.	DETAILS
-3.3' - EL. 110.2	
-2.9' - EL. 109.8	
-2.9' - EL. 109.7	
-2.8' - EL. 109.7	
0.0' - EL. 106.9	2-in OD Sch 40 PVC
1.0' - EL. 105.9	
1.5' - EL. 105.4	Medium chips
4.0' - EL. 102.9	20-30 sand
6.0' - EL. 100.9	2-in OD, Sch 40, 10 slot PVC
10.8' - EL. 96.1	End of Boring at 11.0.



Depth scale: -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

LOG OF BORING NO.: 1738MW08B

Baker

PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET:	**1** OF **3**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: **6/23/2012**	END: **6/23/2012**
NORTH:	**804990.87**	EAST:	**936884.587**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Edwin Maldonado**
EQUIPMENT:	**GeoProbe 7822DT**					DRILL CO.:	**JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **8.0**	TIME: **10:00**	DATE: **6/23/2012**	DESCRIPTION: **First encountered**	INCLINATION:	
WATER DEPTH 2: **6.55**	TIME: **15:47**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	**106.88**

SAMPLE DEPTH (m)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.15 m or (RQD)	TEST RESULTS	STRATA	DEPTH (m)	DESCRIPTION	REMARKS
0.00				**1738MW08B-00(0.00-1.00)** PID=0		0	Sample not described.	
	DP-1	75%		**1738MW08B-01(1.00-3.00)** PID=0			1.00m - EL 105.88 CLAY, SILTY, with gravel; (CL); dark brown; dry; medium stiff; gravel is fine, subangular, igneous.	RESIDUAL.
						1	1.50m - EL 105.38 CLAY, with gravel; (CL); brown, yellowish with red mottles; moist; soft; gravel is fine, rounded, igneous.	RESIDUAL.
4.00	DP-2	100%		**1738MW08B-01 & 03D(5.00-7.00)** PID=0		2	4.00m - EL 102.88 CLAY, SILTY, with gravel; (CL); light brown and red; moist; medium stiff; gravel is fine, rounded, igneous. Gray fracture traces.	RESIDUAL.
8.00	DP-3	100%		**S-1(8.00-12.00)** PID=0		3	8.00m - EL 98.88 CLAY, with silt; (CL); brown and red; damp; medium stiff. Wet zone 8-9.5 ft. Reddish-brown with gray mottles. Red and yellowish-brown with gray mottles; gray fracture traces; damp.	SAPROLITE.
12.00	DP-4	78%		**S-2(12.00-16.00)** PID=0		4	0.5-ft thick wet zone. Red and yellowish-brown with gray mottles; gray fracture traces; damp.	
16.00				**S-3(16.00-20.00)** PID=0		5	Red with yellowish brown mottles; less gray fracture traces; damp.	

PID - MiniRAE 2000

TEMPLATE=8BKTCAM FILE=Site 1738.GEO DATE PRINTED=12/20/2012 S.O.#=125201

Baker

LOG OF BORING NO.: 1738MW08B

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 2 OF 3
LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 6/23/2012 END: 6/23/2012
NORTH: 804990.87 | EAST: 936884.587 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn
STATION: | OFFSET: | BASELINE: | DRILLER: Edwin Maldonado
EQUIPMENT: GeoProbe 7822DT | DRILL CO.: JFA
METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 8.0 | TIME: 10:00 | DATE: 6/23/2012 | DESCRIPTION: First encountered | INCLINATION:
WATER DEPTH 2: 6.55 | TIME: 15:47 | DATE: 6/29/2012 | DESCRIPTION: Synoptic DTW | ELEV. DATUM: MSL+100
WATER DEPTH 3: | TIME: | DATE: | DESCRIPTION: | GROUND ELEV.: 106.88

SAMPLE DEPTH (m)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.15 m or (RQD)	TEST RESULTS	STRATA	DEPTH (m)	DESCRIPTION	REMARKS
	DP-5	68%						
20.00	DP-6	55%		S-4(20.00-24.00) PID=0		6	Yellowish brown and red; white and gray fracture traces near bottom.	
						7		
24.00	DP-7	93%		S-5(24.00-28.00) PID=0			As above, but moist.	
						8	Soupy wet zone to 26.1. Yellowish brown with gray and white fracture traces; damp.	
28.00	DP-8	100%		S-6(28.00-32.00) PID=0		9	Soupy wet zone to 29.9.	
32.00	DP-9	100%		S-7(32.00-36.00)		10	Soupy wet zone to 34.	
36.00	DP-10	68%		S-8(36.00-40.00) PID=0		11	Yellowish brown with red; black fracture traces; damp.	

PID - MiniRAE 2000

TEMPLATE=8BKR_M FILE=Site 1738.GEO DATE PRINTED=12/20/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW08B

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET: 3	OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/23/2012	END: 6/23/2012
NORTH:	804990.87	EAST:	936884.587	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	8.0	TIME:	10:00	DATE:	6/23/2012	DESCRIPTION:	First encountered	INCLINATION:			
WATER DEPTH 2:	6.55	TIME:	15:47	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100		
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	106.88		

SAMPLE DEPTH (m)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.15 m or (RQD)	TEST RESULTS	STRATA	DEPTH (m)	DESCRIPTION	REMARKS
						12		
40.00	A-N							
42.50						13	42.50m - EL 64.38 End of Boring at 42.5.	
						14		
						15		
						16		
						17		

PID - MiniRAE 2000

TEMPLATE=8BKR_M FILE=Site 1738.GEO DATE PRINTED=12/20/2012 S.O.#=125201

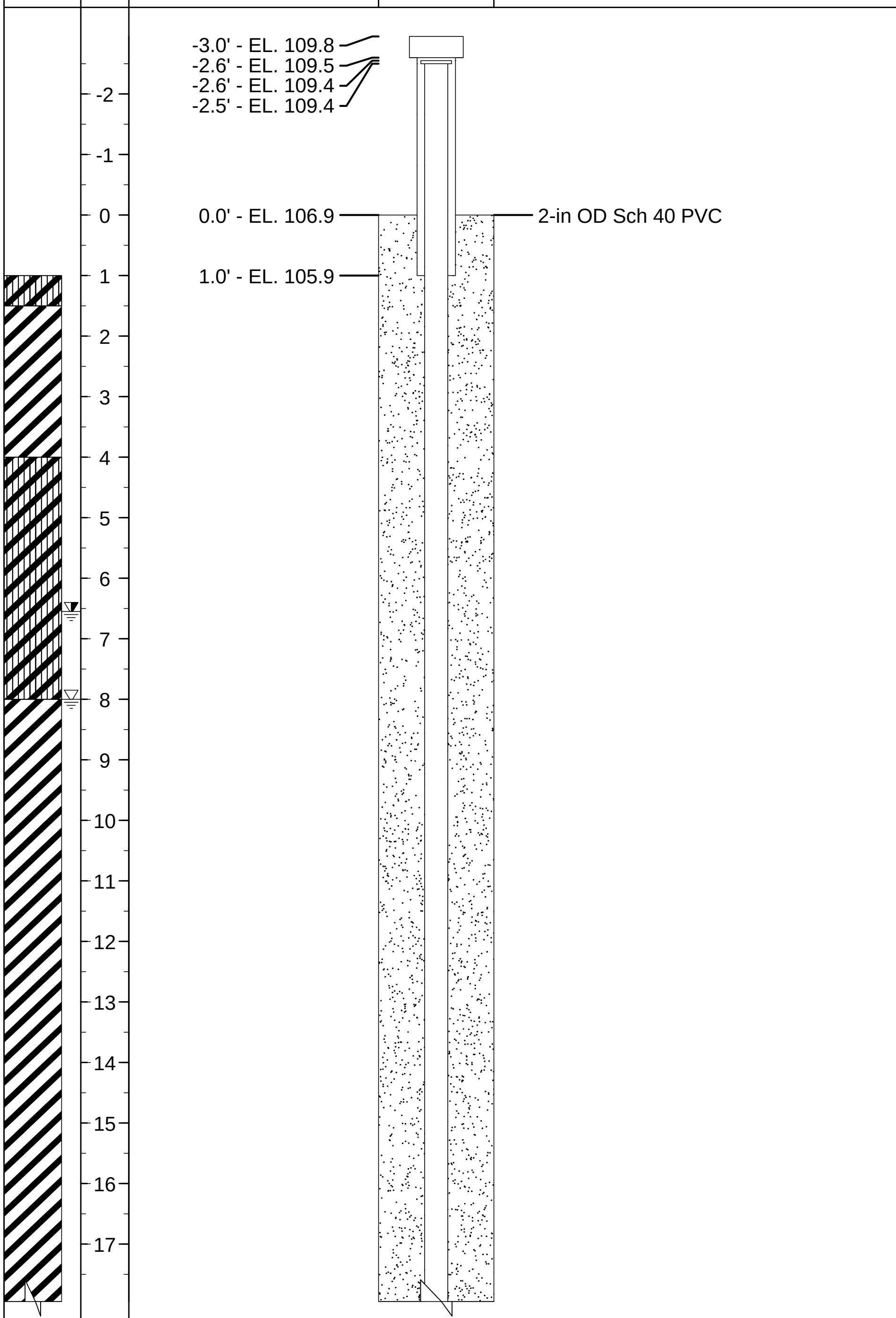
WELL INSTALLATION LOG NO.: 1738MW08B

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/23/2012 END: 6/23/2012
NORTH:	804990.87	EAST:	936884.587	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	8.0	TIME:	10:00	DATE:	6/23/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	6.55	TIME:	15:47	DATE:	6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	106.88

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=10/15/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW08B

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **2** OF **3**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/23/2012** END: **6/23/2012**

NORTH: **804990.87** EAST: **936884.587** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado**

EQUIPMENT: **GeoProbe 7822DT** DRILL CO.: **JFA**

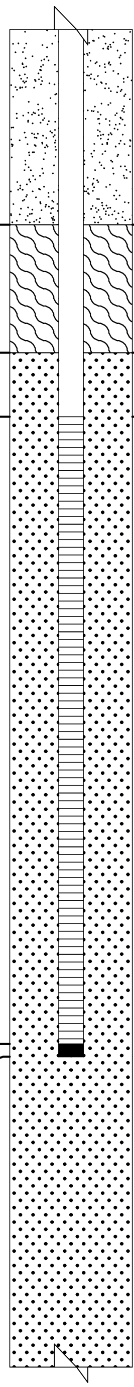
METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **8.0**	TIME: **10:00**	DATE: **6/23/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **6.55**	TIME: **15:47**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **106.88**

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS

Depth scale: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38



DEPTH/ELEV.	DETAILS
21.0' - EL. 85.9	Medium chips
23.0' - EL. 83.9	20-30 sand
24.0' - EL. 82.9	2-in OD, Sch 40. 10 slot PVC
33.8' - EL. 73.1	
34.0' - EL. 72.9	

WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=10/15/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW08B

PROJECT: **Site 1738 - Additional MtBE Investigation**			SHEET: **3** OF **3**
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: **6/23/2012** END: **6/23/2012**
NORTH: **804990.87**	EAST: **936884.587**	COORD. DATUM: **PR/VI 5200**	LOGGER: **Mark DeJohn**
STATION:	OFFSET:	BASELINE:	DRILLER: **Edwin Maldonado**
EQUIPMENT: **GeoProbe 7822DT**			DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **8.0**	TIME: **10:00**	DATE: **6/23/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **6.55**	TIME: **15:47**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **106.88**

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	39			
	40			
	41			
	42			End of Boring at 42.5
	43			
	44			
	45			
	46			
	47			
	48			
	49			
	50			
	51			
	52			
	53			
	54			
	55			
	56			
	57			
	58			
	59			

WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=10/15/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW09A

Baker

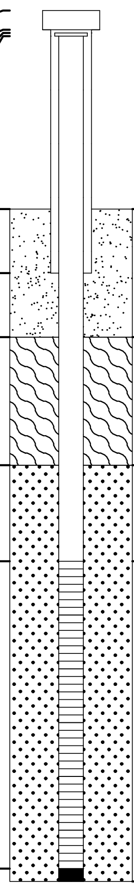
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 1
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/20/2012	END: 6/20/2012
NORTH:	804915.949	EAST:	937066.886	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA.

WATER DEPTH 1:	7.8	TIME: 9:30	DATE: 6/17/2012	DESCRIPTION:	First emcountered	INCLINATION:	
WATER DEPTH 2:	6.0	TIME: 9:00	DATE: 6/18/2012	DESCRIPTION:	24 hours	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	7.70	TIME: 15:43	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW	GROUND ELEV.:	106.68

WELL INSTALLATION

STRATA	DEPTH	DEPTH/ELEV.	SKETCH	DETAILS
	-3	-3.1' - EL. 109.8		
		-2.8' - EL. 109.5		
		-2.8' - EL. 109.4		
	-2	-2.7' - EL. 109.4		
	-1			
	0	0.0' - EL. 106.7		2-in OD, Sch 40 PVC
	1	1.0' - EL. 105.7		
	2	2.0' - EL. 104.7		Medium chips
	3			
	4	4.0' - EL. 102.7		20-30 sand
	5	5.5' - EL. 101.2		2-in OD. Sch 40, 10 slot PVC
	6			
	7			
	8			
	9			
	10	10.3' - EL. 96.4		Eno of boring at 10.5.
	11			
	12			
	13			
	14			
	15			
	16			
	17			



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

LOG OF BORING NO.: 1738MW09B

Baker

PROJECT: Site 1738 - Additional MtBE Investigation			SHEET: 1 OF 3
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 6/17/2012 END: 6/20/2012
NORTH: 804908.246	EAST: 937062.311	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Edwin Maldonado
EQUIPMENT: GeoProbe 7822DT			DRILL CO.: JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: 7.8	TIME: 9:30	DATE: 6/17/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2: 6.0	TIME: 9:00	DATE: 6/18/2012	DESCRIPTION: 24 Hrs.	ELEV. DATUM: MSL+100
WATER DEPTH 3: 6.05	TIME: 15:42	DATE: 6/29/30	DESCRIPTION: Synoptic DTW	GROUND ELEV.: 107.11

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
0.0	DP-1	50%		1738MW09B-00(0.0-1.0) PID=0 1738MW09B-01(1.0-3.0) PID=0	0	0.0' - EL 107.1 CLAY, with silt; (CL); brown; damp; soft.	RESIDUAL.
4.0	DP-2	95%		S-1(4.0-5.0) PID=0 1738MW09B-03(5.0-7.0) PID=0	4	4.0' - EL 103.1 CLAY, SILTY, with sand; (CL); light brown and red; moist; soft; sand is coarse.	RESIDUAL.
8.0	DP-3	35%		S-2(8.0-12.0) PID=0	8	Mottled; brown, gray, tan, and red. Damp. Wet at 7.8 ft.	
12.0	DP-4	88%		S-3(12.0-16.0) PID=0	12	12.0' - EL 95.1 CLAY, SILTY; (CL); mottled; damp; medium stiff. Red and green w/ diagonal white fractures. Wet zone 13-13.7 ft.	RESIDUAL.
16.0				S-4(16.0-20.0) PID=0	16	16.0' - EL 91.1 CLAY, SILTY; (CL); red and green; damp; stiff. White inclusions.	SAPROLITE.

PID - MiniRAE 2000

LOG OF BORING NO.: 1738MW09B

Baker

PROJECT: Site 1738 - Additional MtBE Investigation
SHEET: 2 OF 3

LATITUDE: LONGITUDE: GEO. DATUM:
START: 6/17/2012 END: 6/20/2012

NORTH: 804908.246 EAST: 937062.311 COORD. DATUM: PR/VI 5200
LOGGER: Mark DeJohn

STATION: OFFSET: BASELINE:
DRILLER: Edwin Maldonado

EQUIPMENT: GeoProbe 7822DT
DRILL CO.: JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 7.8 TIME: 9:30 DATE: 6/17/2012 DESCRIPTION: First encountered
INCLINATION:

WATER DEPTH 2: 6.0 TIME: 9:00 DATE: 6/18/2012 DESCRIPTION: 24 Hrs.
ELEV. DATUM: MSL+100

WATER DEPTH 3: 6.05 TIME: 15:42 DATE: 6/29/30 DESCRIPTION: Synoptic DTW
GROUND ELEV.: 107.11

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-5	88%				18		
						19		
20.0				S-5(20.0-24.0) PID=0		20	Wet zone 20-22.3 ft.	
						21		
	DP-6	100%				22		
						23		
24.0				S-6(24.0-28.0) PID=0		24	Wet zone 25-26 ft.	
						25		
	DP-7	85%				26		
						27		
28.0				S-7(28.0-32.0) PID=0		28	Wet zone 28-29.5 ft.	
						29		
	DP-8	78%				30		
						31		
32.0				S-8(32.0-36.0) PID=0		32	Brown, green, and gray w/ white inclusions.	
						33		
	DP-9	78%				34		
						35		
36.0				S-9(36.0-40.0) PID=0		36	Moist.	
						37		
	DP-10	80%				38		

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW09B

PROJECT: **Site 1738 - Additional MtBE Investigation**			SHEET: **3** OF **3**
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: **6/17/2012** END: **6/20/2012**
NORTH: **804908.246**	EAST: **937062.311**	COORD. DATUM: **PR/VI 5200**	LOGGER: **Mark DeJohn**
STATION:	OFFSET:	BASELINE:	DRILLER: **Edwin Maldonado**
EQUIPMENT: **GeoProbe 7822DT**			DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **7.8**	TIME: **9:30**	DATE: **6/17/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **6.0**	TIME: **9:00**	DATE: **6/18/2012**	DESCRIPTION: **24 Hrs.**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3: **6.05**	TIME: **15:42**	DATE: **6/29/30**	DESCRIPTION: **Synoptic DTW**	GROUND ELEV.: **107.11**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
40.0 – 43.0	A-N					39–43		
43.0						43	43.0' - EL 64.1 Drilled deeper to seal flowing mud. End of hole at 43 ft.	
						44–59		

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

Baker

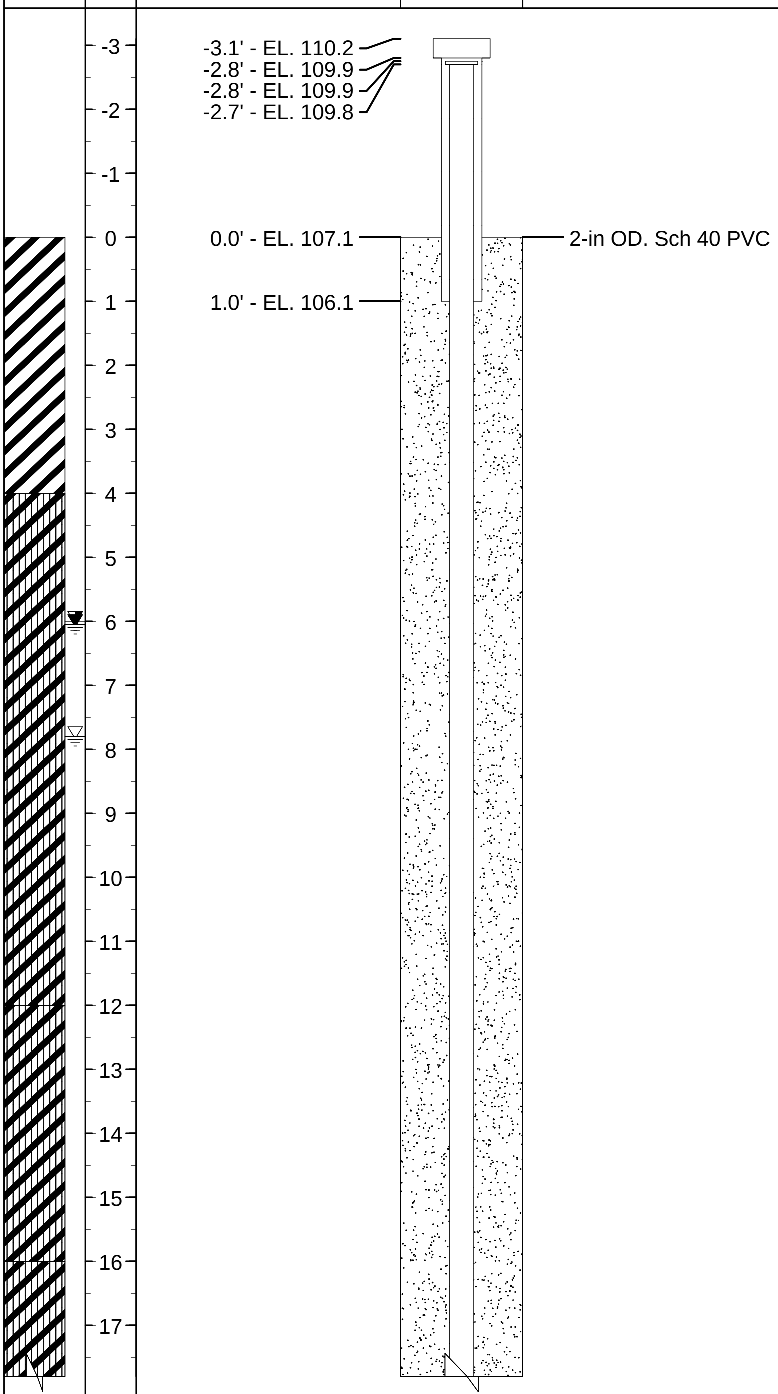
WELL INSTALLATION LOG NO.: 1738MW09B

PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	1 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:	
START:	6/17/2012	END:	6/20/2012		
NORTH:	804908.246	EAST:	937062.311	COORD. DATUM:	PR/VI 5200
LOGGER:	Mark DeJohn				
STATION:		OFFSET:		BASELINE:	
DRILLER:	Edwin Maldonado				
EQUIPMENT:	GeoProbe 7822DT			DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

	Depth	Time	Date	Description		
WATER DEPTH 1:	7.8	9:30	6/17/2012	First encountered	INCLINATION:	
WATER DEPTH 2:	6.0	9:00	6/18/2012	24 Hrs.	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	6.05	15:42	6/29/30	Synoptic DTW	GROUND ELEV.:	107.11

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

WELL INSTALLATION LOG NO.: 1738MW09B

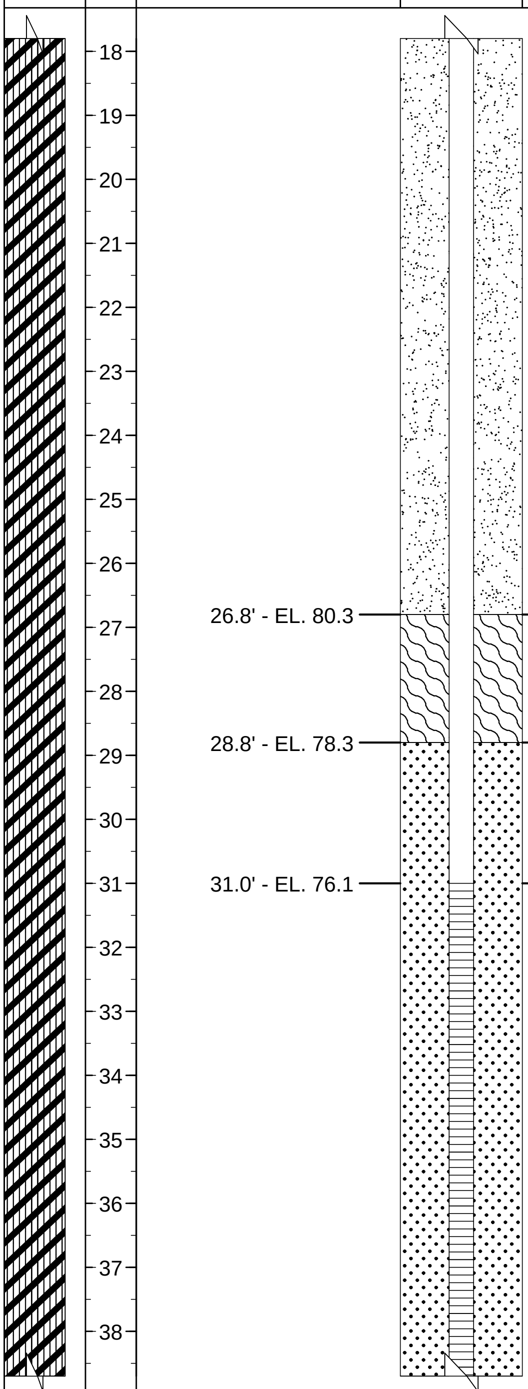
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	2 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/17/2012 END: 6/20/2012
NORTH:	804908.246	EAST:	937062.311	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	7.8	TIME: 9:30	DATE: 6/17/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	6.0	TIME: 9:00	DATE: 6/18/2012	DESCRIPTION:	24 Hrs.	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	6.05	TIME: 15:42	DATE: 6/29/30	DESCRIPTION:	Synoptic DTW	GROUND ELEV.:	107.11

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=10/15/2012 S.O.#=125201

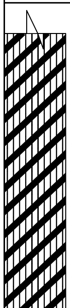
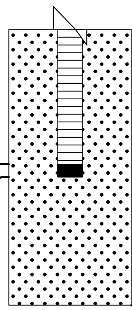
Baker

WELL INSTALLATION LOG NO.: 1738MW09B

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	3 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/17/2012 END: 6/20/2012
NORTH:	804908.246	EAST:	937062.311	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1:	7.8	TIME:	9:30	DATE:	6/17/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	6.0	TIME:	9:00	DATE:	6/18/2012	DESCRIPTION:	24 Hrs.	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	6.05	TIME:	15:42	DATE:	6/29/30	DESCRIPTION:	Synoptic DTW	GROUND ELEV.:	107.11

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	39 – 59	40.8' - EL. 66.3 41.0' - EL. 66.1		End of hole at 43 ft

DEPTH: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59

WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=10/15/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW13

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 1 OF 2

LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 6/14/2012 | END: 6/20/2012

NORTH: 804688.985 | EAST: 936893.92 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn

STATION: | OFFSET: | BASELINE: | DRILLER: Edwin Maldonado

EQUIPMENT: GeoProbe 7822DT | DRILL CO.: JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 22.0 | TIME: 14:30 | DATE: 6/14/2012 | DESCRIPTION: First encountered | INCLINATION:

WATER DEPTH 2: 18.03 | TIME: 16:13 | DATE: 6/29/2012 | DESCRIPTION: Synoptic DTW | ELEV. DATUM: MSL+100

WATER DEPTH 3: | TIME: | DATE: | DESCRIPTION: | GROUND ELEV.: 124.40

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
0.0	DP-1	75%		1738MW13-00(0.0-1.0) PID=0		0	0.0' - EL 124.4 SAND, GRAVELLY, with clay; (SP); light gray; dry; dense; sand is medium to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
				1738MW13-01(1.0-3.0) PID=0		1	1.0' - EL 123.4 CLAY, SILTY; (CL); dark brown, reddish; damp; medium stiff.	RESIDUAL.
4.0	DP-2	100%		S-1(4.0-8.0) PID=0; 1738MW13-03(5.0-7.0)		4	4.0' - EL 120.4 CLAY, SILTY, with gravel; (CL); brown and tan; dry; medium stiff; gravel is fine, subangular, igneous.	SAPROLITE.
8.0	DP-3	100%		S-2(8.0-12.0) PID=0		8	Gray, light-brown and tan.	
12.0	DP-4	100%		S-3(12.0-16.0) PID=0		12		
16.0				S-4(16.0-17.0) PID=0; S-5(17.0-18.0) PID=1		16		

PID - Mini-RAE 2000

LOG OF BORING NO.: 1738MW13

Baker

PROJECT: **Site 1738 - Additional MtBE Investigation**			SHEET: **2** OF **2**
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: **6/14/2012** END: **6/20/2012**
NORTH: **804688.985**	EAST: **936893.92**	COORD. DATUM: **PR/VI 5200**	LOGGER: **Mark DeJohn**
STATION:	OFFSET:	BASELINE:	DRILLER: **Edwin Maldonado**
EQUIPMENT: **GeoProbe 7822DT**			DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **22.0**	TIME: **14:30**	DATE: **6/14/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **18.03**	TIME: **16:13**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **124.40**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-5	100%		**S-6(18.0-19.0)** PID=59		19	Petroleum odor.	
				S-7(19.0-20.0) PID=123				
20.0	DP-6	50%				20	Petroleum odor. Gray, brown and green; Trace rock fragments.	
						21		
				1738MW13-11(22.0-23.0) PID=2026		22	22.0' - EL 102.4	
							CLAY, GRAVELLY, with silt; (CL); brown and green; damp; medium stiff; gravel is fine to coarse, subangular, igneous; petroleum odor. Trace water in pores.	SAPROLITE
				1738MW13-12(23.0-24.0) PID=1953		23		
24.0	DP-N					24	Interval accidentally skipped.	
						25		
						26		
						27		
28.0	DP-7	75%		**S-8(28.0-31.0)** PID=0		28	28.0' - EL 96.4	
							CLAY, SILTY; (CL); brown and tan; damp; medium stiff.	SAPROLITE
						29		
						30		
						31		
32.0	DP-8	100%		**S-9(32.0-33.0)** PID=35		32	Brown.	
				S-10(33.0-34.0) PID=32		33	Wet zone.	
				S-11(34.0-35.0) PID=19		34	Moist zone.	
				S-12(35.0-36.0) PID=0		35	Wet zone.	
36.0						36	36.0' - EL 88.4	
						37		
						38		

PID - Mini-RAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=12/5/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW13

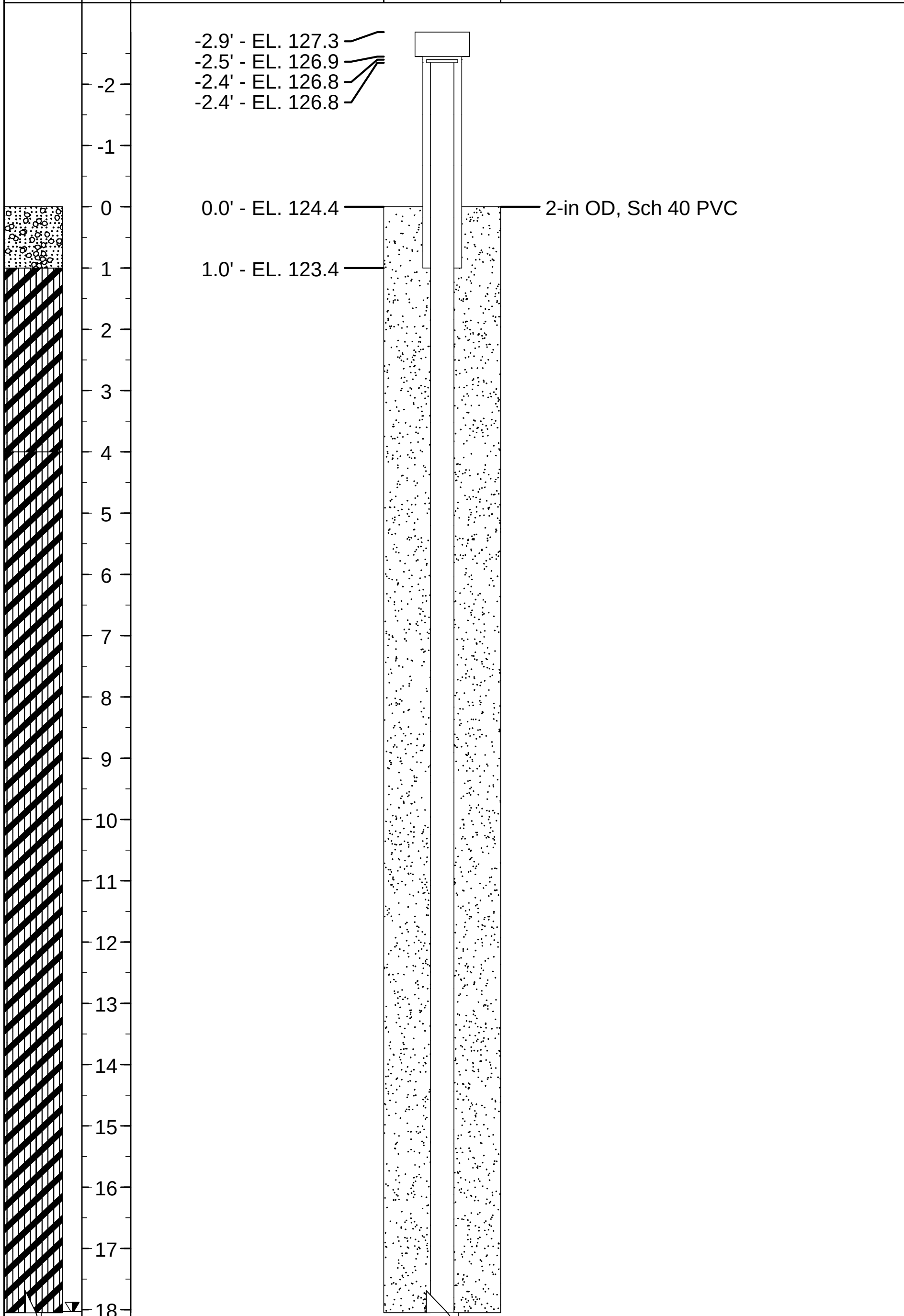
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/14/2012 END: 6/20/2012
NORTH:	804688.985	EAST:	936893.92	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 22.0	TIME: 14:30	DATE: 6/14/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2: 18.03	TIME: 16:13	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	124.40

STRATA	DEPTH	WELL INSTALLATION			WELL LEGEND
		DEPTH/ELEV.	SKETCH	DETAILS	



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - Mini-RAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW13

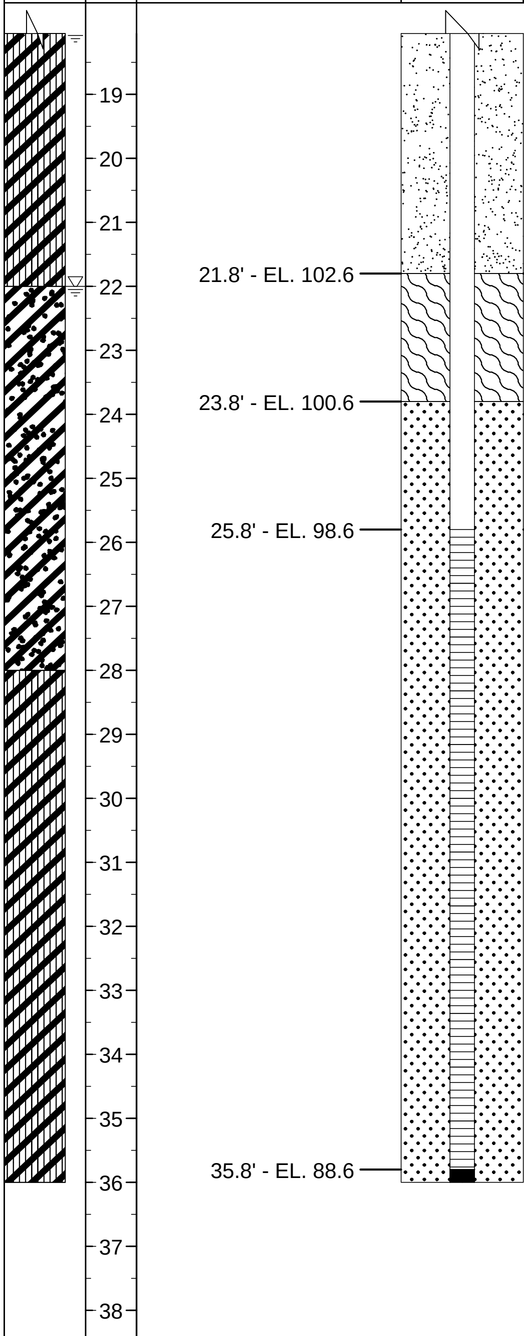
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	2 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/14/2012 END: 6/20/2012
NORTH:	804688.985	EAST:	936893.92	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

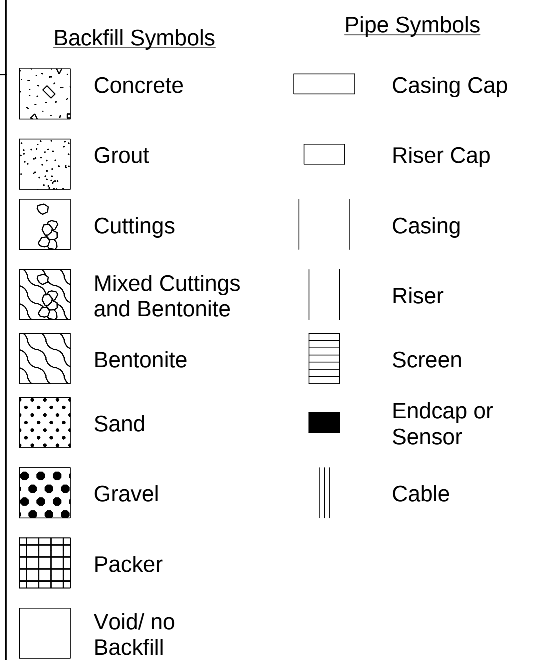
WATER DEPTH 1:	22.0	TIME: 14:30	DATE: 6/14/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	18.03	TIME: 16:13	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	124.40

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



DEPTH/ELEV.	DETAILS
21.8' - EL. 102.6	Medium chips
23.8' - EL. 100.6	20-30 Sand
25.8' - EL. 98.6	2-in OD, Sch 40, 10-slot PVC
35.8' - EL. 88.6	

WELL LEGEND



For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - Mini-RAE 2000

Baker

LOG OF BORING NO.: 1738MW14

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **3**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/16/2012** END: **6/20/2012**

NORTH: **804712.847** EAST: **936713.968** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado/Ammon**

EQUIPMENT: **GeoProbe 7822DT/Reichdrill 650-WII** DRILL CO.: **JFA/CWPS**

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **28.0** TIME: **9:00** DATE: **6/19/2012** DESCRIPTION: **During drilling** INCLINATION:

WATER DEPTH 2: **19.08** TIME: **15:57** DATE: **6/29/2012** DESCRIPTION: **Synoptic DTW** ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **121.41**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						-2		
						-1		
0.0				**1738MW14-00(0.0-1.0)** PID=0		0	0.0' - EL 121.4 GRAVEL, SANDY, with clay; (GP); gray; dry; dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
				1738MW14-01 & 01D(1.0-3.0) PID=0		1		
	DP-1	83%				2	1.5' - EL 119.9 CLAY, SILTY; (CL); brown, orangish; dry; stiff.	RESIDUAL.
						3	3.5' - EL 117.9 CLAY, GRAVELLY, with silt; (CL); brown, reddish; damp; stiff; gravel is coarse, subangular, igneous.	RESIDUAL.
4.0				**S-1(4.0-8.0)** PID=0		4	4.0' - EL 117.4 CLAY, SILTY; (CL); brown, orangish; dry; stiff.	RESIDUAL.
						5		
	DP-2	85%				6	1-in thick fine gravel layer.	
						7		
8.0				**S-2(8.0-12.0)** PID=0		8	Gray and tan.	
						9		
	DP-3	100%				10		
						11		
12.0				**S-3(12.0-16.0)** PID=0		12	12.0' - EL 109.4 CLAY, with silt; (CL); gray and light brown; damp; stiff. Green mottles.	SAPROLITE.
						13		
	DP-4	90%				14		
						15		
16.0				**S-4(16.0-17.0)** PID=0		16	Gray.	
				1738MW14-09(17.0-19.0)		17	Reddish-brown w/ green mottles.	

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

Baker

LOG OF BORING NO.: 1738MW14

PROJECT: Site 1738 - Additional MtBE Investigation						SHEET: 2	OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/16/2012	END: 6/20/2012
NORTH: 804712.847		EAST: 936713.968		COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn	
STATION:		OFFSET:		BASELINE:		DRILLER: Edwin Maldonado/Ammon	
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII						DRILL CO.: JFA/CWPS	

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 28.0	TIME: 9:00	DATE: 6/19/2012	DESCRIPTION: During drilling	INCLINATION:
WATER DEPTH 2: 19.08	TIME: 15:57	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 121.41

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-5	100%		PID=0 S-5(19.0-20.0) PID=0		18 19		
20.0	DP-6	50%		1738MW14-11(21.0-23.0) PID=0		20 21 22 23	Dark gray and brown w/ green mottles.	
24.0	H-N					24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	Refusal at 24.0. End of sample hole.	

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

LOG OF BORING NO.: 1738MW14

Baker

PROJECT: Site 1738 - Additional MtBE Investigation			SHEET: 3 OF 3
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 6/16/2012 END: 6/20/2012
NORTH: 804712.847	EAST: 936713.968	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Edwin Maldonado/Ammon
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII			DRILL CO.: JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 28.0	TIME: 9:00	DATE: 6/19/2012	DESCRIPTION: During drilling	INCLINATION:
WATER DEPTH 2: 19.08	TIME: 15:57	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 121.41

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						39		
						40		
						41		
42.0						42	42.0' - EL 79.4	
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW14

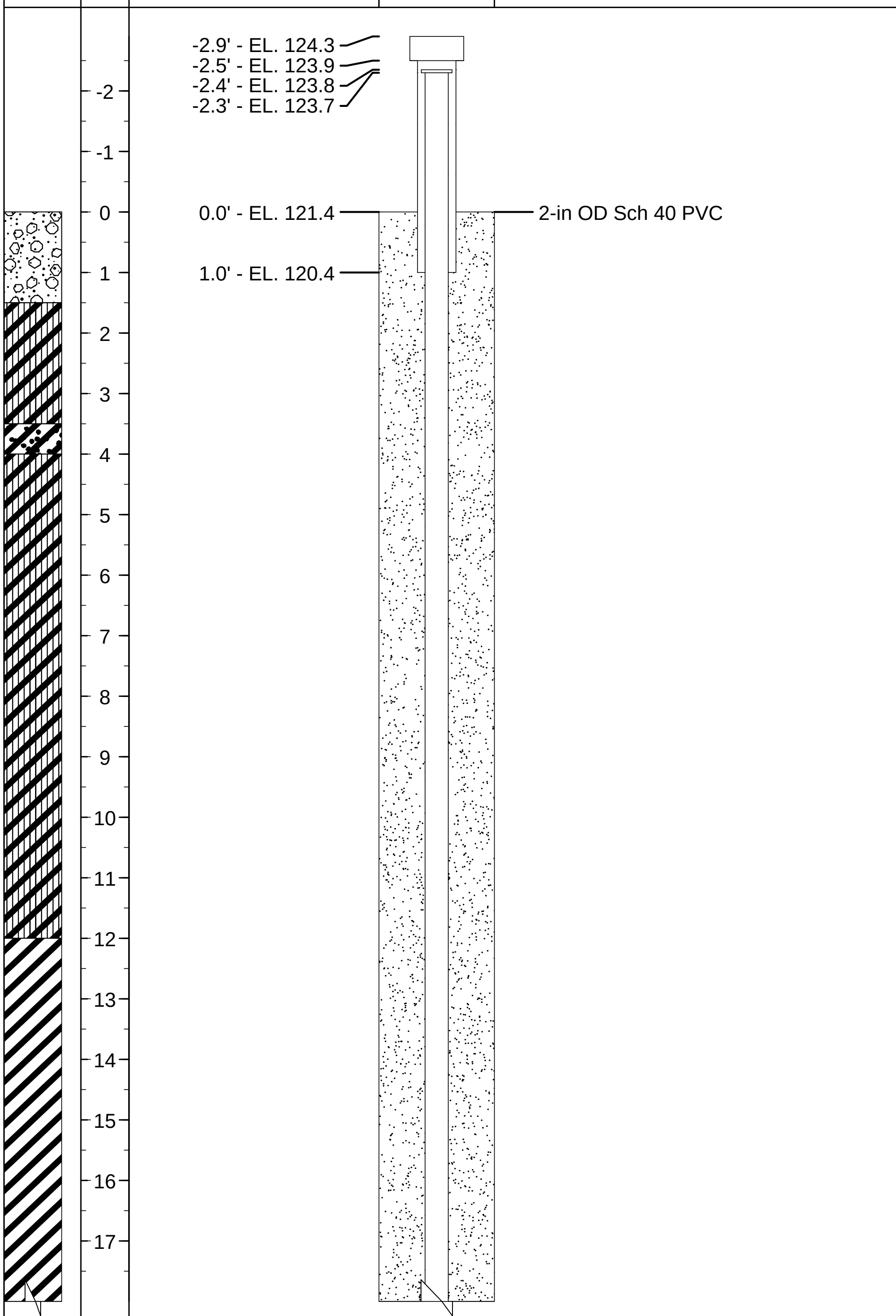
Baker

PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET:	**1** OF **3**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	**6/16/2012** END: **6/20/2012**
NORTH:	**804712.847**	EAST:	**936713.968**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Edwin Maldonado/Ammon**
EQUIPMENT:	**GeoProbe 7822DT/Reichdrill 650-WII**					DRILL CO.:	**JFA/CWPS**

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1:	**28.0**	TIME:	**9:00**	DATE:	**6/19/2012**	DESCRIPTION:	**During drilling**	INCLINATION:	
WATER DEPTH 2:	**19.08**	TIME:	**15:57**	DATE:	**6/29/2012**	DESCRIPTION:	**Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	**121.41**

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

WELL INSTALLATION LOG NO.: 1738MW14

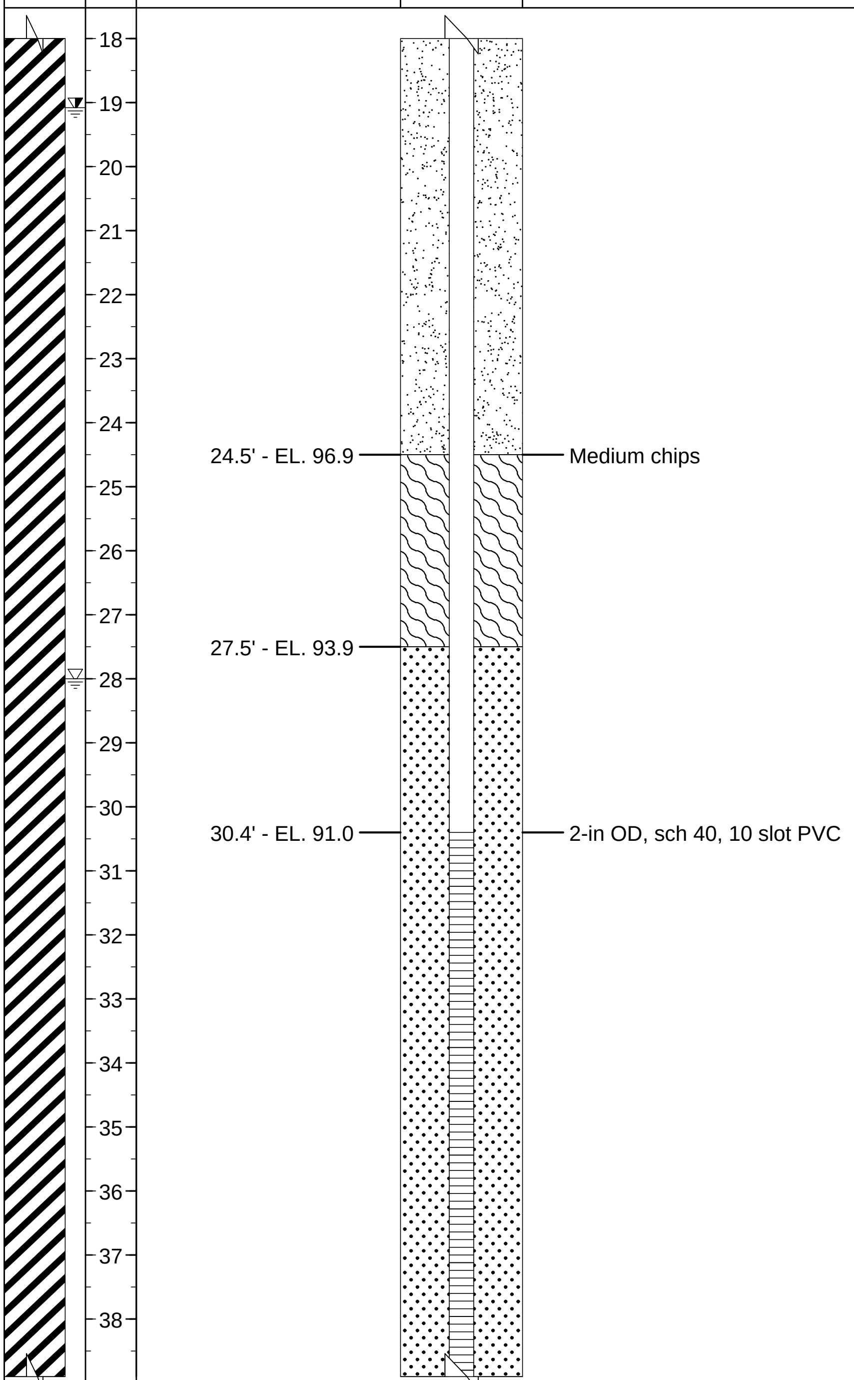
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	2 OF 3
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	6/16/2012 END: 6/20/2012
NORTH:	804712.847	EAST:	936713.968	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado/Ammon
EQUIPMENT:	GeoProbe 7822DT/Reichdrill 650-WII					DRILL CO.:	JFA/CWPS

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 28.0	TIME: 9:00	DATE: 6/19/2012	DESCRIPTION: During drilling	INCLINATION:	
WATER DEPTH 2: 19.08	TIME: 15:57	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	121.41

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

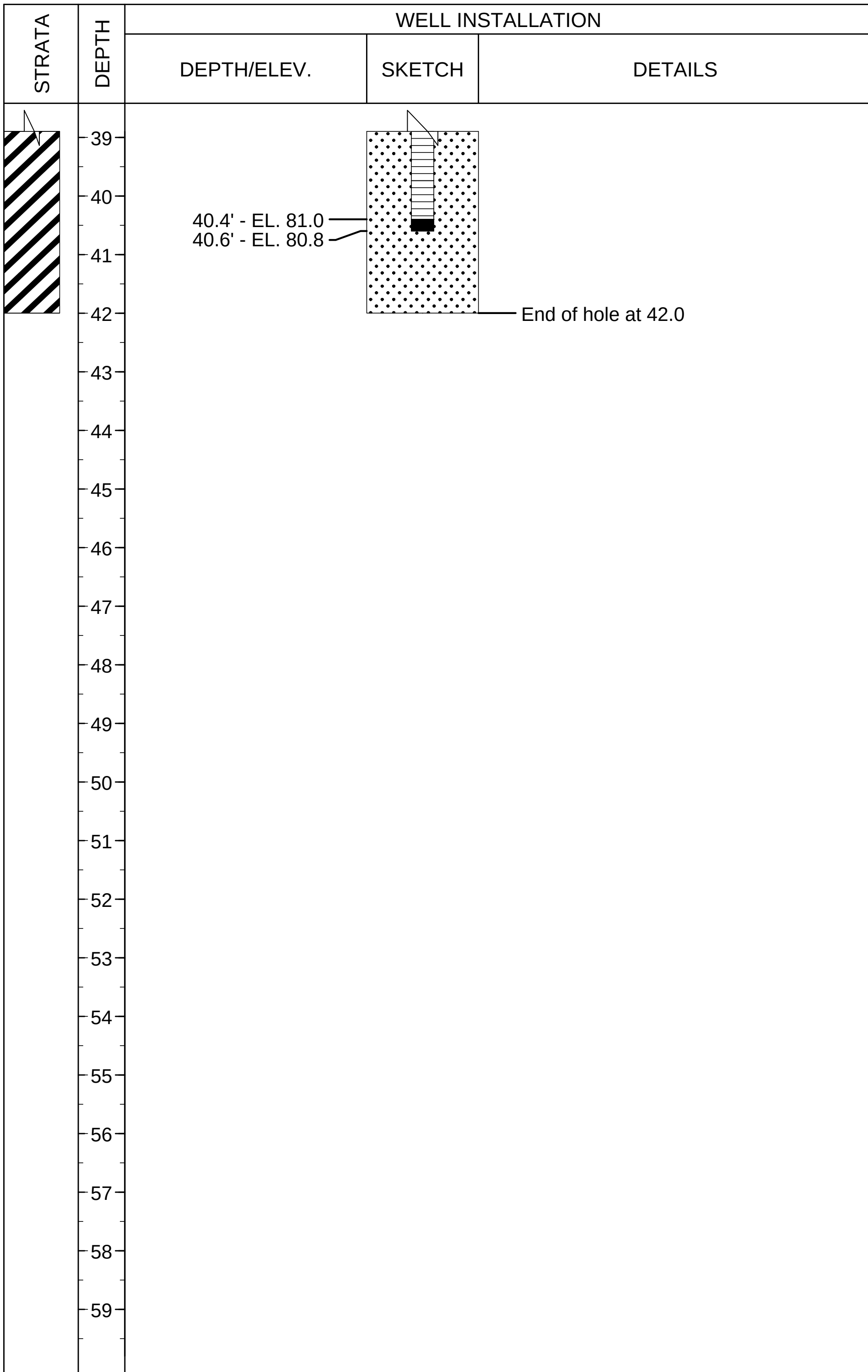
WELL INSTALLATION LOG NO.: 1738MW14

Baker

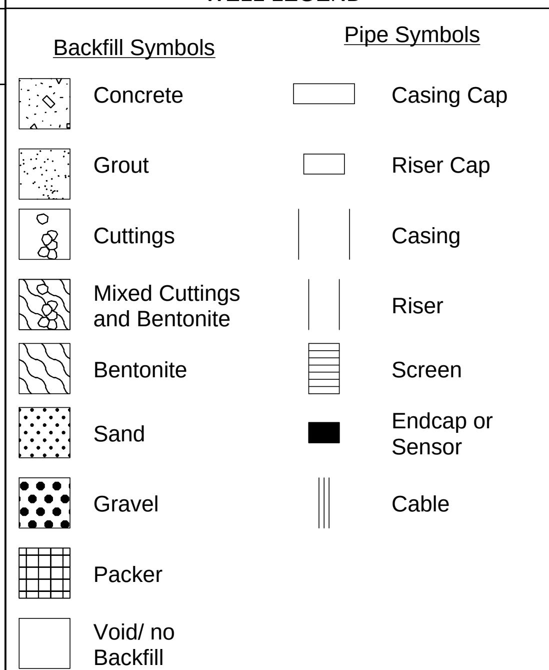
PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET: **3**	OF **3**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: **6/16/2012**	END: **6/20/2012**
NORTH:	**804712.847**	EAST:	**936713.968**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Edwin Maldonado/Ammon**
EQUIPMENT:	**GeoProbe 7822DT/Reichdrill 650-WII**					DRILL CO.:	**JFA/CWPS**

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **28.0**	TIME: **9:00**	DATE: **6/19/2012**	DESCRIPTION: **During drilling**	INCLINATION:	
WATER DEPTH 2: **19.08**	TIME: **15:57**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	**121.41**



WELL LEGEND



For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW15

PROJECT: Site 1738 - Additional MtBE Investigation				SHEET: 1	OF 2
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: 6/16/2012	END: 6/20/2012
NORTH: 804834.915	EAST: 936791.85	COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn	
STATION:	OFFSET:	BASELINE:		DRILLER: Maldonado/DeLong	
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII				DRILL CO.: JFA/CWPS	

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 20.0	TIME: 1:33	DATE: 6/20/2012	DESCRIPTION: During drilling	INCLINATION:
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 121.54

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
0.0	DP-1	90%		**1738MW15-00(0.0-1.0)** PID=0 **1738MW15-01(1.0-3.0)** PID=0	0	0.0' - EL 121.5 GRAVEL, SANDY, with clay; (GP); gray and brown; dry; dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous.	FILL.
4.0	DP-2	85%		**S-1(4.0-8.0)** PID=0	4	4.0' - EL 117.5 CLAY, GRAVELLY, with silt; (CL); brown and gray; damp; stiff; gravel is fine to coarse, subangular, igneous.	FILL.
8.0	DP-3	68%		**S-2(8.0-12.0)** PID=0 **1738MW15-05(9.0-11.0)**	11	11.0' - EL 110.5 CLAY, SILTY; (CL); dark brown and gray; damp; stiff.	RESIDUAL.
12.0	DP-4	63%		**S-3(12.0-16.0)** PID=0	12	12.0' - EL 109.5 CLAY, with silt; (CL); gray and brown; damp; stiff. White inclusions. More brown color with depth.	SAPROLITE.
16.0	DP-5	25%			16	Sampler refusal at 20.0 ft.	SAPROLITE.

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW15

PROJECT: Site 1738 - Additional MtBE Investigation				SHEET: 2	OF 2
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: 6/16/2012	END: 6/20/2012
NORTH: 804834.915	EAST: 936791.85	COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn	
STATION:	OFFSET:	BASELINE:		DRILLER: Maldonado/DeLong	
EQUIPMENT: GeoProbe 7822DT/Reichdrill 650-WII				DRILL CO.: JFA/CWPS	

METHOD DETAILS: 5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 20.0	TIME: 1:33	DATE: 6/20/2012	DESCRIPTION: During drilling	INCLINATION:	
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	121.54

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						19		
20.0						20	Greenish gray and white. End of Boring at 20.0.	
						21		
						22		
	H-N					23		
						24		
						25		
26.0						26	26.0' - EL 95.5 End of Boring at 26.0.	
						27		
						28		
						29		
						30		
						31		
						32		
						33		
						34		
						35		
						36		
						37		
						38		
						39		

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

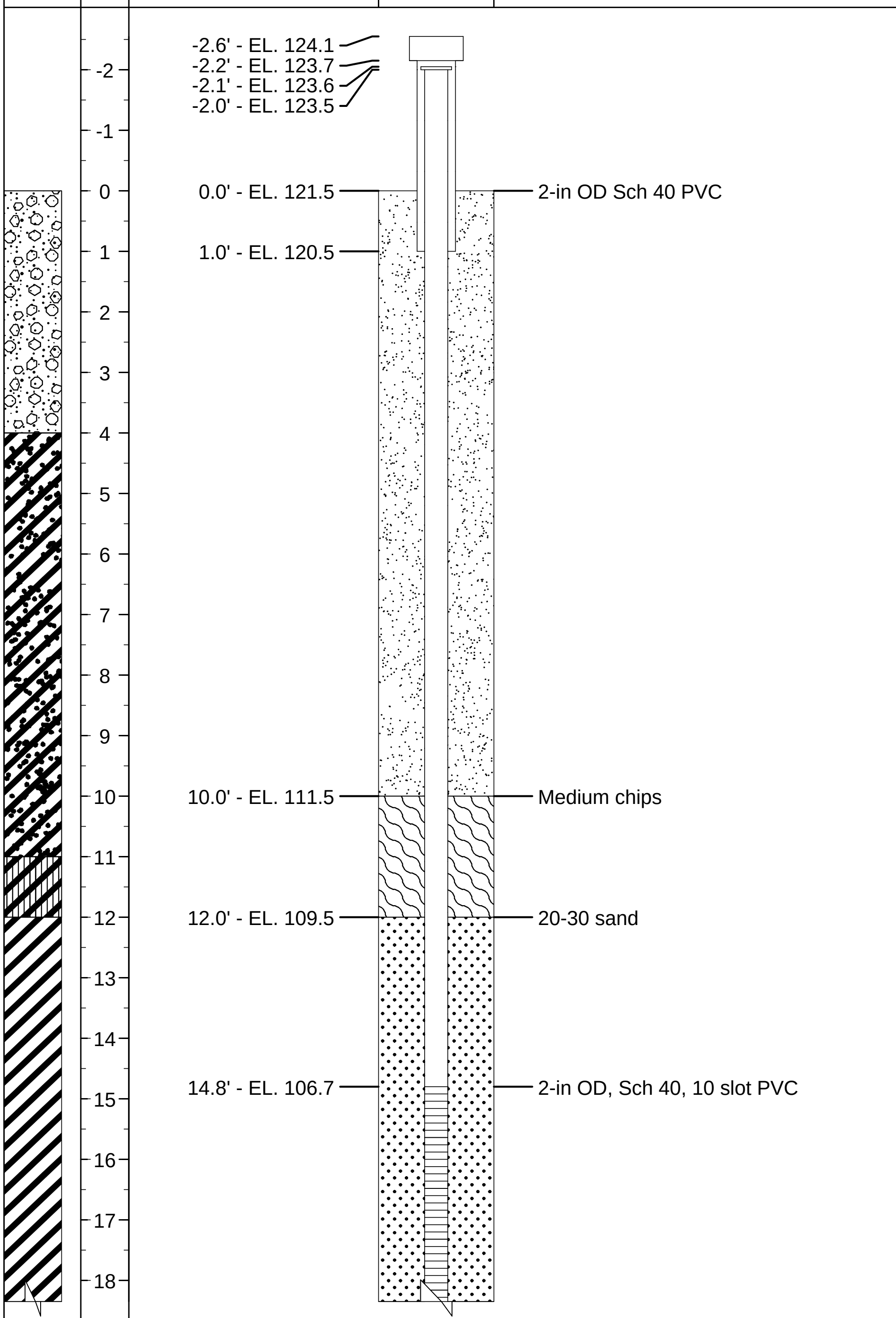
WELL INSTALLATION LOG NO.: 1738MW15

PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	1 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:	
START:	6/16/2012	END:	6/20/2012		
NORTH:	804834.915	EAST:	936791.85	COORD. DATUM:	PR/VI 5200
LOGGER:	Mark DeJohn				
STATION:		OFFSET:		BASELINE:	
DRILLER:	Maldonado/DeLong				
EQUIPMENT:	GeoProbe 7822DT/Reichdrill 650-WII			DRILL CO.:	JFA/CWPS

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: 20.0	TIME: 1:33	DATE: 6/20/2012	DESCRIPTION: During drilling	INCLINATION:	
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	121.54

STRATA | DEPTH | WELL INSTALLATION: DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols: Concrete; Grout; Cuttings; Mixed Cuttings and Bentonite; Bentonite; Sand; Gravel; Packer; Void/ no Backfill

Pipe Symbols: Casing Cap; Riser Cap; Casing; Riser; Screen; Endcap or Sensor; Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW15

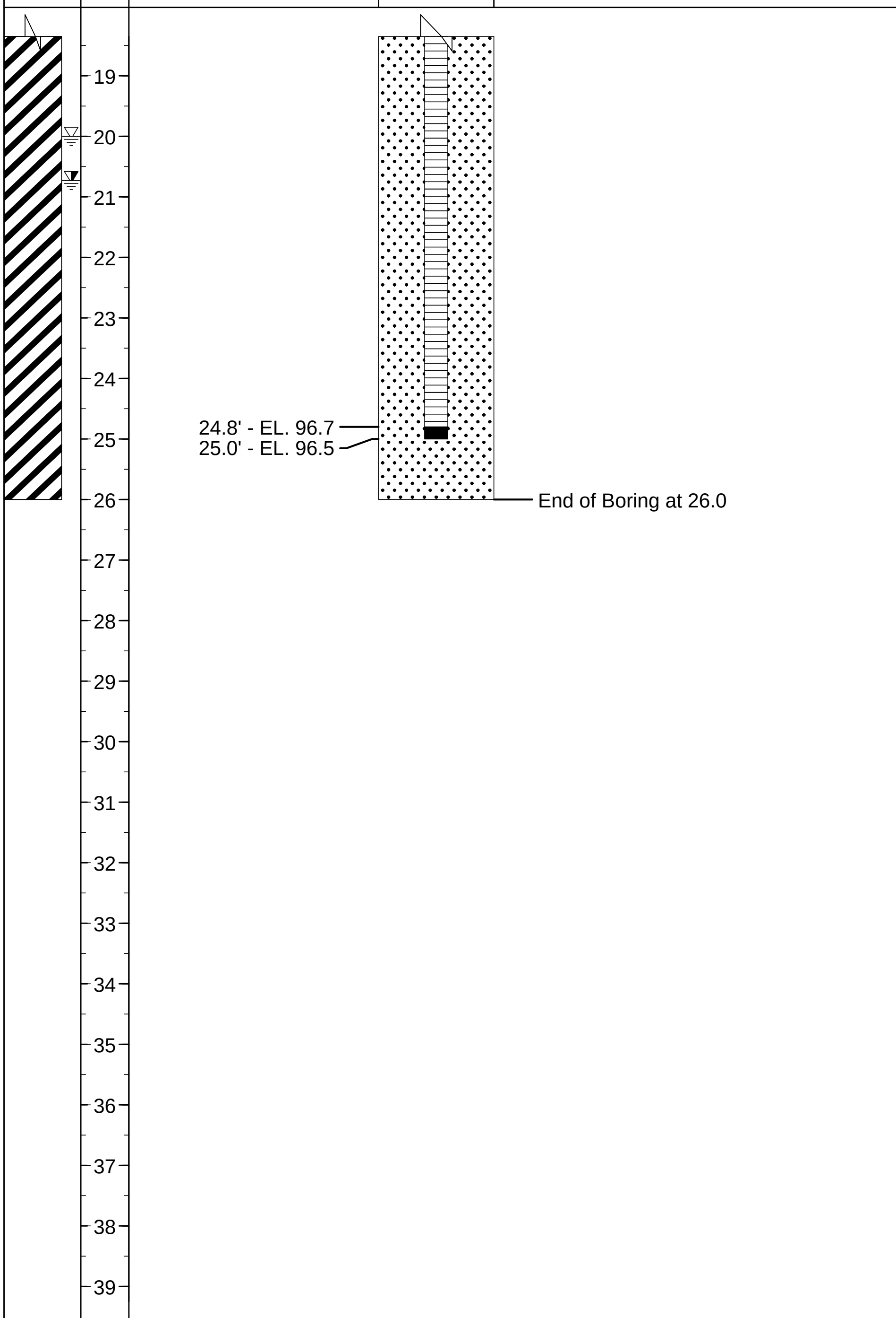
Baker

PROJECT:	Site 1738 - Additional MtBE Investigation			SHEET:	2 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:	
START:	6/16/2012	END:	6/20/2012		
NORTH:	804834.915	EAST:	936791.85	COORD. DATUM:	PR/VI 5200
LOGGER:	Mark DeJohn				
STATION:		OFFSET:		BASELINE:	
DRILLER:	Maldonado/DeLong				
EQUIPMENT:	GeoProbe 7822DT/Reichdrill 650-WII			DRILL CO.:	JFA/CWPS

METHOD DETAILS: **5-3/4 in down hole hammer. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: 20.0	TIME: 1:33	DATE: 6/20/2012	DESCRIPTION: During drilling	INCLINATION:	
WATER DEPTH 2: 20.73	TIME: 16:09	DATE: 6/29/2012	DESCRIPTION: Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	121.54

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000
The soil was sampled by JFA and the well borehole advanced by CWPS

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW16

Baker

PROJECT: **Site 1738 - Additional MtBE Investigation**				SHEET: **1**	OF **2**
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: **6/21/2012**	END: **6/22/2012**
NORTH: **804795.259**	EAST: **937136.459**	COORD. DATUM: **PR/VI 5200**		LOGGER: **Mark DeJohn**	
STATION:	OFFSET:	BASELINE:		DRILLER: **Edwin Maldonado**	
EQUIPMENT: **GeoProbe 7822DT**				DRILL CO.: **JFA**	

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **9.0**	TIME: **17:00**	DATE: **6/21/2012**	DESCRIPTION: **First encountered**	INCLINATION:	
WATER DEPTH 2: **7.08**	TIME: **15:35**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	**109.08**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
0.0	DP-1	88%		**1738MW16-00 & 00D(0.0-1.0)** PID=0		0	0.0' - EL 109.1 CLAY, SILTY; (CL); dark brown; damp; medium stiff.	RESIDUAL.
				1738MW16-01(1.0-3.0) PID=0		1	1.0' - EL 108.1 CLAY, with silt; (CL); brown and gray; moist; medium stiff. Mottled.	RESIDUAL.
4.0	DP-2	100%		**1738MW16-03, MS & MSD(5.0-7.0)** PID=0		5	More gray beginning at 7 ft.	
8.0	DP-3	100%		**S-1(8.0-12.0)** PID=0		8	Wet zone 9-11 ft. Brown and gray; moist at 11 ft.	
12.0	DP-4	100%		**S-2(12.0-16.0)** PID=0		12	12.0' - EL 97.1 CLAY, SILTY; (CL); brown and gray; damp; stiff.	RESIDUAL.
16.0				**S-3(16.0-20.0)** PID=0		16	Brown; black vertical and horizontal fractures.	

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738MW16

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET: 2	OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 6/21/2012	END: 6/22/2012
NORTH:	804795.259	EAST:	937136.459	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Edwin Maldonado
EQUIPMENT:	GeoProbe 7822DT					DRILL CO.:	JFA

METHOD DETAILS: 4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1:	9.0	TIME: 17:00	DATE: 6/21/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:	7.08	TIME: 15:35	DATE: 6/29/2012	DESCRIPTION:	Synoptic DTW	ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	109.08

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-5	90%				19		
20.0	DP-6	78%		S-4(20.0-24.0) PID=0		20	As above with wet zone at 21.6-22.3, damp below.	
						21		
						22		
						23		
24.0	A-N					24		
						25		
						26		
27.0						27	27.0' - EL 82.1 End of Boring at 27.0.	
						28		
						29		
						30		
						31		
						32		
						33		
						34		
						35		
						36		
						37		
						38		

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW16

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/21/2012** END: **6/22/2012**

NORTH: **804795.259** EAST: **937136.459** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado**

EQUIPMENT: **GeoProbe 7822DT** DRILL CO.: **JFA**

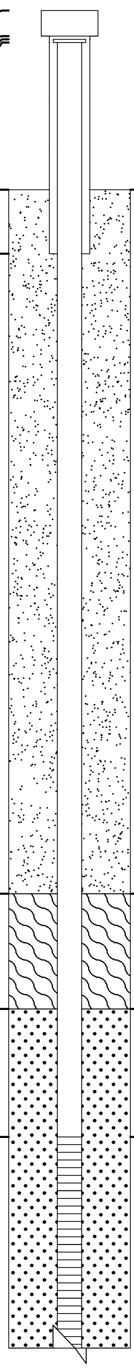
METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **9.0**	TIME: **17:00**	DATE: **6/21/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **7.08**	TIME: **15:35**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **109.08**

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS

Depth scale: -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18



DEPTH/ELEV.	DETAILS
-2.8' - EL. 111.9	
-2.4' - EL. 111.5	
-2.4' - EL. 111.4	
-2.3' - EL. 111.4	
0.0' - EL. 109.1	2-in OD, Sch 40 PVC
1.0' - EL. 108.1	
11.0' - EL. 98.1	Medium chips
12.8' - EL. 96.3	20-30 sand
14.8' - EL. 94.3	2-in OD, Sch 40, 10 slot PVC

WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: 1738MW16

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **2** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **6/21/2012** END: **6/22/2012**

NORTH: **804795.259** EAST: **937136.459** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

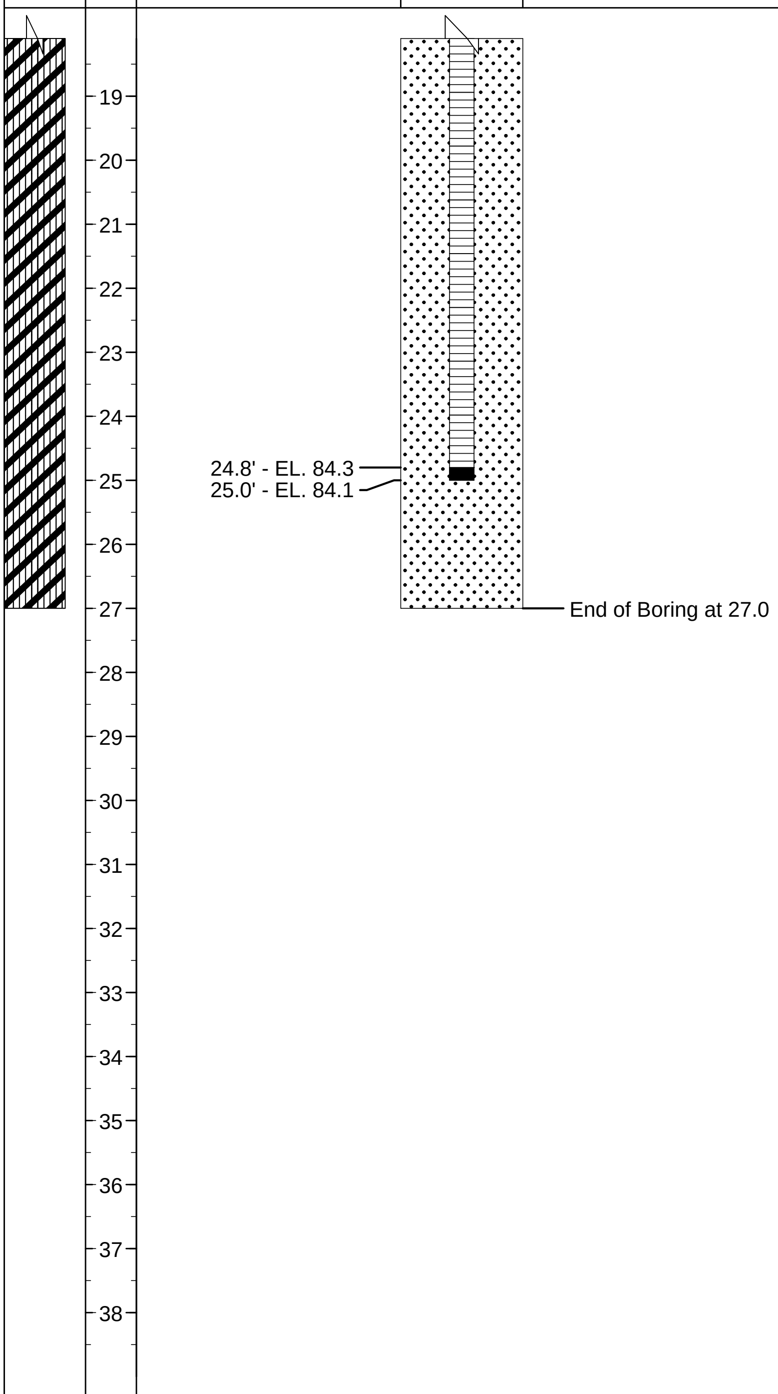
STATION: OFFSET: BASELINE: DRILLER: **Edwin Maldonado**

EQUIPMENT: **GeoProbe 7822DT** DRILL CO.: **JFA**

METHOD DETAILS: **4.25 in ID HSA. 1.5 in ID macrocore w/ actetate liner.**

WATER DEPTH 1: **9.0**	TIME: **17:00**	DATE: **6/21/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2: **7.08**	TIME: **15:35**	DATE: **6/29/2012**	DESCRIPTION: **Synoptic DTW**	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **109.08**

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS



WELL LEGEND

Backfill Symbols

- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols

- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

LOG OF BORING NO.: 1738MW17

PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET:	**1** OF **2**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	**8/20/2012** END:
NORTH:	**804670.158**	EAST:	**936847.058**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Abraham Nunez**
EQUIPMENT:	**Acker II Trailer**					DRILL CO.:	**GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1:	**20.5**	TIME:	**9:00**	DATE:	**8/21/2012**	DESCRIPTION:	**First encountered**	INCLINATION:	
WATER DEPTH 2:		TIME:		DATE:		DESCRIPTION:		ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	**124.20**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
0.0	A-N					0	0.0' - EL 124.2 SILT, CLAYEY, with gravel; (ML); gray; damp; gravel is fine, subrounded, igneous.	FILL
15.0 15.5	S-1	100%	50/6"	**S-1(15.0-15.5)** PID=0.0		15	15.0' - EL 109.2 GABRO; brown; damp; very hard; highly weathered; indistinctly bedded; extremely closely fractured.	WEATHERED GABBRO
	A-N					17		

Depth scale: -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site1738.GEO DATE PRINTED=3/29/2013 S.O.#=125201

LOG OF BORING NO.: 1738MW17

PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET: **2** OF **2**	
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: **8/20/2012**	END:
NORTH:	**804670.158**	EAST:	**936847.058**	COORD. DATUM:	**PR/VI 5200**	LOGGER: **Mark DeJohn**	
STATION:		OFFSET:		BASELINE:		DRILLER: **Abraham Nunez**	
EQUIPMENT:	**Acker II Trailer**					DRILL CO.: **GeoEnviroTech**	

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **20.5**	TIME: **9:00**	DATE: **8/21/2012**	DESCRIPTION: **First encountered**	INCLINATION:
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM: **MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: **124.20**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
						18		
19.0 – 20.2	S-2	100%	25 30 50/4"	**1738MW17-10(19.0-20.2)** PID=0.0		19	Highly fractured, weathered Gabbro; dry; becoming highly weathered, moist, with green and tan weathering.	
						20		
	A-N					21		
22.0 – 22.4	S-3	100%	50/5"	**S-2(22.0-22.4)** PID=0.0		22	Brown and decomposed; damp.	
	A-N					23–29		
30.0						30	30.0' - EL 94.2 End of Boring at 30.0.	
						31–38		

PID - MiniRAE 2000

WELL INSTALLATION LOG NO.: 1738MW17

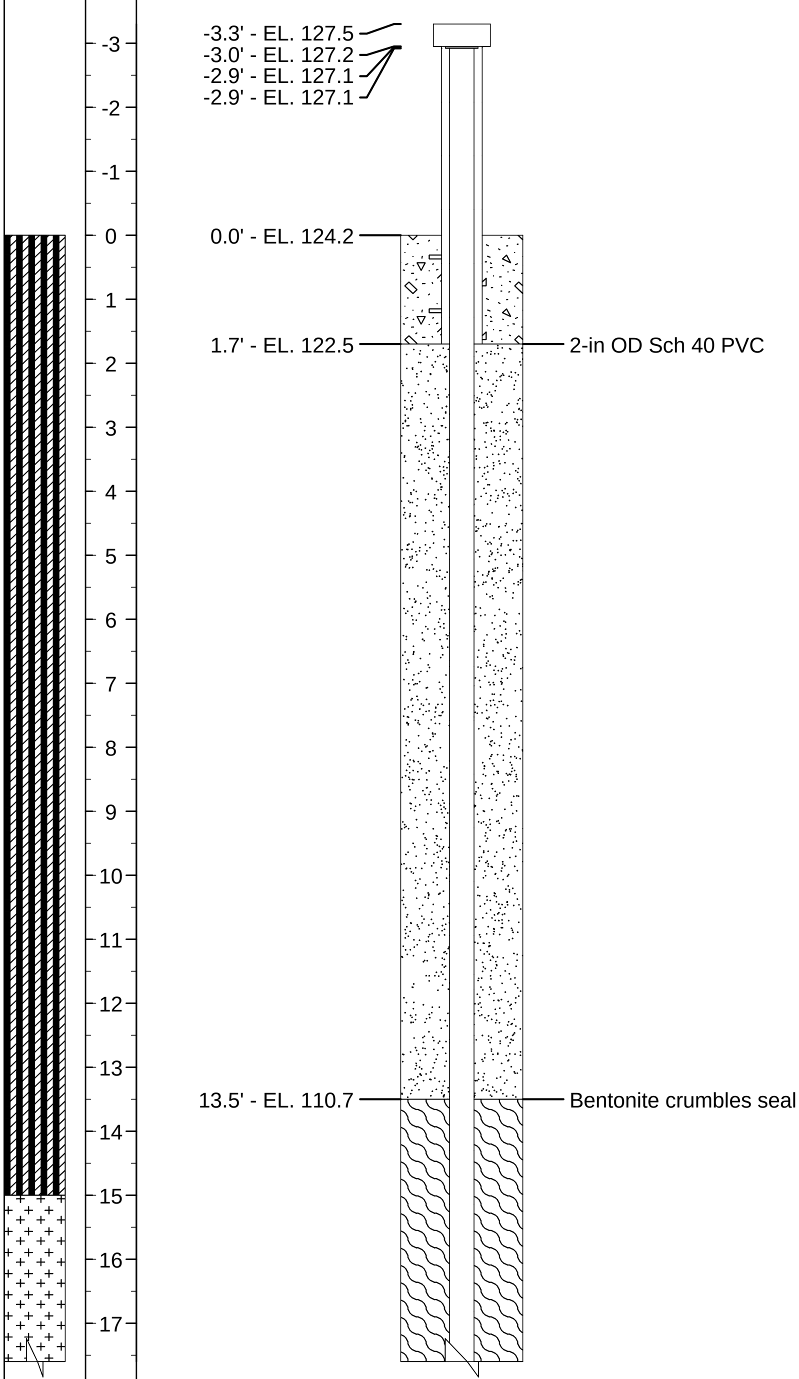
PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	1 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	8/20/2012 END:
NORTH:	804670.158	EAST:	936847.058	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Abraham Nunez
EQUIPMENT:	Acker II Trailer					DRILL CO.:	GeoEnviroTech

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **20.5**	TIME: **9:00**	DATE: **8/21/2012**	DESCRIPTION: **First encountered**	INCLINATION:	
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	**124.20**

WELL INSTALLATION

STRATA | DEPTH | DEPTH/ELEV. | SKETCH | DETAILS



WELL LEGEND

Backfill Symbols
- Concrete
- Grout
- Cuttings
- Mixed Cuttings and Bentonite
- Bentonite
- Sand
- Gravel
- Packer
- Void/ no Backfill

Pipe Symbols
- Casing Cap
- Riser Cap
- Casing
- Riser
- Screen
- Endcap or Sensor
- Cable

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

WELL INSTALLATION LOG NO.: **1738MW17**

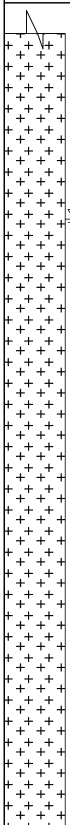
Baker

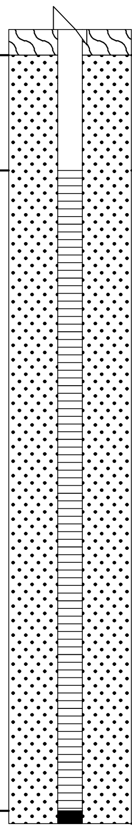
PROJECT:	**Site 1738 - Additional MtBE Investigation**					SHEET:	**2** OF **2**
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	**8/20/2012** END:
NORTH:	**804670.158**	EAST:	**936847.058**	COORD. DATUM:	**PR/VI 5200**	LOGGER:	**Mark DeJohn**
STATION:		OFFSET:		BASELINE:		DRILLER:	**Abraham Nunez**
EQUIPMENT:	**Acker II Trailer**					DRILL CO.:	**GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1:	**20.5**	TIME:	**9:00**	DATE:	**8/21/2012**	DESCRIPTION:	**First encountered**	INCLINATION:	
WATER DEPTH 2:		TIME:		DATE:		DESCRIPTION:		ELEV. DATUM:	**MSL+100**
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	**124.20**

STRATA	DEPTH	WELL INSTALLATION: DEPTH/ELEV.	SKETCH	DETAILS
	18	18.0' - EL. 106.2		20-30 Sand
	19			
	20	19.8' - EL. 104.4		2-in OD Sch 40, 10-slot PVC
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30	29.8' - EL. 94.4		End of Boring at 30.0
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			





WELL LEGEND

Backfill Symbols	Pipe Symbols
Concrete	Casing Cap
Grout	Riser Cap
Cuttings	Casing
Mixed Cuttings and Bentonite	Riser
Bentonite	Screen
Sand	Endcap or Sensor
Gravel	Cable
Packer	
Void/ no Backfill	

For strata symbols, see attached legend sheet.

INSTALLATION/ DEVELOPMENT DESCRIPTION:

2-hour surge and purge

PID - MiniRAE 2000

TEMPLATE=8BKWCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738SB104A

Baker

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 1 OF 2

LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 6/27/2012 END: 6/27/2012

NORTH: 804772.795 | EAST: 936813.032 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn

STATION: | OFFSET: | BASELINE: | DRILLER: Edwin Maldonado

EQUIPMENT: GeoProbe 7822DT | DRILL CO.: JFA

METHOD DETAILS: 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 29 | TIME: 15:00 | DATE: 6/27/2012 | DESCRIPTION: First encountered | INCLINATION:

WATER DEPTH 2: | TIME: | DATE: | DESCRIPTION: | ELEV. DATUM: MSL+100

WATER DEPTH 3: | TIME: | DATE: | DESCRIPTION: | GROUND ELEV.: 122.57

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	DP-N					0–15		
16.0				S-1(16.0-17.0)		16	16.0' - EL 106.6 SAND, GRAVELLY, with clay; (GP); green; dry; medium dense; sand is fine to coarse; gravel is fine to coarse, subangular, igneous; petroleum odor.	RESIDUAL.
				S-2(17.0-18.0) PID=6		17	17.0' - EL 105.6 SAND, with clay; (GP); green; damp; medium dense; sand is fine to coarse; petroleum odor.	RESIDUAL.
18.0	DP-1	73%		S-3(18.0-19.0)		18		
				1738SB104-10(19.0-20.0) PID=801		19	Residual-phase NAPL	
20.0			0	S-5(20.0-21.0)		20	20.0' - EL 102.6 CLAY, SILTY; (CL); green; damp; medium stiff; petroleum odor.	SAPROLITE.

PID - MiniRAE 2000

LOG OF BORING NO.: 1738SB104A

Baker

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 2 OF 2

LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 6/27/2012 | END: 6/27/2012

NORTH: 804772.795 | EAST: 936813.032 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn

STATION: | OFFSET: | BASELINE: | DRILLER: Edwin Maldonado

EQUIPMENT: GeoProbe 7822DT | DRILL CO.: JFA

METHOD DETAILS: 1.5 in ID macrocore w/ actetate liner.

WATER DEPTH 1: 29 | TIME: 15:00 | DATE: 6/27/2012 | DESCRIPTION: First encountered | INCLINATION:

WATER DEPTH 2: | TIME: | DATE: | DESCRIPTION: | ELEV. DATUM: MSL+100

WATER DEPTH 3: | TIME: | DATE: | DESCRIPTION: | GROUND ELEV.: 122.57

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
				PID=361		21		
	DP-2			S-6(21.0-22.0) PID=500		22	No NAPL	
				S-7(22.0-23.0) PID=1044		23		
				S-8(23.0-24.0) PID=919				
24.0				S-9(24.0-25.0) PID=1478		24	No LNAPL. Liner stuck in Sampler.	
						25		
	DP-3					26		
						27		
28.0				S-13(28.0-29.0) PID=1		28		
	DP-4	100%		S-14(29.0-30.0) PID=25		29	Wet zone 29-30 ft.	
				S-15(30.0-31.0) PID=3		30		
				S-16(31.0-32.0)		31		
32.0						32	32.0' - EL 90.6 End of boring at 32.0	
						33		
						34		
						35		
						36		
						37		
						38		
						39		
						40		
						41		

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738SB106A

Baker

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **1**

LATITUDE: LONGITUDE: GEO. DATUM: START: **8/22/2012** END: **8/22/2012**

NORTH: **804729.26** EAST: **936967.795** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: **8-ft East of SB106** BASELINE: DRILLER: **Abraham Nunez**

EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **Dry** TIME: **12:00** DATE: **8/22/2012** DESCRIPTION: **During drilling** INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **125.27**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	A-N					0–18		
18.0	S-1		50/0"			18	18.0' - EL 107.3 GABRO; dark gray; very hard; slightly weathered; indistinctly bedded to very thickly bedded. End of Boring at 18.0.	

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

Baker

LOG OF BORING NO.: 1738SB107

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **8/20/2012** END: **8/20/2012**

NORTH: **804815.243** EAST: **936898.59** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Abraham Nunez**

EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **22.0** TIME: **1:00** DATE: **8/20/2012** DESCRIPTION: **First encountered** INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **123.34**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	A-N					0–2		
						2	2.0' - EL 121.3 GRAVEL, with silt; (GP); gray and brown; dry; very dense; gravel is fine to coarse, subangular, igneous. From cuttings.	FILL
						6	6.0' - EL 117.3 SILT, CLAYEY, with gravel; (CL); brown and gray; damp; hard; gravel is fine to coarse, subangular, igneous. From cuttings.	FILL
16.0	S-1	90%	10 16 21 NR	**S-1(16.0-17.0)** PID=175.0 **1738SB107-08(17.0-18.0)** PID=1705.0		16	16.0' - EL 107.3 CLAY, SILTY; (CL); brown, grayish; damp; stiff; petroleum odor. Residual NAPL.	SAPROLITE
18.0	S-2	90%	7 8 9 12	**S-2(18.0-20.0)** PID=1240.0		18	Olive drab; brown vertical fracture traces; moist; residual NAPL.	
20.0			5 6	**S-3(20.0-21.0)** PID=303.0		20	Brown with gray and green staining.	

PID - MiniRAE 2000

Baker

LOG OF BORING NO.: 1738SB107

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **2** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **8/20/2012** END: **8/20/2012**

NORTH: **804815.243** EAST: **936898.59** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Abraham Nunez**

EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **22.0** TIME: **1:00** DATE: **8/20/2012** DESCRIPTION: **First encountered** INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **123.34**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	S-3	95%	8, NR	**1738SB107-11(21.0-22.0)** PID=811.0		21		
22.0	S-4	55%	3, 3, 5, NR	**S-4(22.0-24.0)** PID=117.0		22	Olive drab; nearly wet.	
24.0	S-5	100%	6, 6, 9, 10	**S-5(24.0-26.0)** PID=1422.0		24	Olive drab and gray with brown vertical fractures; moist; residual NAPL.	
26.0	S-6	75%	13, 10, 23, 31	**1738SB107-14(26.0-28.0)** PID=175.0		26	Brown with red and orange, weathered fracture; very weathered zone; damp to moist; no staining, faint petroleum odor.	
28.0	S-7	95%	12, 15, 15, NR	**S-6(28.0-30.0)** PID=43.0		28	Brown and light gray; damp; no staining or odor.	
30.0						30	30.0' - EL 93.3 End of Boring at 30.0.	

Depth scale: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41

PID - MiniRAE 2000

LOG OF BORING NO.: 1738SB108

Baker

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **1** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **8/15/2012** END: **8/16/2012**

NORTH: **804759.431** EAST: **936840.47** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Abraham Nunez**

EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **27.8** TIME: **12:55** DATE: **8/15/2012** DESCRIPTION: **First encountered** INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **123.23**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
0 – 1.0	A-N					0	Gravel is fine to coarse, subangular, igneous.	FILL
1.0 – 3.0	S-1	50%		**S-1(1.0-3.0)** PID=0.0		1	1.0' - EL 122.2 GRAVEL, with silt; (GP); brown, grayish; dry; very dense; gravel is fine to coarse, subangular, igneous.	FILL
3.0 – 9.0	A-N					3–8		
9.0 – 11.0	S-2	75%	8, 11, 17, 17	**S-2(9.0-11.0)** PID=2.7		9	9.0' - EL 114.2 SILT, CLAYEY, with sand; (CL); brown and gray; damp; stiff; sand is fine.	RESIDUAL
11.0 – 14.0	A-N					11–13		
14.0 – 16.0	S-3	95%	14, 15, 14, 16	**S-3(14.0-16.0)** PID=8.0 **1738SB108-08(15.0-16.0)** PID=108.0		14	14.0' - EL 109.2 CLAY, SILTY; (CL); brown and gray; damp; stiff. Petroleum odor at 15.5 ft.	SAPROLITE
16.0 – 18.0	S-4	60%	25, 26, 24, 25	**S-4(16.0-17.0)** PID=Over. **1738SB108-09(17.0-18.0)** PID=Over.		16		
18.0 – 19.0	S-5	80%	25, 50	**S-5(18.0-19.0)** PID=1340.0		18	Green staining; petroleum odor; residual-phase NAPL; hard.	
19.0 – 20.0	A-N					19		
20.0 – 20.6	S-6	67%	50	**S-6(20.0-20.6)** PID=Over.		20	20.0' - EL 103.2 CLAY; (CL); dark green; damp; hard; petroleum odor. Staining; no NAPL.	SAPROLITE

PID - MiniRAE 2000

LOG OF BORING NO.: 1738SB108

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET:	2 OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START:	8/15/2012 END: 8/16/2012
NORTH:	804759.431	EAST:	936840.47	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Abraham Nunez
EQUIPMENT:	Acker II Trailer					DRILL CO.:	GeoEnviroTech

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1:	27.8	TIME:	12:55	DATE:	8/15/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:		TIME:		DATE:		DESCRIPTION:		ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:		DATE:		DESCRIPTION:		GROUND ELEV.:	123.23

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
	A-N				21		
22.0 – 23.5	S-7	100%	22 30 30	**S-7(22.0-23.5)** PID=9100.0	22	Olive drab; petroleum odor; residual NAPL.	
23.5 – 24.0	A-N				23		
24.0 – 26.0	S-8	70%		**S-8(24.0-25.0)** PID=93.0; **S-9(25.0-26.0)** PID=175.0	24	Brown, gray, and tan; damp; no NAPL.	
26.0 – 28.0	S-9	100%		**S-10(26.0-27.0)** PID=186.0	26		
28.0 – 30.0	S-10	65%		**S-11(28.0-29.0)** PID=25.0; **S-12(29.0-30.0)** PID=28.0	28	Wet zone; no NAPL. Moist; no staining; faint odor.	
30.0					30	30.0' - EL 93.2 End of Boring at 30.0.	

DEPTH scale: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41

PID - MiniRAE 2000

LOG OF BORING NO.: 1738SB109

PROJECT:	Site 1738 - Additional MtBE Investigation					SHEET: 1	OF 2
LATITUDE:		LONGITUDE:		GEO. DATUM:		START: 8/22/2012	END:
NORTH:	804773.268	EAST:	936820.685	COORD. DATUM:	PR/VI 5200	LOGGER:	Mark DeJohn
STATION:		OFFSET:		BASELINE:		DRILLER:	Abraham Nunez
EQUIPMENT:	Acker II Trailer					DRILL CO.:	GeoEnviroTech

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1:	20.0	TIME: 9:30	DATE: 8/24/2012	DESCRIPTION:	First encountered	INCLINATION:	
WATER DEPTH 2:		TIME:	DATE:	DESCRIPTION:		ELEV. DATUM:	MSL+100
WATER DEPTH 3:		TIME:	DATE:	DESCRIPTION:		GROUND ELEV.:	122.28

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	DEPTH	DESCRIPTION	REMARKS
	A-N				0		
1.0	S-1	45%		**1738SB109-01(1.0-3.0)** PID=0.0	1	1.0' - EL 121.3 GRAVEL, SILTY, with clay; (GP); gray; dry; dense; gravel is fine to coarse, subangular, igneous.	FILL
3.0	A-N				3		
					11	Silty clay stringer at 11.0	
16.0	S-2		6, 13, 15, 18	**S-1(16.0-18.0)** PID=0.2	16	16.0' - EL 106.3 CLAY, SILTY; (CL); green and gray; damp; very stiff; faint petroleum odor.	SAPROLITE
18.0	S-3	85%		**S-2(18.0-19.0)** PID=0.0 **1738SB109-10(19.0-20.0)** PID=0.2	18	No odor.	
20.0			3, 5	**S-3(20.0-22.0)**	20	20.0' - EL 102.3 CLAY, with silt; (CL); gray and white; damp; medium stiff.	SAPROLITE

PID - MiniRAE 2000

Baker

LOG OF BORING NO.: 1738SB109

PROJECT: Site 1738 - Additional MtBE Investigation				SHEET: 2	OF 2
LATITUDE:	LONGITUDE:	GEO. DATUM:		START: 8/22/2012	END:
NORTH: 804773.268	EAST: 936820.685	COORD. DATUM: PR/VI 5200		LOGGER: Mark DeJohn	
STATION:	OFFSET:	BASELINE:		DRILLER: Abraham Nunez	
EQUIPMENT: Acker II Trailer				DRILL CO.: GeoEnviroTech	

METHOD DETAILS: 3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.

WATER DEPTH 1: 20.0	TIME: 9:30	DATE: 8/24/2012	DESCRIPTION: First encountered	INCLINATION:	
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM:	MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.:	122.28

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	S-4	95%	10 11	PID=0.0		21		
22.0	S-5	100%	4 11 14 24	**S-4(22.0-23.0)** PID=0.0 **1738SB109-12(23.0-24.0)**		22 23	Wet zone to 22.3.	
24.0	S-6	100%	11 11 15 18	PID=0.0 **S-5(24.0-25.0)** PID=0.0 **S-6(25.0-26.0)** PID=0.0		24 25	24.0' - EL 98.3 CLAY, GRAVELLY, with silt; (CL); dark gray; wet; stiff; gravel is fine to coarse, angular, igneous. 25.0' - EL 97.3 CLAY, SILTY, with gravel; (CL); brown, tan and gray; damp; stiff; gravel is fine, angular, igneous.	SAPROLITE SAPROLITE
26.0						26	26.0' - EL 96.3 End of Boring at 26.0.	
						27 28 29 30 31 32 33 34 35 36 37 38 39 40 41		

PID - MiniRAE 2000

Baker

LOG OF BORING NO.: 1738SB110

PROJECT: Site 1738 - Additional MtBE Investigation | SHEET: 1 OF 2

LATITUDE: | LONGITUDE: | GEO. DATUM: | START: 8/24/2012 | END: 8/24/2012

NORTH: 804730.299 | EAST: 936861.399 | COORD. DATUM: PR/VI 5200 | LOGGER: Mark DeJohn

STATION: | OFFSET: | BASELINE: | DRILLER: Abraham Nunez

EQUIPMENT: Acker II Trailer | DRILL CO.: GeoEnviroTech

METHOD DETAILS: 3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.

WATER DEPTH 1: | TIME: | DATE: | DESCRIPTION: | INCLINATION:

WATER DEPTH 2: | TIME: | DATE: | DESCRIPTION: | ELEV. DATUM: MSL+100

WATER DEPTH 3: | TIME: | DATE: | DESCRIPTION: | GROUND ELEV.: 123.69

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	A-N					0–15		
15.0	A-1	80%	11 20 31 NR	**S-1(15.0-16.0)** PID=144.0 **1738SB110-08(16.0-17.0)**		15	15.0' - EL 108.7 SILT, CLAYEY; (ML); olive drab; damp; very stiff; petroleum odor. Staining; no NAPL.	SAPROLITE
17.0	S-2	75%		PID=697.0 **S-2(17.0-19.0)** PID=3869.0		17	Brown and tan; petroleum odor, no staining; Residual-phase NAPL.	
19.0	S-3	80%	8 30 14 NR	PID=875.0 **1738SB110-10(20.0-21.0)**		19–20		

PID - MiniRAE 2000

TEMPLATE=8BKTCAE FILE=Site 1738.GEO DATE PRINTED=9/14/2012 S.O.#=125201

LOG OF BORING NO.: 1738SB110

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **2** OF **2**

LATITUDE: LONGITUDE: GEO. DATUM: START: **8/24/2012** END: **8/24/2012**

NORTH: **804730.299** EAST: **936861.399** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**

STATION: OFFSET: BASELINE: DRILLER: **Abraham Nunez**

EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: TIME: DATE: DESCRIPTION: INCLINATION:

WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**

WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **123.69**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
21.0	S-4	55%	21 42 30 NR	PID=3485.0 **S-4(21.0-23.0)** PID=986.0		21 22	Brown and rusty brown; vertical fracture traces stained green; no NAPL.	
23.0	S-5	70%	16 17 26 NR	**S-5(23.0-24.0)** PID=51.0 **1738SB110-12(24.0-25.0)** PID=59.0		23 24	23.0' - EL 100.7 SILT, GRAVELLY, with clay; (ML); brown; dark brown and green; damp; very stiff; gravel is fine, subangular, igneous. Faint petroleum odor. Horizontal fracture; green; wet.	
25.0	S-6	65%	26 32 50/5"	**S-6(25.0-26.0)** PID=13.0 **1738SB110-13(26.0-27.0)**		25 26	Wet zone. Light brown, rusty brown and tan; damp; faint petroleum odor.	
27.0						27 28 29 30 31 32 33 34 35 36 37 38 39 40 41	27.0' - EL 96.7 End of Boring at 27.0.	

PID - MiniRAE 2000

LOG OF BORING NO.: 1738SB111

Baker

PROJECT: Site 1738 - Additional MtBE Investigation		SHEET: 1 OF 2	
LATITUDE:	LONGITUDE:	GEO. DATUM:	START: 8/17/2012 END: 8/17/2012
NORTH: 804751.647	EAST: 936879.708	COORD. DATUM: PR/VI 5200	LOGGER: Mark DeJohn
STATION:	OFFSET:	BASELINE:	DRILLER: Abraham Nunez
EQUIPMENT: Acker II Trailer			DRILL CO.: GeoEnviroTech

METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: 28.0	TIME: 14:00	DATE: 8/17/2012	DESCRIPTION: First encountered	INCLINATION:
WATER DEPTH 2:	TIME:	DATE:	DESCRIPTION:	ELEV. DATUM: MSL+100
WATER DEPTH 3:	TIME:	DATE:	DESCRIPTION:	GROUND ELEV.: 123.69

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	A-N					0	GRAVEL, with silt and clay; (GP); brown and gray; damp; very dense; gravel is fine to coarse, subangular, igneous.	FILL
5.0 – 7.0	S-1	20%	11, 15, 12, 6	**S-1(5.0-7.0)** PID=0.0		5		
7.0 – 16.0	A-N							
16.0 – 18.0	S-2	75%	14, 24, 14, NR	**S-2(16.0-17.0)** PID=9999.0 **1738SB111-08(17.0-18.0)** PID=9999.0		16	16.0' - EL 107.7 SILT, CLAYEY, with gravel; (CL); dark brown, grayish; damp; very stiff; gravel is fine, subangular, igneous; petroleum odor. Residual-phase NAPL.	SAPROLITE
18.0 – 20.0	S-3	70%	16, 18, 24, NR	**S-3(18.0-20.0)** PID=9999.0		18	18.0' - EL 105.7 CLAY, with silt; (CL); brown, greenish; damp; very stiff; petroleum odor.	SAPROLITE
20.0			15, 17	**S-4(20.0-21.0)** PID=9999.0		20	Olive drab; vertical fracture traces; no NAPL.	

PID - MiniRAE 2000

Baker

LOG OF BORING NO.: 1738SB111

PROJECT: **Site 1738 - Additional MtBE Investigation** SHEET: **2** OF **2**
LATITUDE: LONGITUDE: GEO. DATUM: START: **8/17/2012** END: **8/17/2012**
NORTH: **804751.647** EAST: **936879.708** COORD. DATUM: **PR/VI 5200** LOGGER: **Mark DeJohn**
STATION: OFFSET: BASELINE: DRILLER: **Abraham Nunez**
EQUIPMENT: **Acker II Trailer** DRILL CO.: **GeoEnviroTech**
METHOD DETAILS: **3.5 in ID HSA. 1.375 in ID spoon. 140 lb donut hammer, 30 in fall.**

WATER DEPTH 1: **28.0** TIME: **14:00** DATE: **8/17/2012** DESCRIPTION: **First encountered** INCLINATION:
WATER DEPTH 2: TIME: DATE: DESCRIPTION: ELEV. DATUM: **MSL+100**
WATER DEPTH 3: TIME: DATE: DESCRIPTION: GROUND ELEV.: **123.69**

SAMPLE DEPTH (FT.)	SAMPLE TYPE -NUMBER	RECOVERY %	SPT BLOWS/ 0.5 FT. or (RQD)	TEST RESULTS	STRATA	DEPTH	DESCRIPTION	REMARKS
	S-4	85%	23 NR	**1738SB111-11(21.0-22.0)** PID=9999.0		21		
22.0	S-5		9 13 18 NR			22	Vertical fractures stained blue-green; no NAPL.	
24.0	S-6	75%	13 27 40 NR	**S-5(24.0-26.0)** PID=9999.0		24	Olive drab; no staining.	
26.0	S-7	133%	23 50/3"	**S-6(26.0-26.8)** PID=9999.0		26	Brown; no staining or fractures.	
26.8	A-8		NR NR			27		
28.0	S-9	100%	28 60	**1738SB111-14(28.0-29.0)** PID=9999.0		28	Brown; no staining or fractures; diminished odor.	
29.0	A-N		NR NR			29		
30.0	S-1	100%	50 NR	**S-9(30.0-30.5)** PID=75.0		30	30.0' - EL 93.7 IGNEOUS ROCK; light green; wet; very hard. Faint petroleum odor.	WEATHERED GABBRO
30.5			NR NR			31	30.5' - EL 93.2 End of Boring at 30.5.	

Depth scale: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41

PID - MiniRAE 2000

Baker

STRATIGRAPHIC SYMBOLS

Granular soils

- Gravel
- Gravel, Sandy
- Gravel, Silty
- Gravel, Clayey
- Sand
- Sand, Gravelly
- Sand, Silty
- Sand, Clayey

Cohesive Soils

- Silt
- Silt, Gravelly
- Silt, Sandy
- Silt, Clayey
- Clay
- Clay, Gravelly
- Clay, Sandy
- Clay, Silty

Miscellaneous Materials

- Cobbles, Boulders
- Slag
- Water
- Peat or Muck
- Concrete
- Wood
- Topsoil
- Void
- Coarse Waste
- Fill
- Asphalt
- Fine Waste

Sedimentary Rocks

- Conglomerate
- Shale
- Calcareous Sandstone
- Marl
- Shaley Limestone
- Shaley Sandstone
- Silty Dolomite
- Breccia
- Chert
- Limestone
- Coal
- Carbonaceous Shale
- Quartz
- Dolomitic Limestone
- Sandstone
- Claystone
- Dolomite
- Mudstone
- Shaley Dolomite
- Carbonaceous Limestone
- Siltstone
- Silty Sandstone
- Chalk
- Argilaceous Limestone
- Fire Clay
- Cherty Limestone

Igneous Rocks

- Diabase
- Basalt
- Pegmatite
- Granite
- Igneous Rock

Metamorphic Rocks

- Gneiss
- Quartzite
- Marble
- Schist
- Slate
- Soapstone, Talc, or Serpentine
- Phyllite
- Metamorphic Rock
- Gneissoid Granite
- Hornfels Porcelanite

- Undifferentiated Bedrock

TEMPLATE=8BKL_AB FILE=Site 1738.GEO DATE PRINTED=12/5/2012 S.O.#=125201

Well Detail and Sampling Logs

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW01 DATE: 8/18/12

PROJECT: MTBE Site Characterization WEATHER: Sun+ Clouds, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: None PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: None Water over PVC? Y/N (N)

Casing (outer): NA Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup (Flushmount)

Comments:

(OTHER):

Static Water Level (ft.): 19.86 Time: 0935 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 19.84 Time: 0952 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 34.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Opened:

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 34.0 Screened Interval (ft.): 19 to 34

Pump Intake Set @ (ft.): 28 Controller Settings / Pressure: 10/5 ~20psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW01-12C Dup.: Y/N (N) (ID#:)

Sample Time: 1050 MS / MSD: Y/N (N) Field Filtered: Y/N (N)

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40 ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1730MW01
DATE: 8/18/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gariglia
SAMPLE ID: 1730MW01-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0952	19.84	- (Water Level : Post-Pump Installation, Pre-Start)								
1006	- (Start of Purging)									
1010	20.04	800	280	28.7	2.647	4.26	6.93	-57.0	3.93	Clear
1014	20.04	1600	200	28.6	2.654	3.44	6.94	-67.1	3.0	
1017	20.04	2400	270	28.6	2.659	2.83	6.95	-63.2	2.12	
1022	20.04	3600	240	28.6	2.665	2.42	6.97	-63.6	1.97	
1028	20.04	5200	270	28.6	2.678	2.15	7.00	-64.4	1.63	
1035	20.04	7000	260	28.6	2.688	1.82	7.01	-61.3	1.47	
1041	20.04	8400	230	28.7	2.696	1.74	7.02	-61.0	1.33	
1046	20.04	9600	240	28.7	2.699	1.80	7.02	-60.0	1.30	
1100	19.97									Water level after sampling
1050	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW01A DATE: 8/10/2012

PROJECT: MtBE Site Characterization WEATHER: M. Cloudy, Lt E wind, mid 80's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: N/A Cover Bolts: N/A Water over PVC? Y/N (N circled)

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 22.18 Time: 0938 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 22.28 Time: 1002 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 27.53 Time: from development

PID Reading (PPM) - Unopened: 0 Opened: 595

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 25 Screened Interval (ft.): 15-25

Pump Intake Set @ (ft.): 25-27' Controller Settings / Pressure: 10/5 20 psi

Comments: Could not get flow rate <100 mL/min; could not stabilize water level

SAMPLE DATA

Sample ID #: 1738MW01A-12C Dup.: Y / N (N circled) (ID#:)

Sample Time: 1115 MS / MSD: Y / N (N circled) Field Filtered: Y / N (N circled)

Sampled By: M DeJohn Signature: [signature]

Sample Description: Cloudy, gray

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH DRO
40 mL Vial, glass	3	HCl	TPH GRO
40 mL Vial, glass	3	HCl	BTEX, MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW01A
DATE: 8/18/2012
PROJECT: MEBE Site Characterization

SAMPLER (s): MDeJohn
SAMPLE ID: 1738MW01A-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1002	22.28	- (Water Level : Post-Pump Installation, Pre-Start)								
1003	- (Start of Purging)		200	24.09	2.122	1.19	7.04	-91.9	863	
1010	23.10	900	~~200~~	29.01	2.116	0.97	7.02	-100.3	976	
1015	23.16	1150	~~150~~	29.45	2.122	0.95	7.02	-97.9	995	
1020	22.66	1750	120	29.44	2.120	0.77	7.01	-99	—	Not pumping
1030	23.14	2000	200	29.82	2.134	1.39	7.02	-87.5	>1000	
1035	23.34	3300	260	28.75	2.119	0.60	6.97	-88.9	577	
1040	(?)	4300	200	28.69	2.113	0.38	6.96	-83.2	554	Below top of pump
1045	(?)	5300	200	28.77	2.124	0.35	6.96	-88.7	>1000	
1050	(?)	6300	200	28.77	2.123	0.32	6.96	-94.1	—	Not pumping
1100	(?)	7000	100	~~29~~ 29.7	2.131	0.42	6.97	-91.4	>1000	
1105	(?)	7500	100	29.3	2.135	0.47	6.95	-80.6	>1000	
1110	(?)	8000	100	28.9	2.128	0.45	6.97	-104	>1000	Well is dry; wait to recharge
	24.38									Post purge/sample
1115	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW01B DATE: 8/18/12

PROJECT: MTBE Site Characterization WEATHER: Clouds & Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: N/A Water over PVC? Y / N

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 22.64 Time: 1148 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 22.63 Time: 1201 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 65.4 Time: From Well Development

PID Reading (PPM) - Unopened: Bksd Opened: 4.0

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 61.8 Screened Interval (ft.): 51.8 - 61.8

Pump Intake Set @ (ft.): 60 Controller Settings / Pressure: 10/5 ~ 20psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW01B-12C Dup.: Y / N (ID#:)

Sample Time: 1315 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: Dave Gaviglia Signature: Dave M. Gaviglia

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW-01B
DATE: 8/18/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW01B-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1201	22.63	- (Water Level : Post-Pump Installation, Pre-Start)								
1223	- (Start of Purging)									
1226	22.58	500	200	30.3	3.569	2 50.38	7.03	4.7	34.6	Clear
1237	22.58	3000	230	29.8	3.503	2.40	7.08	-2.8	22.2	
1243	22.58	4800	300	29.6	3.475	2.68	7.10	1.8	13.5	
1247	22.58	5700	230	29.6	3.470	2.88	7.11	4.5	11.5	
1253	22.58	7200	250	29.5	3.458	3.12	7.12	6.4	9.58	
1259	22.58	8800	270	29.5	3.475	3.19	7.13	9.3	9.24	
1306	22.58	10800	290	29.5	3.458	3.31	7.13	11.5	8.7	
1311	22.58	12,000	240	29.5	3.461	3.50	7.14	11.9	7.1	
1326	22.62									Water level after sampling
1315	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW02 DATE: 8/18

PROJECT: MtBE site characterization WEATHER: P. sunny, lt E wind, near 90°

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G | Well Cap: G | PVC Locking Cap/Plug: F

Cap Lock: none | Cover Bolts: Missing | Water over PVC? Y / N (Y circled)

Casing (outer): G | Casing (inner): G | SWL Reference Mark: F | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup (Flushmount circled)

Comments:

(OTHER): Static Water Level (ft.): 18.48 Time: 1215 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 18.48 Time: 1238 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 33.0 Time: From MNA reports

PID Reading (PPM) - Unopened: 0 Opened: 10

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 33 Screened Interval (ft.): 18-33

Pump Intake Set @ (ft.): 28 Controller Settings / Pressure: 10/5 20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW02-12c Dup.: Y / N (N circled) - (ID#:)

Sample Time: 1400 MS / MSD: Y / N (N circled) Field Filtered: Y / N (N circled)

Sampled By: M DeJohn Signature: [signature]

Sample Description: Clear, w/ sl. petroleum odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH-DRO
40mL vial, glass	3	HCl	TPH GRO
40mL vial, glass	3	HCl	BTEX / MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW02
DATE: 8/18/12
PROJECT: MtBE Site Characterization

SAMPLER (s): M DeJohn
SAMPLE ID: 1738MW02-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1238	18.48	- (Water Level : Post-Pump Installation, Pre-Start)								
1242	- (Start of Purging)		—	30.40	1.766	3.40	6.66	-79	352	
1245	20.00	500	170	30.0	1.771	1.97	6.63	-87.9	26	
1250	20.00	1700	240	29.5	1.767	0.72	6.59	-84.2	21.2	
1255	20.00	2800	220	29.6	1.764	0.56	6.59	-85	19.9	
1300	20.02	3500	140	29.5	1.767	0.57	6.60	-84.5	16.9	
1305	20.21	4700	240	29.3	1.761	0.43	6.59	-94.8	25.3	
1310	20.15	5800	220	29.5	1.751	0.37	6.59	-79.2	52.3	
1315	20.14	6700	180	29.5	1.745	0.39	6.59	-58.5	48.9	
1320	20.03	7500	160	29.6	1.740	0.39	6.60	-55.7	39.0	
1325	20.04	8500	200	29.5	1.736	0.37	6.60	-56.1	33.3	
1330	20.10	9400	180	29.4	1.732	0.35	6.60	-45.5	24.3	
1335	20.04	10400	200	29.4	1.727	0.34	6.60	-38.4	20.4	
1340	20.05	11400	200	29.4	1.725	0.32	6.60	-35.7	18.5	
1345	20.10	12300	180	29.3	1.723	0.29	6.59	-32.2	16.4	
1350	20.12	13300	200	29.3	1.721	0.29	6.59	-31.2	13.1	
1355	20.10	14400	220	29.3	1.720	0.28	6.59	-30.6	14.6	
1358	20.10	14900	170	29.2	1.720	0.28	6.59	-28.6	14.3	
1409	20.00									Post purge & sample
1400	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW02R DATE: 8/19/12

PROJECT: MTBE Site Characterization WEATHER: Clouds + Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G | Well Cap: G | PVC Locking Cap/Plug: G

Cap Lock: None | Cover Bolts: N/A | Water over PVC? Y/(N)

Casing (outer): G | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 21.42 Time: 0938 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 21.41 Time: 1000 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 42.32 Time: From Well Development

PID Reading (PPM) - Unopened: Bkgd Opened: 283

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 40.0 Screened Interval (ft.): 30-40

Pump Intake Set @ (ft.): 35.0 Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW02R-12C Dup (Y)/N - (ID#: 1738MW02R-D-12C)

Sample Time: 1205 MS / MSD: (Y)/N Field Filtered: Y/(N)

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Slightly cloudy, then clear, Fuel odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1 L Amber glass	2	HCl	TPH-DRO
40 ml vial, glass	3	HCl	TPH-GRO
40 ml vial, glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW02R
DATE: 8/19/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738 MW02R-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1000	21.41	- (Water Level : Post-Pump Installation, Pre-Start)								
1023	- (Start of Purging)									
1024	21.51	500	280	30.4	3.755	2.45	6.48	-103.7	113	Slightly Cloudy, fuel odor
1030	21.51	1800	220	30.0	3.721	0.84	6.50	-128.5	64.7	
1036	21.53	3000	200	30.1	3.705	0.54	6.53	-126.6	46.0	
1044	21.53	4800	230	30.1	3.699	0.44	6.56	-115.5	97.0	
1052	21.53	6400	200	30.2	3.712	0.46	6.62	-102.2	107.0	
1059	21.53	7600	170	30.2	3.715	0.48	6.64	-88.8	81.8	
1106	21.53	9000	200	30.4	3.708	0.50	6.66	-74.2	60.4	
1118	21.53	11000	170	30.4	3.707	0.55	6.68	-60.2	45.3	
1124	21.53	12200	200	30.3	3.701	0.60	6.69	-47.9	38.4	
1143	21.53	15000	150	30.2	3.672	0.67	6.72	-27.4	30.0	Time lapse due to Bee Attack
1147	21.53	15800	200	30.4	3.667	0.68	6.72	-24.0	26.9	
1152	21.53	16600	160	30.5	3.678	0.70	6.73	-22.1	23.8	
1157	21.53	17600	200	30.4	3.673	0.74	6.73	-19.6	23.7	
1202	21.53	18200	120	30.5	3.669	0.73	6.74	-18.9	23.1	
1300	21.45									Water level after Sampling
1205	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW03 DATE: 8/18/12

PROJECT: MTBE Site Characterization WEATHER: Clouds + Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap Missing PVC Locking Cap/Plug G

Cap Lock None Cover Bolts Missing Water over PVC? Y/N

Casing (outer) N/A Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount/ Stickup

Comments:

(OTHER): Static Water Level (ft.): 19.96 Time: 1412 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 19.86 Time: 1427 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 30.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: 144

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 30 Screened Interval (ft.): 15-30

Pump Intake Set @ (ft.): 25 Controller Settings / Pressure: 10/5 ~ 20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW03-12C Dup.: Y/N - (ID#:)

Sample Time: 1620 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: Dave Gaviglia Signature:

Sample Description: Clear, Fuel odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW03
DATE: 8/18/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: Clouds + Sun, 90s

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1427	19.86	- (Water Level : Post-Pump Installation, Pre-Start)								
1440	- (Start of Purging)									
1444	20.44	600	210	29.9	3.559	1.13	6.74	-79.9	34.4	Clear. Adjust flow rate
1456	20.26	1200	50	30.4	3.563	0.88	6.78	-76.0	99.4	due to dropping water level
1503	20.21	1800	90	30.5	3.557	0.73	6.78	-75.3	85.8	Fuel odor
1510	20.21	2400	90	30.7	3.554	0.72	6.78	-73.3	65.5	
1519	20.15	3000	70	31.3	3.545	0.63	6.78	-76.6	39.9	
1529	20.10	3400	40	31.8	3.548	0.61	6.78	-78.8	32.5	
1538	20.21	4200	90	30.7	3.523	0.66	6.77	-79.2	23.5	
1547	20.20	4900	90	30.5	3.506	0.69	6.78	-77.4	21.0	
1559	20.19	5800	50	31.0	3.492	0.70	6.78	-67.8	16.9	
1607	20.19	6400	80	30.9	3.482	0.72	6.79	-70.4	21.4	
1613	20.19	6800	50	30.7	3.475	0.75	6.79	-71.1	21.8	
1615	20.19	7000	100	30.7	3.473	0.76	6.79	-70.2	22.2	
1643	20.19									Water level after sampling
1620	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

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WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW04 DATE: 8/18/2012

PROJECT: MtBE Site Characterization WEATHER: M. Cloudy, lt E wind, low 90's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F | Well Cap: G | PVC Locking Cap/Plug: G

Cap Lock: None | Cover Bolts: 1 of 2 | Water over PVC? Y / N (Y circled)

Casing (outer): G | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup (Flushmount circled)

Comments:

(OTHER):

Static Water Level (ft.): 20.77 Time: 1447 (Pre-Pump Installation)

Depth to Product (ft.): none

Water Level (ft.): 20.51 Time: ~~14~~58 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 29.50 Time: From MNA reports

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 28.5 Screened Interval (ft.): 18.5 - 28.5

Pump Intake Set @ (ft.): 24.5 Controller Settings / Pressure: 10/5 18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW04-12C Dup.: Y / N (N circled) (ID#:)

Sample Time: 1555 MS / MSD: Y / N (N circled) Field Filtered: Y / N (N circled)

Sampled By: MDeJohn Signature: [signature]

Sample Description: No odor, clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH DRO
40 mL vial, glass	3	HCl	TPH GRO
40 mL vial, glass	3	HCl	BTEX / MtBE

GENERAL COMMENTS

Final DTW was below top of pump

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW04
DATE: 8/18/2012
PROJECT: MtBE Site Characterization

SAMPLER (s): M DeJohn
SAMPLE ID: 1738MW04-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1458	20.51	- (Water Level : Post-Pump Installation, Pre-Start)								
	- (Start of Purging)									
1500	21.20	0	–	30.4	1.183	3.58	7.03	61.1	–	
1505	21.30	1100	220	30.1	1.169	1.83	6.93	63.0	289	
1510	21.33	1600	100	30.4	1.166	1.88	6.94	61.1	163	Flow rate is at lowest w/o stopping
1515	21.45	2500	180	30.0	1.164	1.64	6.93	60.7	80.1	
1520	21.57	3300	160	30.1	1.167	1.63	6.93	60.8	61.3	
1525	21.67	3900	120	30.0	1.173	1.50	6.93	60.5	39.5	
1530	21.80	4500	120	29.9	1.177	1.45	6.93	61.0	30.3	
1535	21.85	5200	140	30.0	1.183	1.50	6.94	60.1	25.4	
1540	21.96	5900	140	29.9	1.189	1.44	6.94	59.4	25.9	
1545	21.98	6400	100	30.0	1.194	1.45	6.94	58.8	23.9	
1550	22.15	7500	220	29.6	1.199	1.46	6.92	60.2	24.3	
1555	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [illegible]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW05 DATE: 8/22/12

PROJECT: MTBE Site Characterization WEATHER: Clouds & Sun w/ Rain 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap P PVC Locking Cap/Plug F

Cap Lock None Cover Bolts N/A Water over PVC? Y / N

Casing (outer) P Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 9.14 Time: 1324 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 8.69 Time: 1342 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 10.5 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: GeoTech Model CF

From Boring Log: Total Depth (ft.): 10.5 Screened Interval (ft.): 3.5 to 10.5

Pump Intake Set @ (ft.): 8.5 Controller Settings / Pressure: 10-5 / 18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW05-12C Dup.: Y / N (ID#:)

Sample Time: 1450 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: D. Gaviglia Signature: [signature]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml Glass	3	HCl	BTEX + MTBE
40 ml Glass	3	HCl	TPH-GRO
1L Amber Glass	2	HCl	TPH-DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW05

DATE: 8/22/12

PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia

SAMPLE ID: 1738MW05-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1342	8.69	- (Water Level : Post-Pump Installation, Pre-Start)								
1352	- (Start of Purging)									
1354	9.95	300	200	29.0	17.18	1.21	7.00	523.0	23.2	Adjust flow rate due to falling
1359	9.80	580	60	29.8	17.14	0.79	7.02	522.0	22.1	water level
1404	9.73	750	34	30.2	17.08	0.68	7.03	496.3	23.9	Pump stopped, readjust rate
1409	9.95	1100	70	28.9	16.86	0.74	7.00	220.5	23.5	readjust rate
1414	10.14	1600	100	28.5	16.66	0.74	6.98	112.2	19.5	readjust rate
1419	9.92	1800	40	29.0	16.50	0.69	7.00	94.7	13.5	
1424	10.0	2200	80	28.9	16.47	0.79	7.00	91.2	11.7	Battery died. Got charged battery
1434	9.33	2470	50	29.5	16.20	0.80	7.00	74.6	10.3	
1439	9.94	2890	80	28.3	16.19	0.83	7.00	73.3	9.67	
1444	10.04	3220	70	28.5	16.11	0.84	7.00	72.1	8.89	
1500	10.29									water level after sampling
1450	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: D. Gaviglia

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW05L DATE: 8/24/12

PROJECT: MTBE Site Characterization WEATHER: Cloudy, Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap F PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N

Casing (outer) F Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 8.54 Time: 0948 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 8.44 Time: 1010 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 40.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: 0.3

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 40.0 Screened Interval (ft.): 30 to 40

Pump Intake Set @ (ft.): 35 Controller Settings / Pressure: 10/5 ~ 20psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW05L Dup.: Y/N (ID#:)

Sample Time: 1135 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Cloudy, then clearing

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW05L
DATE: 8/24/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW05L-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1010	8.44	- (Water Level : Post-Pump Installation, Pre-Start)								
1037	- (Start of Purging)									Clear
1039	8.98	450	370	27.2	16.45	2.17	11.11	113.8	391	[illegible] Adjust rate
1044	8.87	1400	196	27.2	16.86	1.08	10.47	118.3	316	due to falling water level
1048	8.87	2100	140	27.3	16.87	0.95	10.12	119.6	256	Cloudy
1053	8.86	3000	180	27.3	16.73	0.90	10.10	124.2	121	
1058	8.86	3800	160	27.3	16.55	0.83	10.06	124.4	55	
1103	8.89	4700	180	27.3	16.39	0.77	9.92	122.8	34.8	
1108	8.88	5500	160	27.3	16.35	0.69	9.94	122.1	20.5	
1113	8.87	6400	180	27.3	16.92	0.65	9.38	119.1	14.7	
1118	8.87	7200	160	27.4	16.55	0.61	9.45	117.4	12.2	
1123	8.88	8000	160	27.4	16.62	0.59	9.31	115.2	8.75	
1128	8.88	8900	180	27.3	16.65	0.57	9.30	113.6	7.98	
1133	8.88	9750	170	27.3	16.71	0.55	9.32	112.9	7.43	
1155	8.70									Water level after sampling
1135	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW05R DATE: 8/24/12

PROJECT: MTBE Site Characterization WEATHER: Clouds & Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: P Well Cap: P PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: N/A Water over PVC? Y / N

Casing (outer): P Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 7.75 Time: 1206 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 7.67 Time: 1222 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 24.5 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: 7.0

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 24.5 Screened Interval (ft.): 14.5 to 24.5

Pump Intake Set @ (ft.): 22.5 Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW05R-12C Dup.: Y / N (ID#:)

Sample Time: 1330 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Cloudy, lt. brown, then clearing

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW05R
DATE: 8/24/13
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW85R

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1222	7.67	- (Water Level : Post-Pump Installation, Pre-Start)								
1231	- (Start of Purging)									
1233	8.05	750	210	27.3	9.036	1.74	11.15	201.6	648	Cloudy, lt. brown
1238	7.95	1200	90	27.41	9.044	0.85	13.06	177.7	542	
1243	7.96	1700	100	27.3	9.037	0.62	11.46	156.6	359	
1248	7.98	2300	[illegible]	26.7	[illegible]	[illegible]	[illegible]	[illegible]	138	
1253	7.98	3100	[illegible]	26.5	8.914	0.56	10.40	[illegible]	89.9	
1258	7.98	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	68.	
1303	7.98	4500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	59.9	
1308	8.00	5300	[illegible]	26.4	8.910	0.53	9.82	144.	38.5	
1313	8.01	6000	100	26.5	8.902	0.60	9.45	143.0	34.4	
1318	8.01	6750	100	26.4	8.89	0.60	9.19	142.3	29.4	
1323	8.01	7750	100	26.4	8.882	0.62	9.1	142.5	29.4	
1328	8.01	8300	100	26.3	8.885	0.62	9.1	140.0	28.2	
1346	7.93									Water level after sampling
1330	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

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WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW06 DATE: 8/26/12

PROJECT: MTBE Site Characterization WEATHER: Clouds w/ Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F Well Cap: P PVC Locking Cap/Plug: F

Cap Lock: None Cover Bolts: N/A Water over PVC? Y/(N)

Casing (outer): P Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 10.56 Time: 0946 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 9.96 Time: 0958 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 15.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 15.0 Screened Interval (ft.): 5 to 15

Pump Intake Set @ (ft.): 13.0 Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW06-12C Dup.: Y/(N) (ID#:)

Sample Time: 1105 MS / MSD: Y/(N) Field Filtered: Y/(N)

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1 L Amber Glass	2	HCl	TPH-DRO
40 ml vial, Glass	3	HCl	TPH-GRO
40 ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738mw06
DATE: 8/28/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviola
SAMPLE ID: 1738mw06-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0958	9.96	- (Water Level : Post-Pump Installation, Pre-Start)								
1010	- (Start of Purging)									
1012	11.99	200	170	27.6	9.526	2.53	6.81	155.7	9.97	Clear. Adjust flow rate due
1017	11.52	700	100	27.6	9.563	1.33	6.80	169.1	6.67	to falling water level
1022	11.54	1150	90	27.7	9.521	1.05	6.81	217.2	6.64	Cannot sustain a steady flow
1027	11.70	1600	90	27.5	9.269	1.24	6.85	259.1	5.10	rate, pump keeps shutting off
1032	11.88	2300	140	27.6	8.846	1.60	6.90	288.6	4.91	
1037	11.84	2800	100	27.6	8.634	1.58	6.92	279.2	3.06	
1042	12.0	3350	110	27.5	8.025	1.58	6.97	267.9	3.31	
1047	11.92	3850	100	27.5	7.673	1.65	6.99	235.3	3.21	
1052	11.83	4300	90	27.5	7.363	1.63	7.01	205.5	3.01	
1057	11.79	4800	100	27.5	7.558	1.68	7.01	210.3	2.97	
1102	11.74	5180	80	27.6	7.329	1.67	7.01	209.8	2.78	
1125	12.01									Water level after sampling
1135	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW07 DATE: 8/25/12

PROJECT: MTBE Site Characterization WEATHER: Clouds + Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: P | Well Cap: F | PVC Locking Cap/Plug: G

Cap Lock: None | Cover Bolts: N/A | Water over PVC? Y/N (N circled)

Casing (outer): F | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 6.57 Time: 0954 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 5.91 Time: 1006 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 25.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CF

From Boring Log: Total Depth (ft.): 25 Screened Interval (ft.): 15 to 25

Pump Intake Set @ (ft.): 20 Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW07-12C Dup. Y/N (Y circled) - (ID#: 1738MW07D-12C)

Sample Time: 1105 MS / MSD: Y N (Y circled) Field Filtered: Y/N (N circled)

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description:

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml Vial, Glass	3	HCl	TPH-GRO
40ml Vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW07
DATE: 8/25/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gavialis
SAMPLE ID: 1738MW07-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1006	5.91	- (Water Level : Post-Pump Installation, Pre-Start)								
1021	- (Start of Purging)									
1022	7.53	400	220	27.4	17.76	2.53	6.49	79.0	116	Slightly Cloudy, Adjust flow
1027	7.88	1330	190	27.3	17.74	1.03	6.49	77.3	75.3	rate due to falling water level
1032	7.82	1800	90	27.8	17.70	0.84	6.49	75.6	45.8	
1037	7.80	2600	160	27.6	17.74	0.67	6.49	74.9	33.2	
1042	7.77	3200	120	27.7	17.71	0.71	6.50	73.6	23.5	
1047	7.74	3800	120	27.7	17.70	0.63	6.50	73.1	15.0	
1052	7.74	4500	140	27.7	17.71	0.70	6.50	73.1	17.3	
1057	7.74	5100	120	27.7	17.69	0.71	6.50	73.0	16.3	
1102	7.74	5600	100	27.7	17.68	0.73	6.50	72.9	15.4	
1214	7.63									water level after Sampling
1105	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

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WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW07A　　DATE: 8/24/12

PROJECT: MTBE Site Characterization　　WEATHER: Cloudy & Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G　　Well Cap: G　　PVC Locking Cap/Plug: G

Cap Lock: None　　Cover Bolts: N/A　　Water over PVC? Y/(N)

Casing (outer): G　　Casing (inner): G　　SWL Reference Mark: G　　Reference Mark Location? PVC

Casing Dia.: 2"　　Casing Material: PVC　　Flushmount / (Stickup)

Comments:

(OTHER):

Static Water Level (ft.): 6.99　　Time: 1510 **(Pre-Pump Installation)**

Depth to Product (ft.): None

Water Level (ft.): 6.36　　Time: 1523 **(Post-Pump Installation, Pre-Purge)**

Total Well Depth (ft.) - Post Sampling: 13.46　　Time: From well development

PID Reading (PPM) - Unopened: Bkgd　　Opened: 1.6

PURGE DATA

Pump Type: GeoTech CF

From Boring Log:　　Total Depth (ft.): 10.3　　Screened Interval (ft.): 5.3 to 10.3

Pump Intake Set @ (ft.): 10　　Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW07A-12C　　Dup.: Y/(N) - (ID#:)

Sample Time: 1620　　MS / MSD: Y/(N)　　Field Filtered: Y/(N)

Sampled By: Dave Gaviglia　　Signature: [signature]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW07A
DATE: 8/24/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D Gavisle
SAMPLE ID: 1738MW07A-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1523	6.36	- (Water Level : Post-Pump Installation, Pre-Start)								
1526	- (Start of Purging)									
1531	7.39	550	200	26.7	11.21	1.90	[illegible]	[illegible]	2.93	Clear. Adjust flowrate
1536	8.45	1150	120	26.9	11.14	1.95	6.3[illegible]	35.7	2.56	due to falling water level. Set
1541	8.73	1650	100	27.0	11.15	2.35	6.34	21.5	3.69	to lowest rate
1546	8.71	2150	100	27.0	11.18	2.46	6.35	19.5	1.98	
1552	8.70	3150	150	27.1	11.24	2.36	6.39	16.2	1.79	
1557	8.74	3900	150	27.1	11.26	2.74	6.39	14.5	1.33	
1602	8.74	4900	200	27.2	11.33	2.55	6.38	13.3	0.99	
1607	8.74	5550	130	27.2	11.38	2.43	6.38	12.7	0.96	
1612	8.79	5800	50	27.1	11.43	2.37	6.38	12.3	0.92	
1629	8.72									Water level after sampling
1620	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW07B DATE: 8/25/12

PROJECT: MTBE Site Characterization WEATHER: Cloudy + Rain, 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: N/A Water over PVC? Y/N (N circled)

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 6.63 Time: 1228 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 6.01 Time: 1304 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 48.93 Time: From Well Development

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 44.8 Screened Interval (ft.): 30 to 40

Pump Intake Set @ (ft.): 39 Controller Settings / Pressure: 10/5 ~ 20psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW07B-12C Dup.: Y/N (N circled) (ID#:)

Sample Time: 1440 MS / MSD: Y/N (N circled) Field Filtered: Y/N (N circled)

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Cloudy

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW07B
DATE: 8/25/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gavaglia
SAMPLE ID: 1738MW07B-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1304	6.01	- (Water Level : Post-Pump Installation, Pre-Start)								
1323	- (Start of Purging)									
1325	7.10	400	220	27.5	25.67	269.20	6.44	69.7	841	Cloudy. Adjust flow rate
1330	6.97	1000	120	27.6	26.08	1.29	6.40	69.5	813	due to falling water level
1335	6.34	1250	50	29.0	26.11	0.92	6.40	69.7	783	
1340	6.88	1570	60	28.2	26.19	0.85	6.39	70.5	739	
1345	6.93	2000	90	27.8	26.25	0.81	6.39	71.7	564	
1350	6.96	2450	90	27.7	26.22	0.72	6.39	72.4	498	
1355	6.97	2930	96	27.7	26.17	0.82	6.40	73.0	403	
1400	6.97	3350	84	27.7	26.14	0.72	6.40	73.2	290	
1405	6.93	3800	90	27.7	26.12	0.72	6.40	73.5	221	
1410	6.98	4200	80	27.6	26.10	0.74	6.41	74.2	95.9	
1415	6.98	4650	90	27.5	26.10	0.74	6.41	74.8	83.2	
1420	7.00	5100	90	27.5	26.09	0.84	6.41	75.2	75.7	
1425	7.01	5600	100	27.5	26.04	0.75	6.41	75.9	69.8	
1430	7.01	6000	80	27.6	26.03	0.84	6.41	76.0	67.5	
1435	7.02	6550	110	27.6	26.02	0.75	6.41	76.1	63.5	
1500	7.00									Water level after sampling
1440	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW08 DATE: 8/21/12

PROJECT: MTBE Site Characterization WEATHER: Clouds & Sun w/ Rain, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad F Well Cap F PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N

Casing (outer) F Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 7.18 Time: 1205 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 6.79 Time: 1219 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 24.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 24.0 Screened Interval (ft.): 14-24

Pump Intake Set @ (ft.): 19 Controller Settings / Pressure: 10/5 ~20psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW08-12C Dup.: Y/N (ID#:)

Sample Time: 1350 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Cloudy

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40 ml vial, Glass	3	HCl	TPH-GRO
40 ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW08
DATE: 8/21/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gavidia
SAMPLE ID: 1738MW08-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1219	6.74	- (Water Level : Post-Pump Installation, Pre-Start)								
1236	- (Start of Purging)									
1238	8.48	500	280	27.5	31.47	2.20	5.90	138.2	282	Adjust flow rate due to falling
1243	8.23	1100	80	28.2	31.41	1.79	5.93	140.3	324	water level
1248	8.01	1500	80	28.9	31.49	1.56	5.94	139.5	326	Adjust rate
1253	8.63	2000	100	28.6	31.51	1.56	5.94	138.8	330	
1258	8.13	2500	100	28.2	31.27	2.01	5.97	138.6	343	Adjust rate
1303	7.97	2800	60	28.7	31.14	2.09	5.99	144.4	355	
1308	7.88	3180	80	28.7	31.19	2.21	5.99	154.7	360	
1313	7.87	3400	80	28.2	31.17	2.26	5.98	161.6	350	
1319	7.93	3800	80	27.8	31.03	2.65	6.00	160.9	[illegible]	Pause due to heavy rain
[illegible]	[illegible]	4750	80	26.8	30.95	3.19	6.00	[illegible]	[illegible]	
1332	[illegible]	5200	90	26.5	30.31	3.56	6.03	[illegible]	255	
1337	8.05	5750	90	26.6	30.72	3.37	6.03	199.9	202	Readjust rate
1342	8.19	6100	70	26.5	30.38	3.30	6.01	203.1	254	
1347	8.44	7100	200	26.5	30.76	3.36	6.03	205.6	252	
1405	8.37									Water level after Sampling
1350	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW08A　　DATE: 8/22/12

PROJECT: MTBE Site Characterization　　WEATHER: Clouds & Sun w/ Rain 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G　Well Cap: G　PVC Locking Cap/Plug: G

Cap Lock: None　Cover Bolts: N/A　Water over PVC? Y / N (N circled)

Casing (outer): G　Casing (inner): G　SWL Reference Mark: G　Reference Mark Location? PVC

Casing Dia.: 2"　Casing Material: PVC　Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 7.44　Time: 1107 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 7.12　Time: 1115 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 13.63　Time: From Well Development

PID Reading (PPM) - Unopened: Bkgd　Opened: 0.7

PURGE DATA

Pump Type: GeoTech Model CE

From Boring Log: Total Depth (ft.): 13.63　Screened Interval (ft.): 8.63 - 13.63

Pump Intake Set @ (ft.): 11　Controller Settings / Pressure: 10-5 / 18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW08A-12　Dup.: Y / N (N circled) (ID#:)

Sample Time: 1230　MS / MSD: Y / N (N circled)　Field Filtered: Y / N (N circled)

Sampled By: D. Gavliglia　Signature: Dan M. Gg[illegible]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml Glass	3	HCl	BTEX & MTBE
40 ml Glass	3	HCl	TPH-GRO
1L Amber Glass	2	HCl	TPH-DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 MW08A

DATE: 8/22/12

PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia

SAMPLE ID: 1738MW08A-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1115	7.12	- (Water Level : Post-Pump Installation, Pre-Start)								
1130	- (Start of Purging)									
1132	7.93	500	350	28.7	17.28	1.01	7.21	-62.0	4.11	Adjust flow rate due to falling
1137	7.63	760	50	29.7	17.29	0.82	7.23	-32.8	3.28	water level
1142	7.68	960	40	29.7	17.38	0.93	7.21	-37.9	3.43	Adjust rate-stopped pumping
1147	7.79	1600	120	28.8	17.39	0.76	7.18	-33.6	2.85	Readjust
1152	7.78	2200	120	29.3	17.40	0.73	7.17	-33.6	2.50	
1158	7.72	2750	110	29.7	17.48	0.71	7.16	-47.8	2.35	
1203	7.69	3000	50	29.9	17.50	0.68	7.16	-49.3	1.88	
1208	7.59	3150	30	31.1	17.53	0.73	7.16	-31.5	2.35	Pump stopped, Readjust flow
1213	7.69	3450	60	30.3	17.64	0.72	7.15	-43.0	1.65	
1218	7.69	3760	60	30.5	17.62	0.69	7.15	-38.9	1.39	Pump stopped. readjust
1223	7.34	4550	158	29.1	17.64	0.73	7.15	-39.3	1.53	
1240	7.69									Water level after sampling
1238	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

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WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW08B | DATE: 8/21/12

PROJECT: MTBE Site Characterization | WEATHER: Clouds & Sun, Afternoon Storms, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G | Well Cap: G | PVC Locking Cap/Plug: G

Cap Lock: None | Cover Bolts: N/A | Water over PVC? Y/N (N circled)

Casing (outer): G | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC

Casing Dia.: 2" | Casing Material: PVC | Flushmount / Stickup (Stickup circled)

Comments:

(OTHER):

Static Water Level (ft.): 7.14 | Time: 1523 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 7.05 | Time: 1537 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 35.2 | Time: From Development

PID Reading (PPM) - Unopened: Bkgd | Opened: 3.0

PURGE DATA

Pump Type: Geotech Model CE

From Boring Log: Total Depth (ft.): 35.2 | Screened Interval (ft.): 25.2 to 35.2

Pump Intake Set @ (ft.): 30 | Controller Settings / Pressure: 10-5 / 18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW08B-12C | Dup.: Y/N (N circled) - (ID#:)

Sample Time: 1640 | MS / MSD: Y/N (N circled) | Field Filtered: Y/N (N circled)

Sampled By: D. Gaviglia | Signature: [signature]

Sample Description: Cloudy, lt. brown

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml Glass	3	HCl	BTEX + MTBE
40 ml Glass	3	HCl	TPH-GRO
1L Amber Glass	2	HCl	TPH-DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW08B
DATE: 8/21/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW08B-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1537	7.05	- (Water Level : Post-Pump Installation, Pre-Start)								
1546	- (Start of Purging)									
1549	7.68	1150	300	26.7	30.99	1.76	6.07	170.2	277	Cloudy, lt. brown
1554	7.77	2300	230	26.7	31.39	0.89	6.05	175.3	184	Adjust flow rate due to
1558	7.76	3400	270	26.8	31.63	0.7	6.04	177.3	317	falling water level
1603	7.77	4900	200	26.9	32.26	0.63	6.03	179.3	378	
1608	7.76	5600	240	26.9	33.90	0.65	6.02	181.0	836	
1613	7.77	6900	260	26.9	34.63	0.67	6.02	183.7	858	
1618	7.77	8250	270	26.9	34.83	0.68	6.02	184.9	699	
1623	7.77	9400	230	27.0	34.92	0.70	6.02	184.7	608	
1628	7.77	10600	240	27.2	35.01	0.69	6.02	183.7	580	
1633	7.77	11800	240	27.4	35.07	0.69	6.02	181.5	544	
1638	7.77	12000	240	27.51	35.11	0.70	6.02	180.6	523	
1654	7.68									Water level after sampling
1640	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW09 **DATE:** 8/20/12

PROJECT: MtBE Site Characterization **WEATHER:** Clouds & Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: F | Well Cap: F | PVC Locking Cap/Plug: G
Cap Lock: None | Cover Bolts: | Water over PVC? Y / (N)
Casing (outer): F | Casing (inner): G | SWL Reference Mark: G | Reference Mark Location? PVC
Casing Dia.: 2" | Casing Material: PVC | Flushmount / (Stickup)

Comments:

(OTHER):
Static Water Level (ft.): 7.41 Time: 1257 (Pre-Pump Installation)
Depth to Product (ft.): None
Water Level (ft.): 7.15 Time: 1310 (Post-Pump Installation, Pre-Purge)
Total Well Depth (ft.) - Post Sampling: 24.0 Time: From MNA Reports
PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 24 Screened Interval (ft.): 14-24

Pump Intake Set @ (ft.): 19 Controller Settings / Pressure: 10/5 / Varied, ≤20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW09-12C Dup.: Y / (N) - (ID#:)

Sample Time: 1420 MS / MSD: Y / (N) Field Filtered: Y / (N)

Sampled By: David Gaviglia Signature: [signature]

Sample Description: Cloudy, no odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH, DRO
40 mL vial, glass	3	HCl	TPH GRO
40 mL vial, glass	3	HCl	BTEX/MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW09
DATE: 8/20/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW09-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1310	7.15	- (Water Level : Post-Pump Installation, Pre-Start)								
1328	- (Start of Purging)									
1330	8.02	390	280	28.5	19.77	1.10	5.94	92.2	132	Slightly Cloudy
1338	7.83	1300	110	28.8	20.08	0.66	5.93	99.3	111	Adjust flow rate due to falling
1343	7.83	2100	160	28.7	19.94	0.71	5.94	103.5	70.1	water level
1348	7.83	2950	170	28.7	19.83	0.80	5.94	109.8	52.9	
1353	7.84	3800	170	28.6	19.78	0.89	5.95	113.4	62.3	
1358	7.88	4600	160	28.4	19.72	0.97	5.95	113.6	69.9	Adjust flow rate
1403	7.81	5350	150	28.8	19.82	1.00	5.95	113.0	77.2	
1408	7.79	6000	130	28.9	19.85	1.05	5.95	115.9	109	
1413	7.83	6800	160	28.8	19.85	1.08	5.95	116.3	112	
1418	7.84	7500	140	28.7	19.83	1.10	5.95	118.1	116	
1435	7.70									Water level after sampling
1420	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW09A DATE: 8/21/12

PROJECT: MTBE Site Characterization WEATHER: Clouds + Sun w/ Rain, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y / N

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 6.97 Time: 0950 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 6.16 Time: 0955 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 10.67 Time: from well development

PID Reading (PPM) - Unopened: Bkgd Opened: 0.3

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 10.3 Screened Interval (ft.): 5.3-10.3

Pump Intake Set @ (ft.): 8 Controller Settings / Pressure: 10/5 / varied, but <20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW09A-12C Dup.: Y / N - (ID#:)

Sample Time: 1107 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: David Gaviglia Signature: [signature]

Sample Description: Clear, no odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH DRO
40 mL vial, glass	3	HCl	TPH GRO
40 mL vial, glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW09A

DATE: 8/21/12

PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia

SAMPLE ID: 1738MW09A-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0955	6.16	- (Water Level : Post-Pump Installation, Pre-Start)								
1017	- (Start of Purging)									
1022	7.79	550	80	27.5	15.28	0.93	6.05	-43.5	27.7	clear
1027	8.11	750	40	27.6	15.18	0.93	6.07	-29.8	25.9	
1034	8.40	1000	40	28.6	14.82	1.07	6.10	-10.4	25.1	lower flow rate due to falling water
1038	8.34	1190	50	29.0	14.64	1.32	6.11	-2.6	24.0	level. 70 is the lowest rate.
1043	8.39	1350	30	29.4	14.35	1.34	6.13	8.7	21.5	
1048	8.49	1830	100	28.7	14.03	2.25	6.20	20.8	26.2	Try to readjust flow rate
1053	8.40	2350	100	29.2	13.49	2.59	6.24	39.2	22.6	
1058	8.35	2500	30	30.1	13.39	2.72	6.25	43.4	20.3	
1103	8.37	2600	30	30.8	13.37	2.55	6.25	47.4	19.9	
1105	8.37	2700	50	31.2	13.38	2.62	6.24	47.4	18.7	
1129	8.35									Water level after sampling
1107	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW09B DATE: 8/20/12

PROJECT: MtBE Site Characterization WEATHER: Clouds + Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: N/A Water over PVC? Y/(N)

Casing (outer): G Casing (inner): G SWL Reference Mark: G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount/(Stickup)

Comments:

(OTHER):

Static Water Level (ft.): 6.75 Time: 1452 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 6.59 Time: 1513 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 43.51 Time: From Well Development

PID Reading (PPM) - Unopened: Bkgd Opened: 1.9

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 40.8 Screened Interval (ft.): 30.8-40.8

Pump Intake Set @ (ft.): 36 Controller Settings / Pressure: 10/5 / Varied, but <20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW09B-12C Dup.: Y/(N) - (ID#:)

Sample Time: 1635 MS / MSD: Y/(N) Field Filtered: Y/(N)

Sampled By: David Gaviglia Signature: [signature]

Sample Description: Turbid, no odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH/DRO/ORO
40 mL vial, glass	3	HCl	TPH GRO
40 mL vial, glass	3	HCl	BTEX/MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW09B

DATE: 8/20/12

PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia

SAMPLE ID: 1738MW09B-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1513	6.59	- (Water Level : Post-Pump Installation, Pre-Start)								
1523	- (Start of Purging)									
1525	7.71	500	230	28.4	22.55	1.48	6.11	123.1	117	Slightly cloudy
1530	7.36	1150	130	29.8	22.56	0.85	6.12	108.0	99.8	Adjust flow rate due to
1535	7.31	1400	50	30.1	22.60	0.72	6.13	100.0	79.3	falling water level
1540	7.31	1750	70	29.8	22.65	0.65	6.14	92.8	75.5	
1545	7.32	2350	120	29.6	22.60	0.60	6.14	86.8	71.0	
1550	7.37	2800	90	29.3	22.54	0.58	6.13	82.2	115	Adjust flow rate
1558	7.21	3350	70	30.0	22.55	0.64	6.14	80.2	257	
1603	7.18	3600	50	29.9	22.62	0.67	6.14	79.5	288	
1608	7.19	4000	80	29.4	22.59	0.78	6.14	82.2	467	
1613	7.21	4350	70	29.2	22.55	0.85	6.13	86.3	512	
1618	7.21	4620	50	28.9	22.54	0.87	6.13	87.9	483	
1623	7.23	5050	80	28.7	22.50	0.88	6.13	88.2	465	
1628	7.23	5400	80	28.6	22.48	0.94	6.12	94.4	496	
1658	7.23									Water level after sampling
1635	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [illegible]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW10 DATE: 8/19/12

PROJECT: MTBE Site Characterization WEATHER: Clouds + Sun, 70s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad F Well Cap F PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N (N circled)

Casing (outer) F Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup (Stickup circled)

Comments:

(OTHER): Static Water Level (ft.): 8.62 Time: 1440 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 8.48 Time: 1445 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 25.0 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech Model CB

From Boring Log: Total Depth (ft.): 25.0 Screened Interval (ft.): 15.0 to 25.0'

Pump Intake Set @ (ft.): 20.0 Controller Settings / Pressure: 10-5 /18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW10-12C Dup.: Y/N (N circled) (ID#:)

Sample Time: 1605 MS / MSD: Y/N (N circled) Field Filtered: Y/N (N circled)

Sampled By: D. Gaviglia Signature: [signature]

Sample Description: Cloudy, lt. brown, medium turbidity

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml Glass	3	HCl	BTEX + MTBE
40 ml Glass	3	HCl	TPH-GRO
1L Amber Glass	2	HCl	TPH-DRO

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738 mw10

DATE: 8/19/12

PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia

SAMPLE ID: 1738 MW10-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1445	8.48	- (Water Level : Post-Pump Installation, Pre-Start)								
1510	- (Start of Purging)									
1512	8.32	300	180	29.3	12.31	2.95	6.11	253.9	715	Cloudy, lt. brown
1517	8.26	900	120	28.5	12.25	3.16	6.19	380.3	>1000	Med. Turb.
1523	8.28	1800	180	28.5	12.23	3.26	6.20	444.0	>1000	
1528	8.04	3000	240	27.7	12.17	3.95	6.25	448.1	>1000	
1533	8.10	4600	320	27.6	12.09	3.63	6.25	456.0	>1000	
1540	8.05	6820	440	27.5	11.04	3.43	6.26	455.4	>1000	
1545	8.05	8400	320	27.5	11.88	3.35	6.27	456.6	>1000	
1550	8.01	10000	320	27.5	11.82	3.28	6.28	453.8	>1000	
1555	8.01	11700	340	27.4	11.78	3.23	6.28	451.1	>1000	
1600	8.01	13100	280	27.4	11.76	3.19	6.28	450.8	>1000	
1616	8.62									water level after sampling
1605	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW11 DATE: 8/19/2012

PROJECT: MtBE Site Characterization WEATHER: P. Sunny, Mod E wind, mid 80's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: F PVC Locking Cap/Plug: G

Cap Lock: None Cover Bolts: 1 of 2 Water over PVC? Y / N

Casing (outer): G Casing (inner): G SWL Reference Mark: F Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 18.55 Time: 0941 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 18.55 Time: 0959 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 26.0 Time: ~~From MTBE report~~ stat

PID Reading (PPM) - Unopened: 0 Opened: 14.9

PURGE DATA

Pump Type: Geotech LE

From Boring Log: Total Depth (ft.): 26 Screened Interval (ft.): 16-26

Pump Intake Set @ (ft.): 22 Controller Settings / Pressure: 10/5 18 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW11-12C Dup.: Y / N (ID#:)

Sample Time: 1035 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: MKDeJohn Signature: [signature]

Sample Description: Clear, slight petroleum odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	2	HCl	TPH DRO
40 mL VOA glass	3	HCl	TPH GRO
40 mL VOA glass	3	HCl	BTEX/MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW11

DATE: 8/19/2012

PROJECT: MEBE Site Characterization

SAMPLER (s): M DeJohn

SAMPLE ID: 1738MW11-RC

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0958	18.55	- (Water Level : Post-Pump Installation, Pre-Start)								
0959	- (Start of Purging)			~~32.08~~	~~14.32~~	~~9.81~~	~~6.50~~	~~44.6~~		
1000	19.20	0	–	32.08	14.32	9.81	6.50	44.6	11.9	
1005	19.15	1000	200	31.4	14.56	1.93	6.52	25.9	6.0	
1010	19.05	1500	100	32.2	14.62	1.66	6.54	16.0	3.4	
1015	19.01	1600	20	32.2	14.71	1.54	6.52	15.5	2.5	temp flow stoppage
1020	19.10	2000	80	32.0	14.80	1.39	6.50	16.0	2.3	
1025	19.04	2400	80	32.1	14.86	1.50	6.52	14.6	2.6	
1030	19.14	2800	80	32.0	14.92	1.50	6.53	15.6	3.4	
1033	19.11	3000	70	32.1	14.91	1.47	6.53	15.8	3.4	
	19.14									post purge/sampling
										~~post purge/sampling~~
1035	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW12 DATE: 8/16/12

PROJECT: MTBE Site Characterization WEATHER: Sunny, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y / N

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 23.80 Time: 1229 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 23.68 Time: 1406 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 27.5 Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 27.5 Screened Interval (ft.): 17.5 to 27.5

Pump Intake Set @ (ft.): 25.5 Controller Settings / Pressure: 10/5 ~ 20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW12-12C Dup.: Y / N (ID#:)

Sample Time: 1608 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: Dave Gaviglia Signature: Da M. G

Sample Description: Cloudy, then clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738mw12
DATE: 8/16/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738mw12-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1406	23.68	- (Water Level : Post-Pump Installation, Pre-Start)								
1408	- (Start of Purging)									
1416	24.72	1400	300	29.0	8.197	2.69	6.90	69.5	615	Cloudy, lt. gray
1421	24.83	2800	280	29.1	8.180	2.01	6.87	67.6	331	Adjust flow rate due to dropping
1426	24.81	4000	240	29.1	8.198	1.81	6.86	67.2	151	water level. clearing
1430	24.80	5000	250	29.0	8.007	1.57	6.87	63.3	102	
1442	24.90	8000	250	29.0	7.929	1.52	6.87	62.5	52.4	
1452	24.78	10,000	200	29.0	7.762	1.43	6.87	61.1	34.8	clear
1457	24.80	11,400	280	29.0	7.640	1.42	6.88	59.7	23.3	
1504	24.80	13,100	240	29.0	7.561	1.50	6.88	59.2	21.1	
1513	24.80	15,000	210	29.0	7.455	1.54	6.89	58.9	13.2	
1522	24.81	17,200	240	29.0	7.358	1.59	6.89	58.3	10.1	
1527	24.80	18,400	240	29.0	7.306	1.56	6.89	58.4	10.3	
1534	24.81	20,000	230	29.0	7.213	1.54	6.89	58.5	8.65	
1538	24.81	21,000	250	29.0	7.201	1.55	6.89	58.3	8.53	
1542	24.81	22,000	250	29.0	7.196	1.51	6.89	57.8	6.92	
1549	24.81	23,600	230	29.0	7.132	1.60	6.89	56.8	6.16	
1557	24.81	25,400	230	29.0	7.079	1.59	6.89	55.2	6.07	
1605	24.82	27,400	250	29.0	7.059	1.62	6.89	55.4	5.64	
1613	24.79									Depth after Sampling
1608	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [illegible]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW13 DATE: 8/15/12

PROJECT: MTBE Site Characterization WEATHER: Sunny, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 22.59 Time: 0854 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 22.58 Time: 0925 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 38.85 Time: Well Development

PID Reading (PPM) - Unopened: Bkg Opened: 6.4

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 35.8 Screened Interval (ft.): 25.8 to 35.8

Pump Intake Set @ (ft.): 31.0 Controller Settings / Pressure: 10/5 ~ 20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW13-12C Dup.: Y/N (ID#:)

Sample Time: 1220 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: D. Gaviglia Signature: [signature]

Sample Description: Slightly cloudy, slight fuel odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml Glass	3	HCl	TPH-GRO
1 L Glass Amber	2	HCl	TPH-DRO
40 ml Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW13
DATE: 8/15/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gavialia / M DeJohn
SAMPLE ID: 1738MW13-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0925	22.53	- (Water Level : Post-Pump Installation, Pre-Start)								
0942	- (Start of Purging)									
0950	22.62	1000	200	30.0	2967	5.79	6.95	-63.7	844	
0953	22.64	2250	220	29.8	2950	3.79	6.96	-69.8	776	Cloudy, lt brown
1014	22.58	5000								
1134	22.65	—	—	31.8	3.745	3.95	7.05	43.1	518	Shut down - YSI Broke, Start over
1140	22.65	1400	220	29.3	3.383	3.11	7.03	38.7	445	
1145	22.65	2800	280	29.1	3.393	2.63	7.05	27.3	465	
1149	22.65	3600	200	29.1	3.393	2.42	7.05	22.7	439	
1155	22.65	5200	260	29.0	3.380	2.44	7.06	14.9	436	
1201	22.65	6600	230	29.1	3.365	2.34	7.07	11.7	423	
1208	22.65	8000	200	29.1	3.354	2.31	7.08	8.4	400	
1217	22.65	10,000	220	29.4	3.343	2.30	7.03	4.0	414	
1220	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: Da M. D.J.

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW14 DATE: 8/17/12

PROJECT: MTBE Site Characterizati WEATHER: Pt. Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G   Well Cap: G   PVC Locking Cap/Plug: G

Cap Lock: None   Cover Bolts: N/A   Water over PVC? Y/N (N circled)

Casing (outer): G   Casing (inner): G   SWL Reference Mark: G   Reference Mark Location? PVC

Casing Dia.: 2"   Casing Material: PVC   Flushmount / Stickup

Comments:

(OTHER):

Static Water Level (ft.): 19.73   Time: 1039 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 19.75   Time: 1056 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 40.4   Time: From MNA Reports

PID Reading (PPM) - Unopened: Bkgd   Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 40.4   Screened Interval (ft.): 30.4 - 40.4

Pump Intake Set @ (ft.): 35   Controller Settings / Pressure: 10/5 ~ 20psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW14-12C   Dup.: Y/N (N circled) (ID#:)

Sample Time: 1208   MS / MSD: Y/N (N circled)   Field Filtered: Y/N (N circled)

Sampled By: Dave Gaviglia   Signature: [signature]

Sample Description: Slightly cloudy, then clearing

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber, Glass	2	HCl	TPH-DRO
40ml vial, Glass	3	HCl	TPH-GRO
40ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW14
DATE: 8/17/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglio
SAMPLE ID: 1738MW14-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1056	19.70	- (Water Level : Post-Pump Installation, Pre-Start)								
1102	- (Start of Purging)									
1105	19.85	800	300	—	—	—	—	—	—	
1108	19.86	1500	230	29.5	1.943	4.38	7.23	35.2	230	Slightly Cloudy
1111	19.86	2400	300	29.4	1.939	3.31	7.24	33.8	252	
1116	19.87	3600	240	29.4	1.934	2.99	7.25	31.6	262	
1123	19.87	5400	260	29.4	1.929	3.10	7.28	30.8	182	
1129	19.87	7000	270	29.4	1.930	3.22	7.28	30.2	149	
1134	19.87	8400	280	29.3	1.927	3.32	7.29	30.1	98.3	
1142	19.87	10200	230	29.3	1.923	3.44	7.29	30.6	86.4	
1148	19.87	11800	270	29.4	1.930	3.56	7.30	32.0	74.2	
1154	19.88	13400	270	29.4	1.941	3.68	7.30	31.5	67.1	
1201	19.88	15200	300	29.4	1.939	3.76	7.30	31.4	64.4	
1206	19.88	16400	240	29.3	1.938	3.94	7.30	31.3	59.5	
1222										Water level after Sampling - 19.88
1208	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738 MW-15 DATE: 8/17/12

PROJECT: MTBE Site Characterization WEATHER: Pt. Sun, 90s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 19.18 Time: 1258 **(Pre-Pump Installation)**

Depth to Product (ft.): None

Water Level (ft.): 18.86 Time: 1309 (Post-Pump Installation, **Pre-Purge**)

Total Well Depth (ft.) - Post Sampling: 27.75 Time: From well development

PID Reading (PPM) - Unopened: Bkgd Opened: Bkgd

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 24.8 Screened Interval (ft.): 14.8 - 24.8

Pump Intake Set @ (ft.): 23 Controller Settings / Pressure: 10/5 ~20psi

Comments:

SAMPLE DATA

Sample ID #: 1738 MW15-12C Dup.: Y/N (ID#:)

Sample Time: 1432 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: Dave Gaviglia Signature: [signature]

Sample Description: Clear

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1 L Amber, Glass	2	HCl	TPH-DRO
40 ml vial, Glass	3	HCl	TPH-GRO
40 ml vial, Glass	3	HCl	BTEX/MTBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 1738MW15
DATE: 8/17/12
PROJECT: MTBE Site Characterization

SAMPLER (s): D. Gaviglia
SAMPLE ID: 1738MW15-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1309	18.86	- (Water Level : Post-Pump Installation, Pre-Start)								
1345	- (Start of Purging)									
1350	20.12	1400	220	27.7	8.640	2.17	6.93	45.6	29.5	Clear
1355	20.44	2400	200	27.8	8.646	1.68	6.94	47.8	27.3	Adjust flow rate due to
1402	20.53	3000	90	28.1	8.663	1.46	6.95	48.8	25.2	falling water level
1408	20.60	3800	70	28.2	8.645	1.16	6.94	51.2	18.1	
[illegible]	[illegible]	[illegible]								
1417	20.60	4000	70	28.2	8.643	1.13	6.94	51.7	16.7	
1423	20.61	4400	70	28.2	8.646	1.11	6.95	52.5	15.7	
1428	20.62	4700	60	28.3	8.650	1.18	6.95	53.2	14.9	
1505	20.73									water level after sampling
1432	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 1738MW16 DATE: 8/19/2012

PROJECT: MtBE Site Characterization WEATHER: P sunny, mod E wind, near 90°

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock None Cover Bolts N/A Water over PVC? Y/N

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 7.85 Time: 1317 (Pre-Pump Installation)

Depth to Product (ft.): None

Water Level (ft.): 7.79 Time: 1327 (Post-Pump Installation, Pre-Purge)

~~Total Well Depth (ft.) - Post Sampling: 8.01 Time: 1512~~

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech CE

From Boring Log: Total Depth (ft.): 24.8 Screened Interval (ft.): 14.8-24.8

Pump Intake Set @ (ft.): 18 Controller Settings / Pressure: 10/5 ~20 psi

Comments:

SAMPLE DATA

Sample ID #: 1738MW16-12C Dup. Y/N - (ID#: 1738MW16-12C)

Sample Time: 1450 MS / MSD: Y/N Field Filtered: Y/N

Sampled By: MDeJohn Signature:

Sample Description: clear, no odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
1L Amber glass	~~8~~ 4	HCl	TPH DRO
40 mL vials, glass	~~8~~ 6	HCl	TPH GRO
40 mL vials, glass	6	HCl	BTEX/MtBE

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 17MW16
DATE: 8/19/2012
PROJECT: MtBE Site Characterization

SAMPLER (s): M DeJohn
SAMPLE ID: 1738MW16-12C

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1327	7.79	- (Water Level : Post-Pump Installation, Pre-Start)								
1330	- (Start of Purging)	0	~220	30.9	3.774	12.28	7.31	35.4	817	
1335	7.87	1100	1100	28.2	7.250	1.30	6.64	47.1	217	
1340	8.07	1700	120	28.8	7.206	0.87	6.64	46.8	91.4	
1345	8.00	2000	60	30.0	7.230	0.84	6.65	46.7	82.0	
1350	7.99	2300	60	30.3	7.242	0.83	6.65	48.4	76.3	
1355	7.99	2600	60	30.4	7.242	0.88	6.64	49.1	67.3	
1400	7.98	2900	60	30.5	7.236	1.00	6.64	49.7	65.2	
1405	7.98	3300	80	30.1	7.240	1.09	6.65	50.1	58.3	
1410	7.98	3800	80	29.8	7.221	1.20	6.65	50.3	50.5	
1415	7.98	4000	60	29.8	7.209	1.23	6.66	50.6	42.8	
1420	7.96	4200	40	29.9	7.215	1.29	6.66	51.1	35.0	
1425	8.08	4900	140	28.5	7.200	1.50	6.66	53.1	33.2	
1430	8.12	5600	140	28.1	7.177	1.54	6.67	58.6	28.8	
1440	7.99	6500	90	28.1	7.163	1.48	6.68	58.6	29.2	
1445	7.99	6900	80	29.1	7.173	1.56	6.68	59.3	27.2	
	~~8.04~~									
	8.01									Post purge/sample
1450	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature: [signature]

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

Daily Meter Calibration Record

DAILY METER CALIBRATION RECORD

Date: 8/15/12 Time: 1056

Model: YSI 556 MPS
Serial #: 11F00176

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.05	4.00
Buffer:	7	7.06	7.00
Buffer:	10	10.04	10.02
ORP (mV's)			
Std.:	N/A		
Sp.Cond. (mS/cm)			
Std.:	1409	1.536	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	8.49	7.42
Temp. (Celsius)			N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model:
Serial #:

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10		

DAILY METER CALIBRATION RECORD

Date: 8/15 Time: 0840

Model: YSI 556 MPS
Serial #: 10K101386

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.08	4.00
Buffer:	7	7.00	7.00
Buffer:	10	9.90	9.98
ORP (mV's)			
Std.:	N/A		
Sp.Cond. (mS/cm)			
Std.:	1.409	1.545	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	8.16	7.42
Temp. (Celsius)		30.4	N/A

	Initial	Adjusted
Isobutylene (100ppm)	99	100

Model:
Serial #: U64514X

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	16	15

DAILY METER CALIBRATION RECORD

Date: 8/16/12 Time: 1215

Model: YSI 556 MPS
Serial #: 11F100176

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.01	4.00
Buffer:	7	7.03	7.00
Buffer:	10	10.01	10.00
ORP (mV's)			
Std.:	N/A		
Sp.Cond. (mS/cm)			
Std.:	1.409	1489	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	753	774
Temp. (Celsius)			N/A

	Initial	Adjusted
Isobutylene (100ppm)	99.3	100

Model: HI 98703
Serial #: 08390705

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10/15	15.1	15.0

DAILY METER CALIBRATION RECORD

Date: 8/17/12 Time: 0820

Model: YSI 556 MPS
Serial #: 11F100176

Model: RAE 2000
Serial #:

	Initial	Adjusted
pH (Std. Units)		
Buffer: 4	3.99	4.00
Buffer: 7	6.99	7.00
Buffer: 10	9.99	10.00
ORP (mV's)		
Std.: N/A		
Sp.Cond. (mS/cm)		
Std.: 1.409	1.452	1.409
D.O. (mg/l)		
Baro. Pressure (mm/Hg): 762	8.01	7.69
Temp. (Celsius)		N/A

	Initial	Adjusted
Isobutylene (100ppm)	97	100

Model: HI 98703
Serial #: 08390705

	Initial	Adjusted
Turbidity (NTU's)		
Std.: ~~10~~ 15	14.7	15.0

DAILY METER CALIBRATION RECORD

Date: 8/18/12 Time: 0900

Model: YSI 556 MPS
Serial #: 04E8905

Model: RAE 2000
Serial #:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.08	4.00
Buffer:	7	7.00	7.00
Buffer:	10	9.92	9.99
ORP (mV's)			
Std.:	N/A		
Sp.Cond. (mS/cm)			
Std.:	1.409	1.380	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	6.00	751
Temp. (Celsius)			N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model: HI 98703
Serial #: 61724

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	15.8	Error Message

DAILY METER CALIBRATION RECORD

Date: 8/18/12 Time: 0900

Model:	YSI 556 MPS
Serial #:	11F100176

	Initial	Adjusted
pH (Std. Units)		
Buffer: 4	4.03	4.00
Buffer: 7	6.99	7.00
Buffer: 10	9.96	10.00
ORP (mV's)		
Std.: N/A		
Sp.Cond. (mS/cm)		
Std.: 1.409	1.355	1.409
D.O. (mg/l)		
Baro. Pressure (mm/Hg): 762	730	740
Temp. (Celsius)		N/A

Model:	RAE 2000
Serial #:	110-010098

	Initial	Adjusted
Isobutylene (100ppm)	100	—

Model:	HI 98703
Serial #:	08390705

	Initial	Adjusted
Turbidity (NTU's)		
Std.: ~~10~~15	14.8	15.0

DAILY METER CALIBRATION RECORD

Date: 8/11/12 Time: 0900

Model: YSI 556 MPS	Model: RAE 2000
Serial #: 04E8905	Serial #: —

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.02	4.00
Buffer:	7	7.00	7.00
Buffer:	10	9.92	9.99
ORP (mV's)			
Std.:	—	—	—
Sp.Cond. (mS/cm)			
Std.:	1.409	1.367	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	763	9.46	7.43
Temp. (Celsius)		31.34	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

Model:
Serial #: 08292211

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	6.4	~~Cap error; no closing properly~~ 14.8

DAILY METER CALIBRATION RECORD

Date: 8/19/12 Time: 0900

Model: YSI 556 MPS
Serial #: 11F100176

Model: RAE 2000
Serial #: 110-010098

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.97	4.00
Buffer:	7	7.00	7.00
Buffer:	10	9.98	10.00
ORP (mV's)			
Std.:	-	-	-
Sp.Cond. (mS/cm)			
Std.:	1.409	1.369	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	763	7.35	7.43
Temp. (Celsius)		31.08	N/A

	Initial	Adjusted
Isobutylene (100ppm)	102	100

Model:
Serial #: U 66514 X

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~20~~ 15	30	15.8

DAILY METER CALIBRATION RECORD

Date: 8/20/12 Time: 0810

Model: YSI 556 MPS
Serial #: 04E0905

Model: RAE 2000
Serial #: 110-010098

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.01	4.00
Buffer:	7	7.10	7.00
Buffer:	10	9.90	~~9.98~~ 9.99
ORP (mV's)			
Std.:	–	–	–
Sp.Cond. (mS/cm)			
Std.:	1.409	1.354	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	7.54	7.68
Temp. (Celsius)		28.7	N/A

	Initial	Adjusted
Isobutylene (100ppm)	97	100

Model: HI 98703
Serial #: 08390705

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	15	15

DAILY METER CALIBRATION RECORD

Date: 8/21/12 Time: 0832

Model: YSI 556 MPS
Serial #: 0458905

Model: RAE 2000
Serial #: 110-010098

	Std.	Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.05	4.00
Buffer:	7	7.01	7.00
Buffer:	10	9.93	9.99
ORP (mV's)			
Std.:	–	–	–
Sp.Cond. (mS/cm)			
Std.:	1.409	1.399	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	762	7.62	7.43
Temp. (Celsius)		29.9	N/A

	Initial	Adjusted
Isobutylene (100ppm)	94	100

Model: HI 98703
Serial #: 08390705

	Std.	Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~20~~ 15	15	15

DAILY METER CALIBRATION RECORD

Date: 8/22/12 Time: 0900

Model: YSI 556 MPS
Serial #: 04E8905

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	~~4.00~~ 3.90	4.00
Buffer:	7	6.18	6.99
Buffer:	10	10.93	10.13
ORP (mV's)			
Std.:	–	–	–
Sp.Cond. (mS/cm)			
Std.:	1.409	1.471	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.12	7.94
Temp. (Celsius)		28.7	N/A

Model: RAE 2000
Serial #: 110-010098

	Initial	Adjusted
Isobutylene (100ppm)	94	103

Model: Hanna HI 98703
Serial #: 08390705

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	18.6	14.9

DAILY METER CALIBRATION RECORD

Date: 8/24/12 Time: 0820 (1315)

Model: YSI 556 MPS
Serial #: 04E0905
11F100176 (2)

Model: RAE 2000
Serial #: 110-010098

		Initial	Adjusted
pH (Std. Units) (1)		(4.02)	(4.00)
Buffer:	4	4.59	3.98
Buffer:	7	4.26	6.99 (7.04) | (7.00)
Buffer:	10	8.04	9.99
		(9.97)	(10.00)
ORP (mV's)			
Std.:	~	~	~
Sp.Cond. (mS/cm)		(1.511)	(1.409)
Std.:	1.409	1.429	1.409
D.O. (mg/l)		(6.50)	(7.27)
Baro. Pressure (mm/Hg):	759	7.33	7.76
Temp. (Celsius)		27.5	N/A

	Initial	Adjusted
Isobutylene (100ppm)	92	99.8

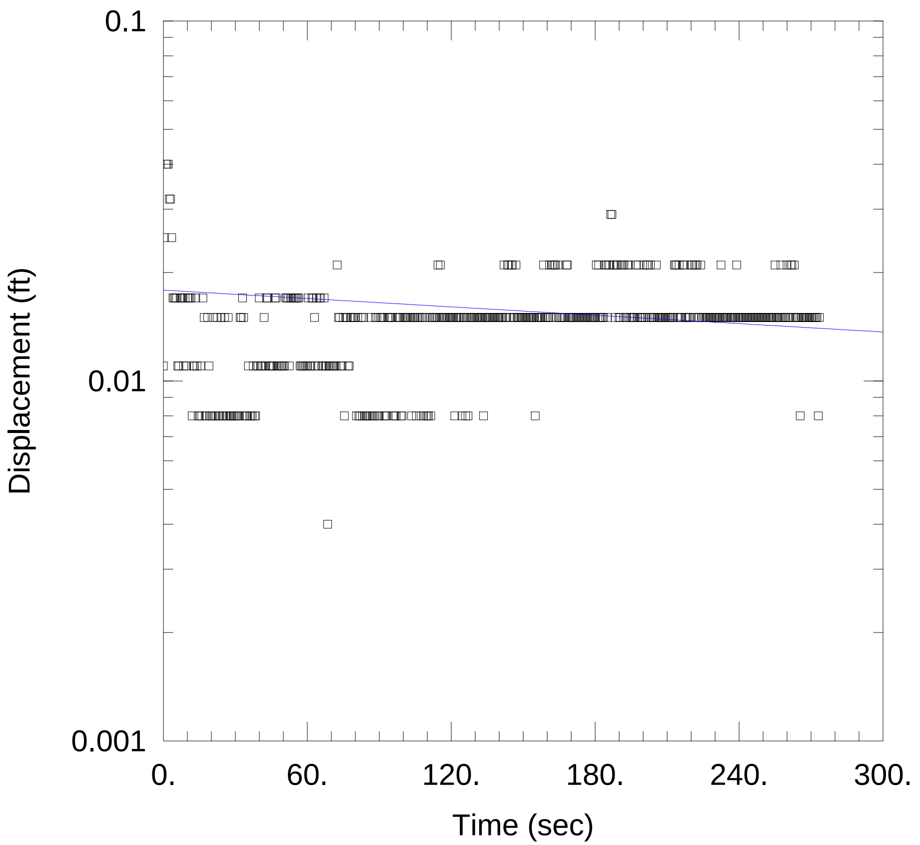
(1) pH probe doesn't seem to be holding calibration. It is reading lower than actual std (e.g. 7.00 reads ~6.00)

(2) Calibrated another meter

Model: Hanna HI 98703
Serial #: 08390705

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	10 15	14.1	14.7

Slug Test Data Plots



1738MW01B RISING HEAD TEST

Data Set: K:\...\MW01B Rising Head Test_DMG.aqt
Date: 03/22/13 Time: 13:26:59

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW01B
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

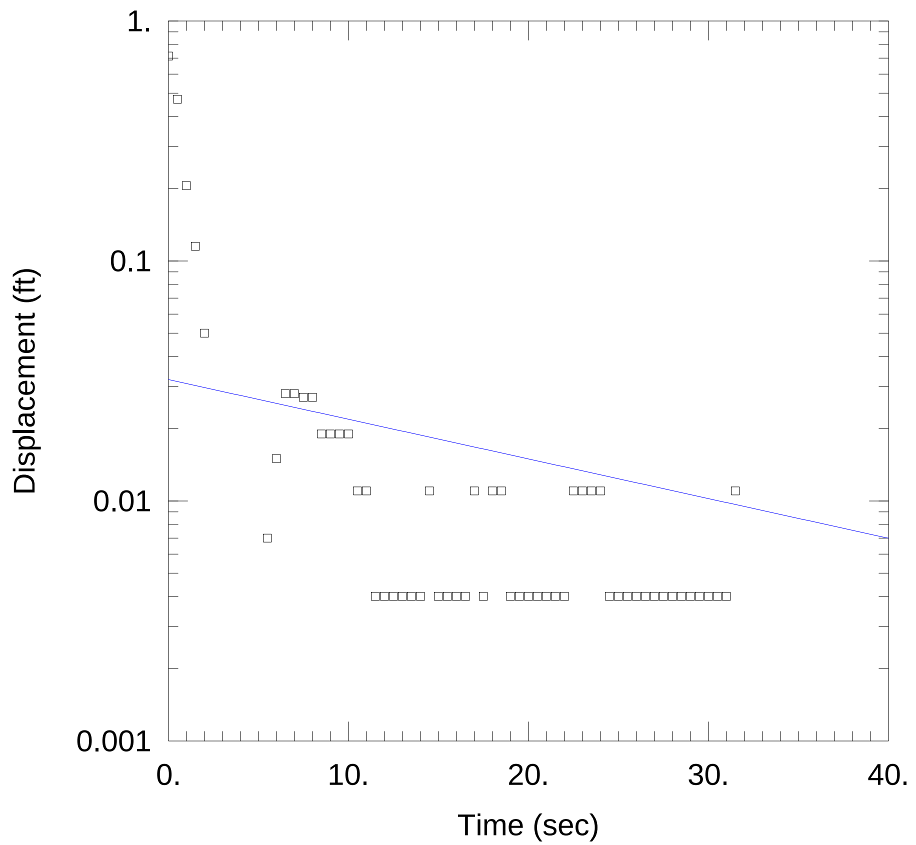
K = 0.1456 ft/day
y0 = 0.01787 ft

AQUIFER DATA

Saturated Thickness: 42. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW01B)

Initial Displacement: 0.011 ft
Total Well Penetration Depth: 42. ft
Casing Radius: 0.083 ft
Static Water Column Height: 42. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW01B FALLING HEAD TEST

Data Set: K:\...\MW01B Falling Head Test_DMG.aqt
Date: 03/22/13 Time: 13:26:22

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW01B
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

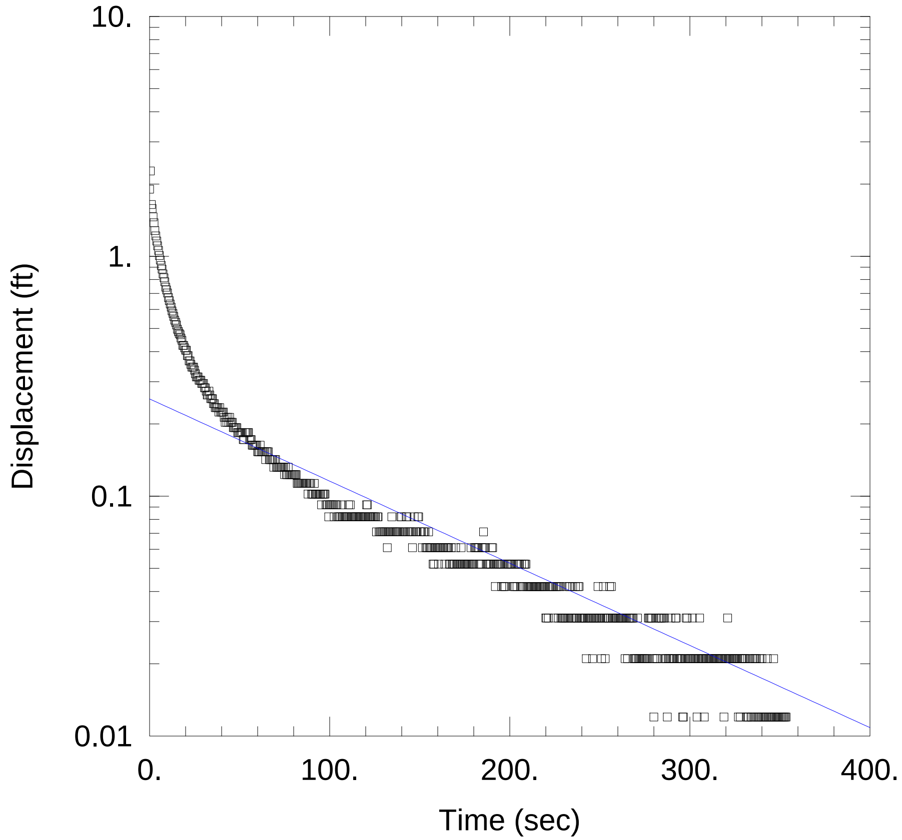
K = 6.208 ft/day
y0 = 0.03202 ft

AQUIFER DATA

Saturated Thickness: 42. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW01B)

Initial Displacement: 0.714 ft
Total Well Penetration Depth: 42. ft
Casing Radius: 0.083 ft
Static Water Column Height: 42. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW02R RISING HEAD TEST

Data Set: K:\...\MW02R Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:30:47

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW02R
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

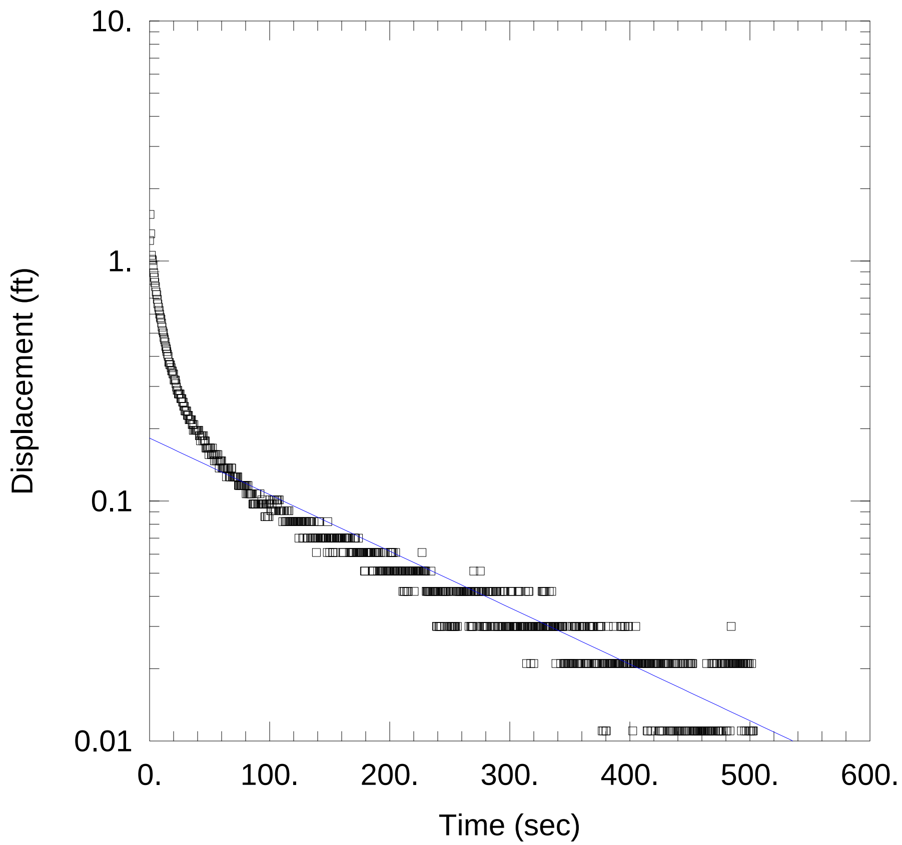
K = 1.288 ft/day
y0 = 0.2542 ft

AQUIFER DATA

Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW02R)

Initial Displacement: 1.904 ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.083 ft
Static Water Column Height: 21. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW02R FALLING HEAD TEST

Data Set: K:\...\MW02R Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:30:20

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW02R
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

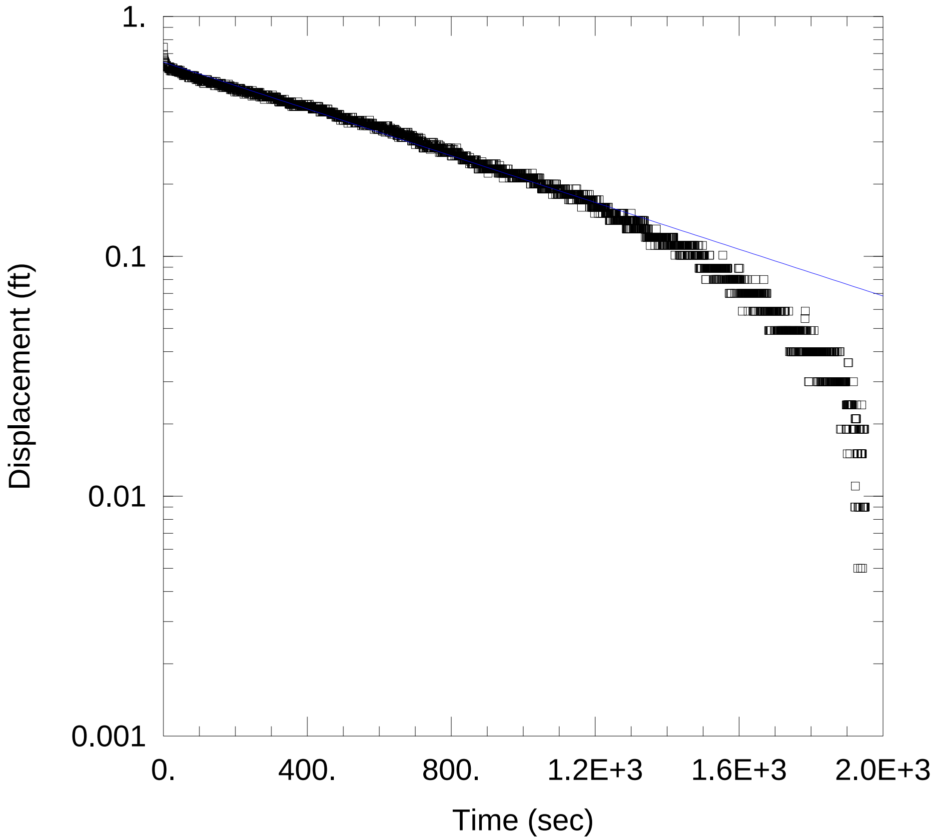
K = 0.8852 ft/day
y0 = 0.1827 ft

AQUIFER DATA

Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW02R)

Initial Displacement: 1.217 ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.083 ft
Static Water Column Height: 21. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW07A RISING HEAD TEST

Data Set: K:\...\MW07A Rising Head_DMG.aqt
Date: 04/02/13 Time: 11:12:20

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW07A
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 0.3201 ft/day
y0 = 0.6446 ft

AQUIFER DATA

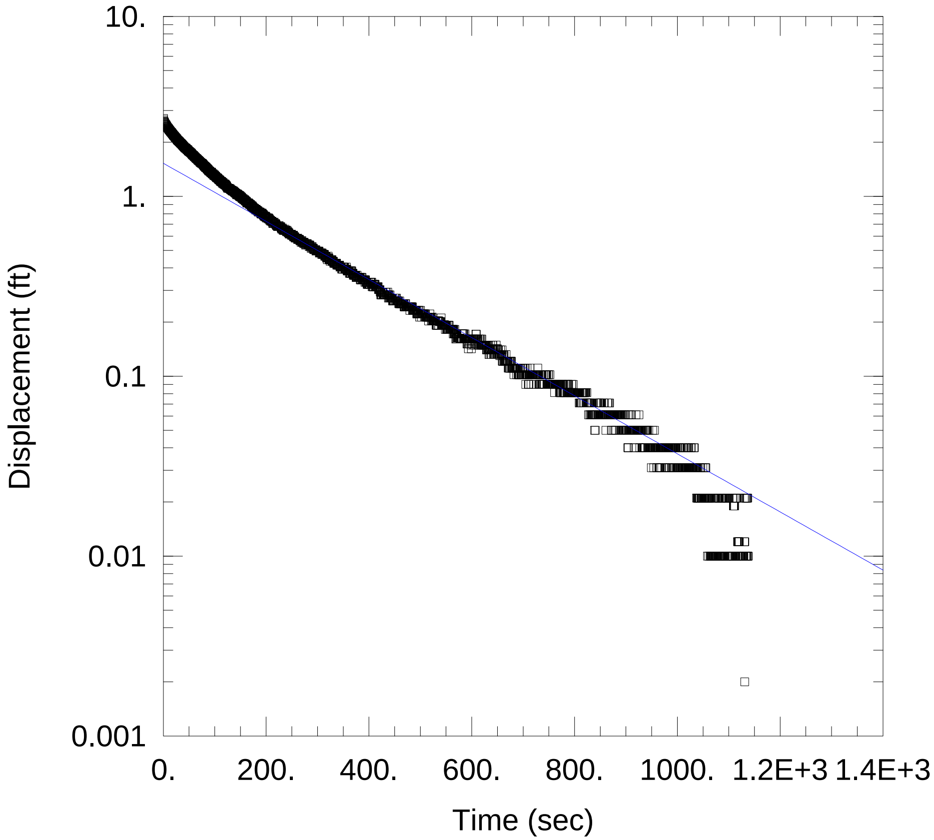
Saturated Thickness: 6. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW07A)

Initial Displacement: 0.744 ft
Total Well Penetration Depth: 6. ft
Casing Radius: 0.083 ft

Static Water Column Height: 6. ft
Screen Length: 5. ft
Well Radius: 0.083 ft



1738MW07B RISING HEAD TEST

Data Set: K:\...\MW07B Rising Head_DMG.aqt
Date: 04/02/13 Time: 11:13:21

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW07B
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

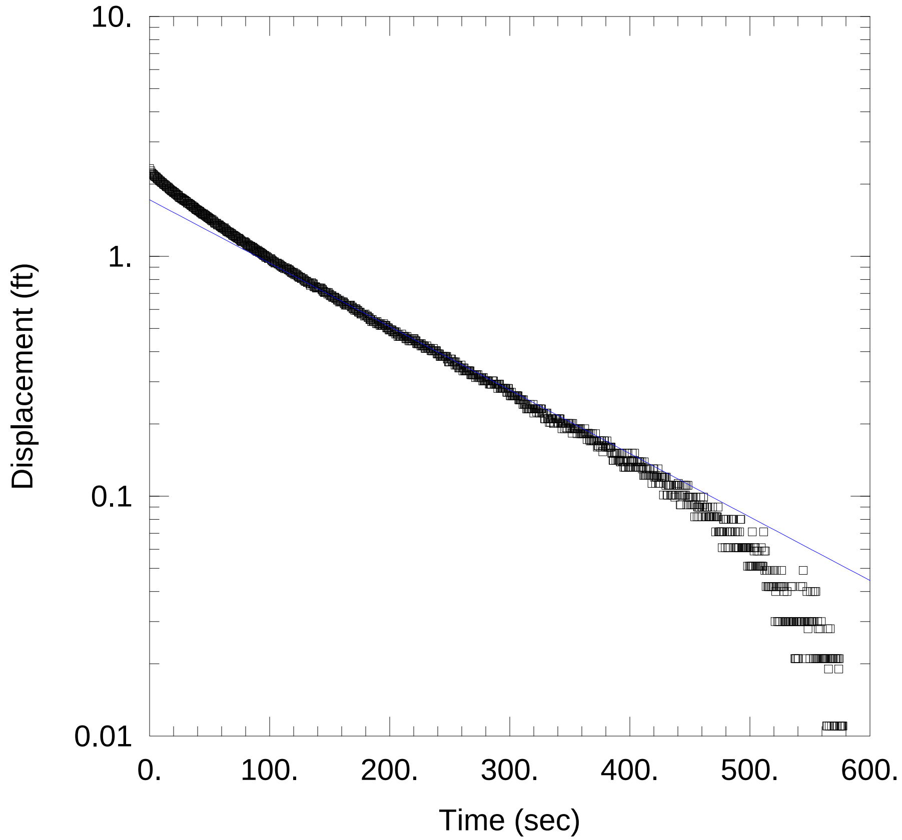
K = 0.6071 ft/day
y0 = 1.526 ft

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW07B)

Initial Displacement: 2.658 ft
Total Well Penetration Depth: 36. ft
Casing Radius: 0.083 ft
Static Water Column Height: 36. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW07B FALLING HEAD TEST

Data Set: K:\...\MW07B Falling Head_DMG.aqt
Date: 04/02/13 Time: 11:14:13

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW07B
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

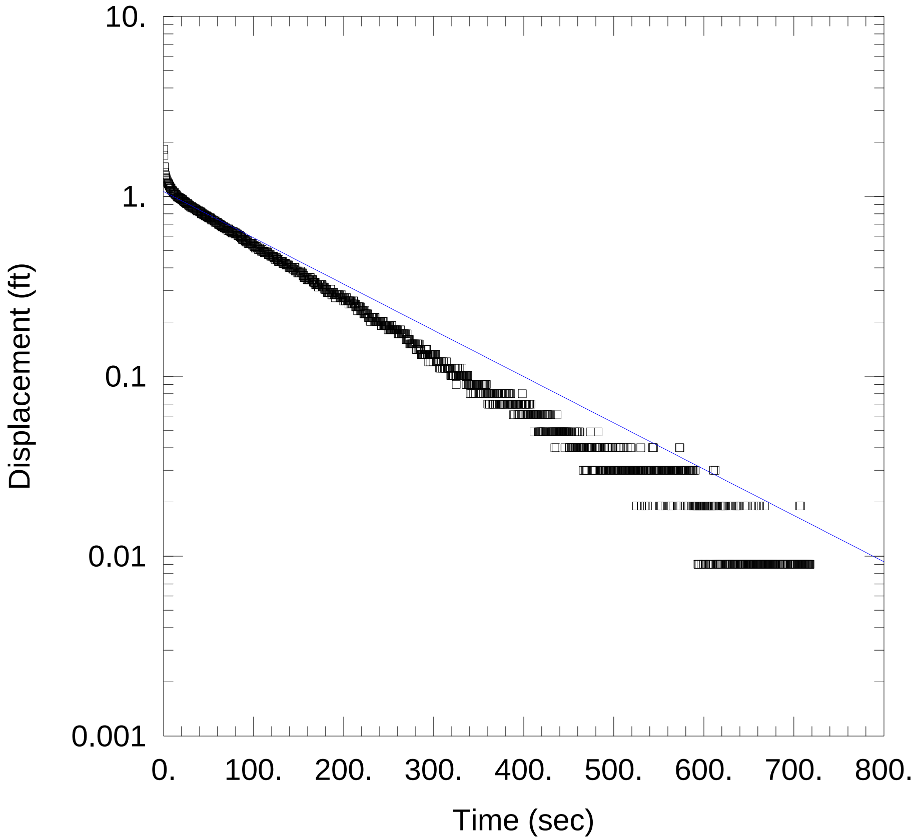
K = 0.9942 ft/day
y0 = 1.72 ft

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW07B)

Initial Displacement: 2.321 ft
Total Well Penetration Depth: 36. ft
Casing Radius: 0.083 ft
Static Water Column Height: 36. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW08A RISING HEAD TEST

Data Set: K:\...\MW08A Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:33:18

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW08A
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

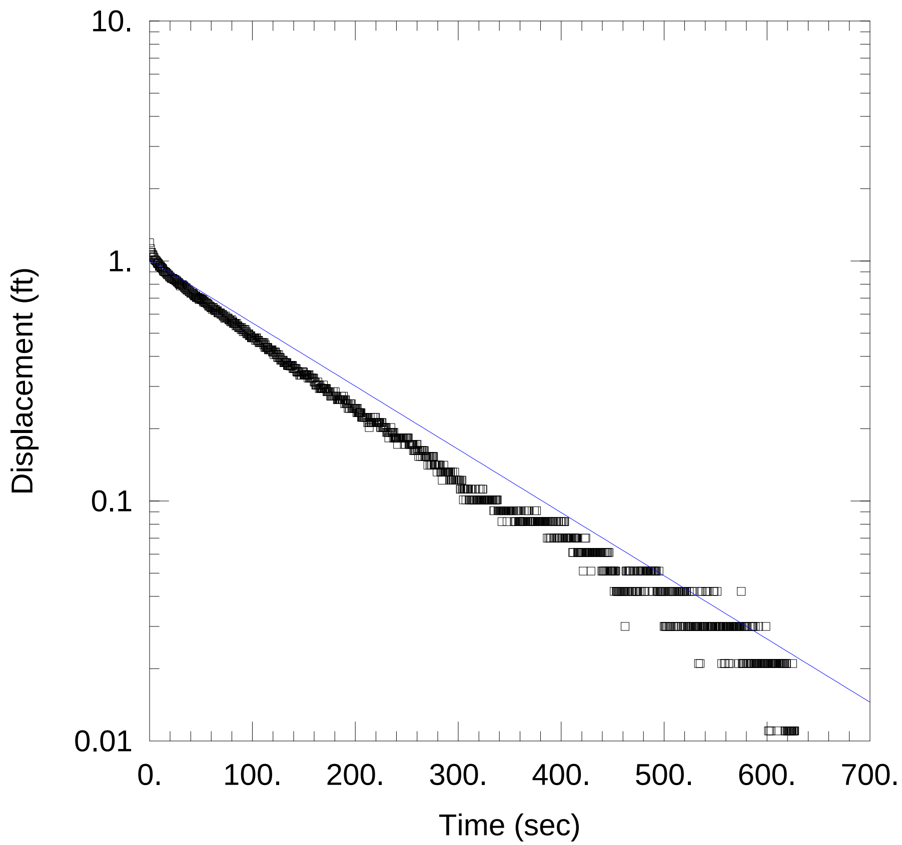
K = 1.689 ft/day
y0 = 1.063 ft

AQUIFER DATA

Saturated Thickness: 7. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW08A)

Initial Displacement: 1.822 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7. ft
Screen Length: 5. ft
Well Radius: 0.083 ft



1738MW08A FALLING HEAD TEST

Data Set: K:\...\MW08A Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:32:56

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW08A
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 1.729 ft/day
y0 = 1.011 ft

AQUIFER DATA

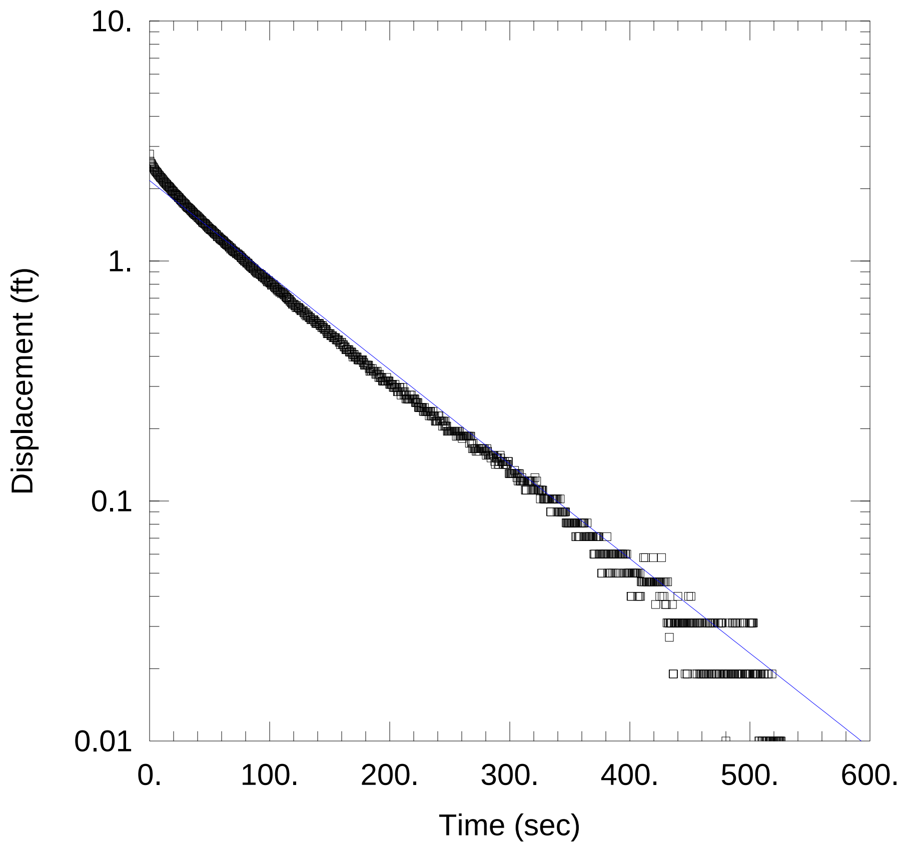
Saturated Thickness: 7. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW08A)

Initial Displacement: 1.19 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.083 ft

Static Water Column Height: 7. ft
Screen Length: 5. ft
Well Radius: 0.083 ft



1738MW08B RISING HEAD TEST

Data Set: K:\...\MW08B Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:34:16

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW08B
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

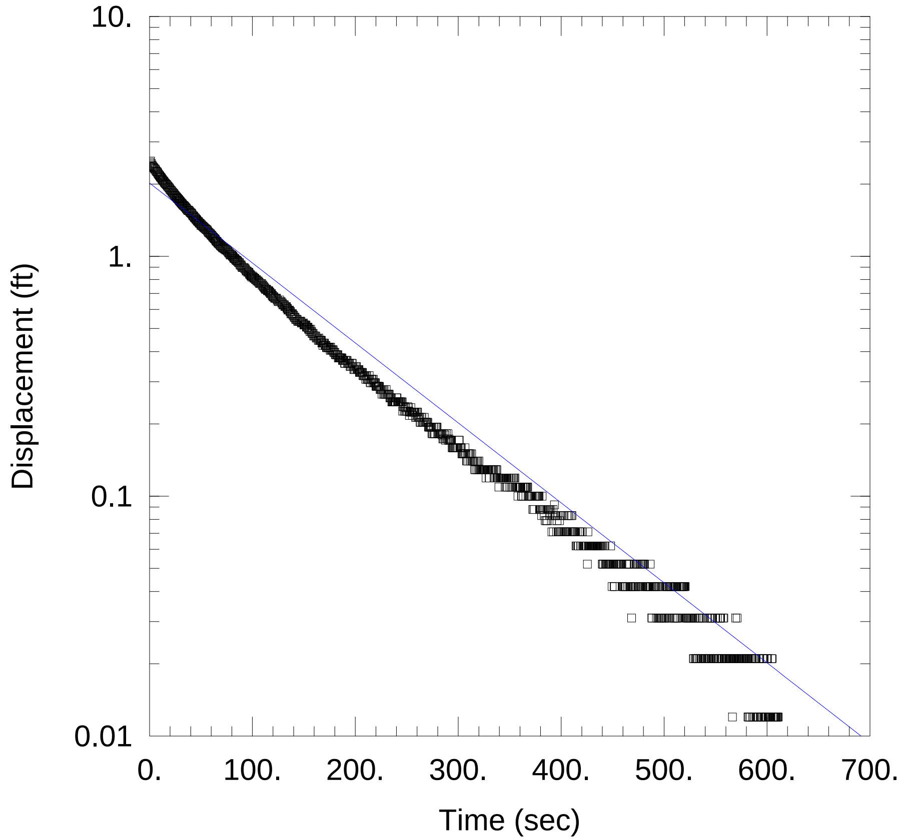
K = 1.48 ft/day
y0 = 2.162 ft

AQUIFER DATA

Saturated Thickness: 28. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW08B)

Initial Displacement: 2.787 ft
Total Well Penetration Depth: 28. ft
Casing Radius: 0.083 ft
Static Water Column Height: 28. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW08B FALLING HEAD TEST

Data Set: K:\...\MW08B Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:33:53

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW08B
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

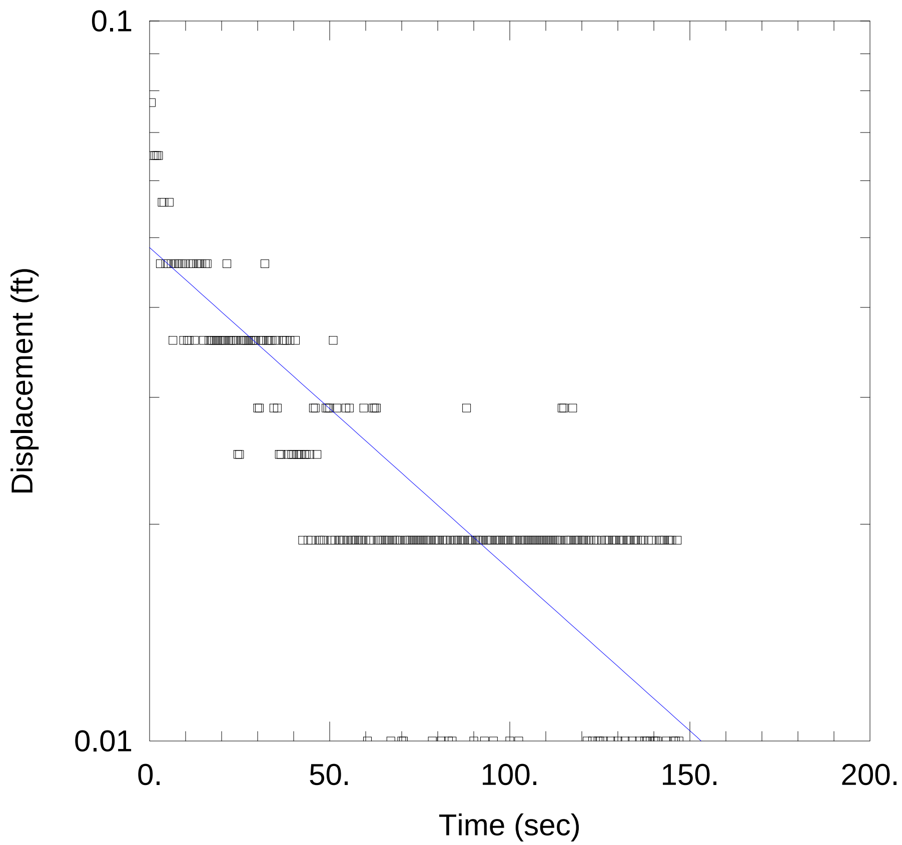
K = 1.253 ft/day
y0 = 2.019 ft

AQUIFER DATA

Saturated Thickness: 28. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW08B)

Initial Displacement: 2.364 ft
Total Well Penetration Depth: 28. ft
Casing Radius: 0.083 ft
Static Water Column Height: 28. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW09A RISING HEAD TEST

Data Set: K:\...\MW09A Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:36:15

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW09A
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

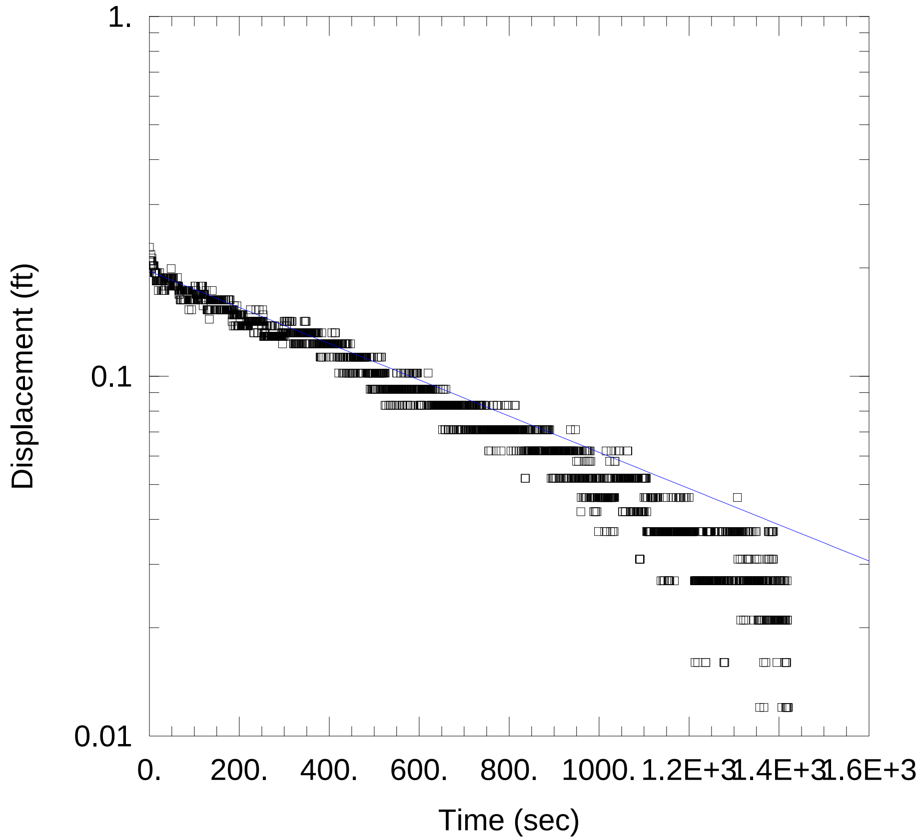
K = 2.938 ft/day
y0 = 0.04845 ft

AQUIFER DATA

Saturated Thickness: 7. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW09A)

Initial Displacement: 0.138 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7. ft
Screen Length: 5. ft
Well Radius: 0.083 ft



1738MW09A FALLING HEAD TEST

Data Set: K:\...\MW09A Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:34:44

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW09A
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 0.3305 ft/day
y0 = 0.1957 ft

AQUIFER DATA

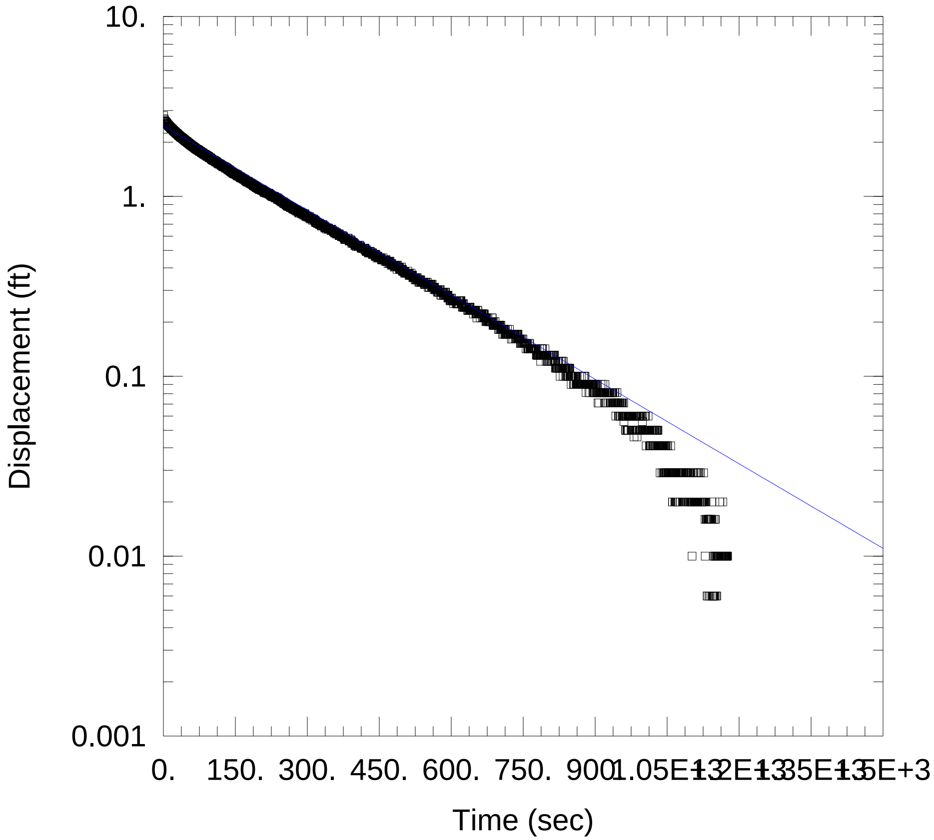
Saturated Thickness: 7. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW09A)

Initial Displacement: 0.228 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.083 ft

Static Water Column Height: 7. ft
Screen Length: 5. ft
Well Radius: 0.083 ft



1738MW09B RISING HEAD TEST

Data Set: K:\...\MW09B Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:37:07

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW09B
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

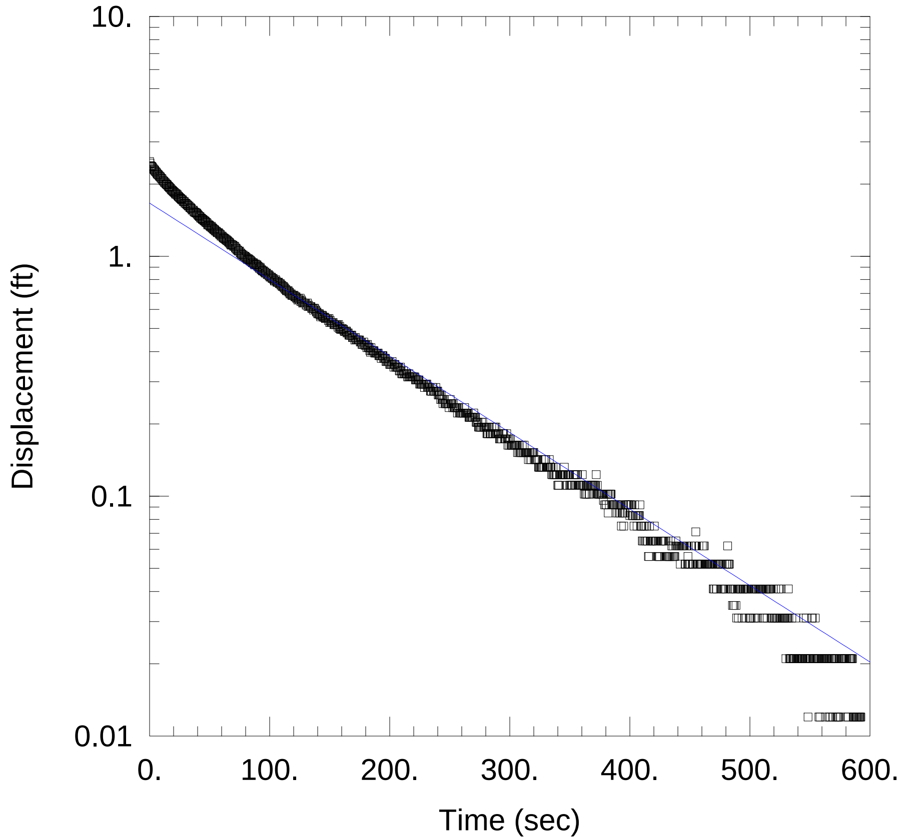
K = 0.5887 ft/day
y0 = 2.47 ft

AQUIFER DATA

Saturated Thickness: 37. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW09B)

Initial Displacement: 2.362 ft
Total Well Penetration Depth: 37. ft
Casing Radius: 0.083 ft
Static Water Column Height: 37. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW09B FALLING HEAD TEST

Data Set: K:\...\MW09B Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:36:41

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW09B
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

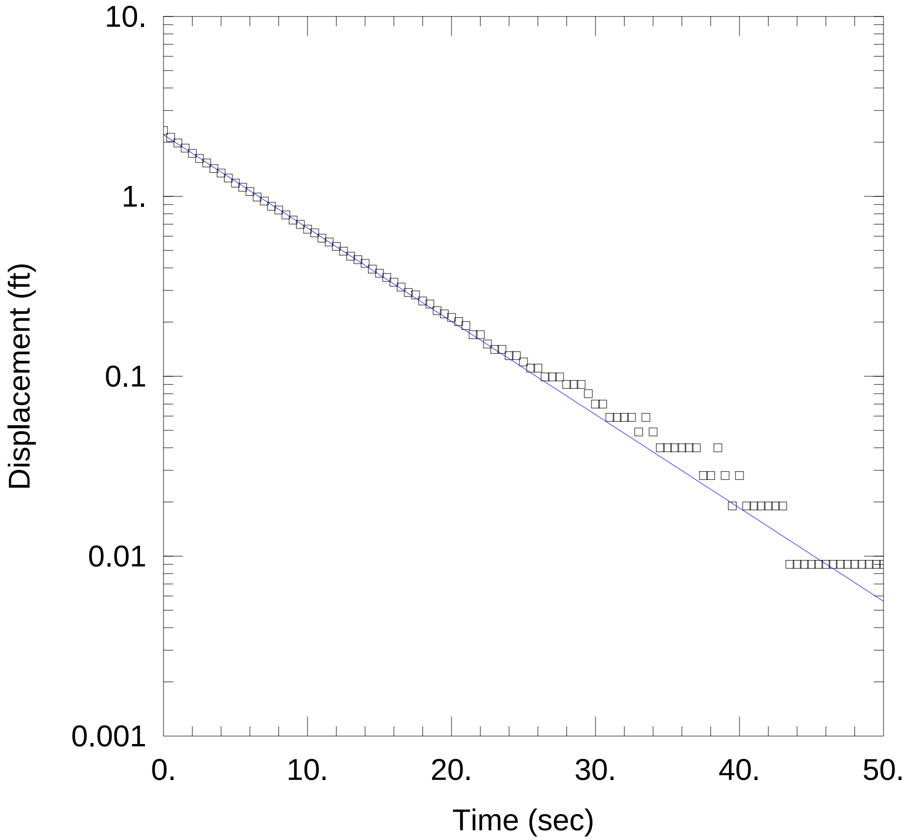
K = 1.198 ft/day
y0 = 1.666 ft

AQUIFER DATA

Saturated Thickness: 37. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW09)

Initial Displacement: 2.485 ft
Total Well Penetration Depth: 37. ft
Casing Radius: 0.083 ft
Static Water Column Height: 37. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW13 RISING HEAD TEST

Data Set: K:\...\MW13 Rising Head_DMG.aqt
Date: 03/22/13 Time: 13:44:35

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW13
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

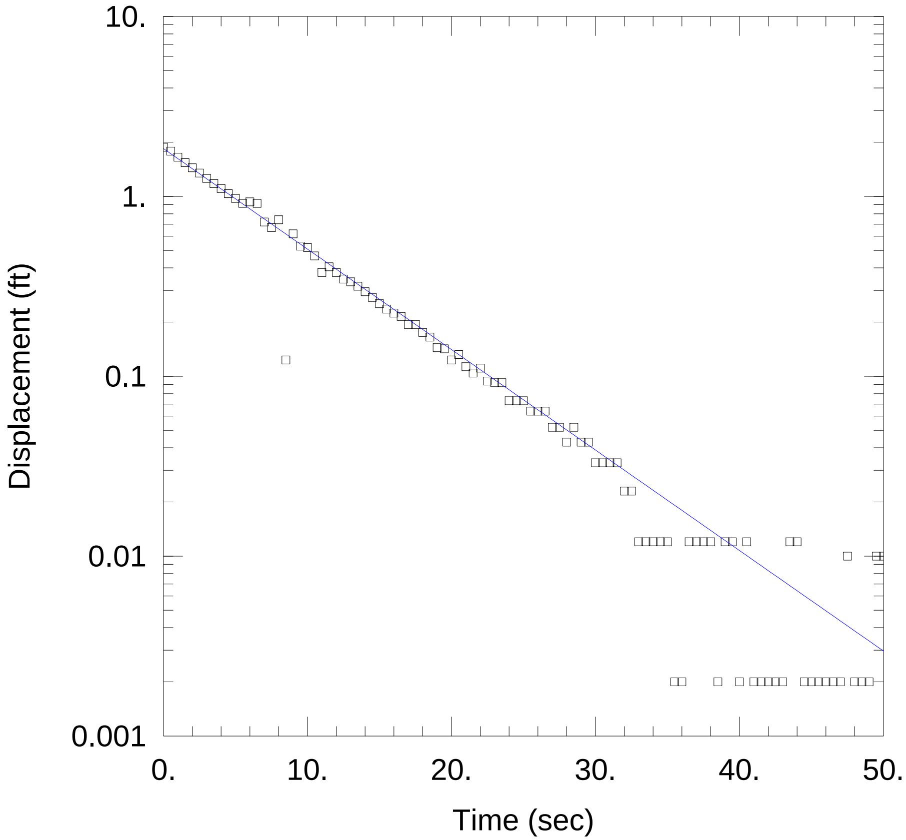
K = 19.5 ft/day
y0 = 2.199 ft

AQUIFER DATA

Saturated Thickness: 16. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW13)

Initial Displacement: 2.321 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.083 ft
Static Water Column Height: 16. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW13 FALLING HEAD TEST

Data Set: K:\...\MW13 Falling Head_DMG.aqt
Date: 03/22/13 Time: 13:44:14

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW13
Test Date: August 26, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 20.99 ft/day
y0 = 1.841 ft

AQUIFER DATA

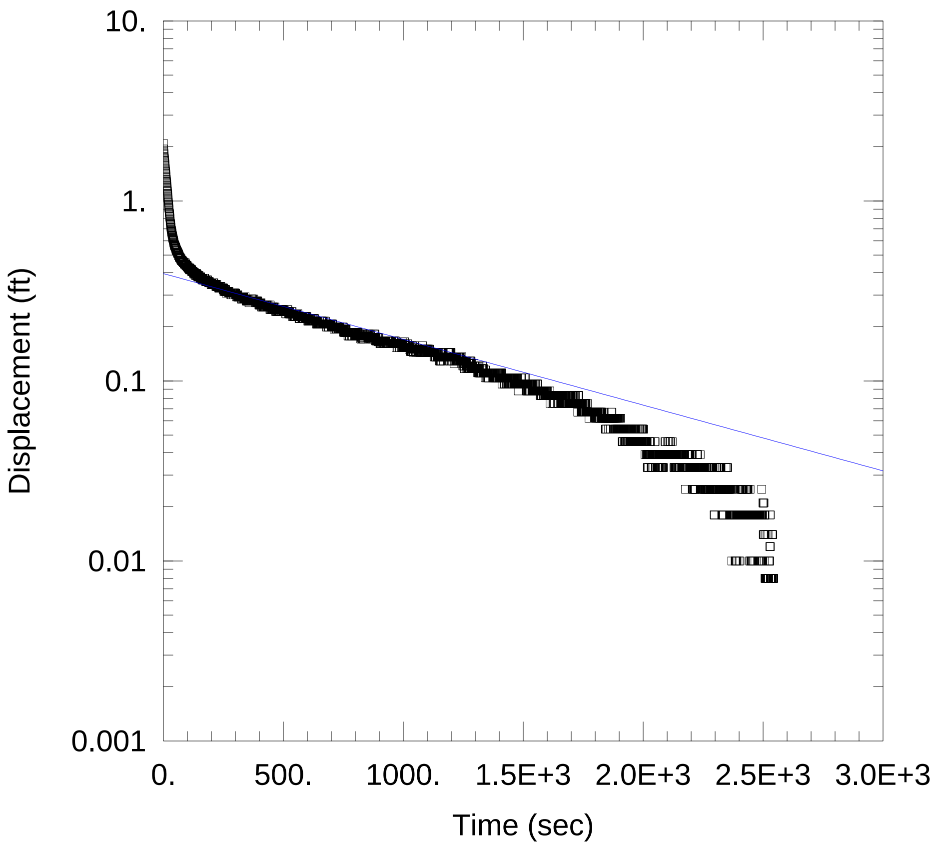
Saturated Thickness: 16. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW13)

Initial Displacement: 1.874 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.083 ft

Static Water Column Height: 16. ft
Screen Length: 10. ft
Well Radius: 0.083 ft



1738MW15 RISING HEAD TEST

Data Set: C:\...\MW15 Rising Head_DMG.aqt
Date: 03/25/13 Time: 10:43:05

PROJECT INFORMATION

Company: Michael Baker Jr., Inc.
Client: NAPR
Project: 125201
Location: 1738
Test Well: 1738MW15
Test Date: August 27, 2012

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev

K = 0.1326 ft/day
y0 = 0.3948 ft

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (1738MW15)

Initial Displacement: 0. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 10. ft
Screen Length: 10. ft
Well Radius: 0.083 ft

Chain-of-Custody Forms

Serial Number 55761

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 412-375-3996
CLIENT NAME: Michael Baker Corp.	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr / Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 OF 3

STANDARD REPORT DELIVERY ⊗ DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / PRESERVATIVE / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	TIME	SAMPLE IDENTIFICATION	C/G	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	BTEX/MtBE (NaB/Meth)	TPH-GRO (NaB/Meth)	TPH-DRO (–)	BTEX/MtBE (HCl)	TPH-GRO (HCl)	TPH-DRO (HCl)					REMARKS
6/13/12	1020	1738MW01B-00			X			3	3	1								
↓	1030	1738MW01B-01			X			3	3	1								
↓	1130	1738MW01B-06			X			3	3	1								
6/13/12	1145	1738MW01B-11			X			3	3	1								
6/14/12	1430	1738MW13-01			X			3	3	1								
6/14/12	1450	1738MW13-12			X			3	3	1								
6/14/12	1350	1738MW13-03			X			3	3	1								
6/15/12	0800	1738MW13-00			X			3	3	1								Added per Shannon Raub request. ON 6/22/12
↓	0900	1738ER09		X							3	3	2					
6/15/12	1045	~~1738MW~~ 1738FB03		X							3	3	2					
6/16/12	1000	1738MW02R-00			X			3	3	1								
6/16/12	1430	1738MW14-00			X			3	3	1								

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	6/18/12	1200						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	6/19/12	0930	YES ○ NO ○		680-80447	3.6/3.6/4.4/4.4/4.0°c

TAL8240-680 (1008)

Serial Number 55657

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: (cell) 412-523-2108	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr / Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 2 OF 3

STANDARD REPORT DELIVERY: X
DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE)
DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / PRESERVATIVE / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	BTEX/MtBE (NaBi/Meth)	TPH-GRO (NaBi/Meth)	TPH-DRO	BTEX/MtBE (HCl)	TPH-GRO (HCl)	TPH-DRO (HCl)					REMARKS
6/16/12	0805	1738MW15-00			X			3	3	1								
↓	1010	1738MW02R-01			X			3	3	1								
	1445	1738MW14-01			X			3	3	1								
	1445	1738MW14-01D			X			3	3	1								
	0815	1738MW15-01			X			3	3	1								
	1045	1738MW02R-07			X			3	3	1								
	1125	1738MW02R-10			X			3	3	1								
	1545	1738MW14-09			X			3	3	1								
	1620	1738MW14-11			X			3	3	1								
↓	0845	1738MW15-05			X			3	3	1								
6/16/12	1610	1738ER10		X							3	3	1					
6/16/12	1400	1738MW02R-17			X			3	3	1								

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	6/18/12	1200						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	6/19/12	0930	YES ◯ NO ◯		680-80447	3.6 / 3.6 / 4.4 / 4.0 / 4.0°C

Serial Number 55656

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Site 1738
PROJECT NO.: 125201
PROJECT LOCATION (STATE): PR
PAGE 3 OF 3

TAL (LAB) PROJECT MANAGER: Jerry Lanier
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn
CLIENT PHONE: 412-269-6007
CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp.
CLIENT E-MAIL: mdejohn@mbakercorp.com
CLIENT ADDRESS: 100 Airside Dr./Moon Twp, PA 15108
COMPANY CONTRACTING THIS WORK (if applicable):

STANDARD REPORT DELIVERY
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE)
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / PRESERVATIVE: BTEX/MtBE (NaB./Meth); TPH-GRO (NaB./Meth); TPH-DRO (–); BTEX/MtBE (HCl); TPH-GRO (HCl); TPH-DRO (HCl)

NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	Composite/Grab	Aqueous	Solid	Air	Nonaqueous	BTEX/MtBE	TPH-GRO	TPH-DRO	BTEX/MtBE	TPH-GRO	TPH-DRO	REMARKS
6/17/12	0940	1738MW09B-00			X			3	3	1				
↓	0940	1738MW09B-00 MS			X			3	3	1				
	0940	1738MW09B-00 MSD			X			3	3	↓				
	1015	1738MW09B-01			X			3	3	1				
↓	1040	1738MW09B-03			X			3	3	1				
6/17/12	1525	1738ER11		X							3	3	1	
6/18/12	–	1738TB04		X				~~2~~	~~2~~		2	2		
6/17/12	1040	1738MW09B-03D		X				3	3	1				added per Shannon Raub request. DM 6/22/12
6/16/12	0900	1738MW15-10		X				3	3	1				

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	6/18/12	1200						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	6/18/12	0930	YES ○ NO ○		680-80447	3.6/3.6/4.4/4.4/4.0°C

Serial Number

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
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Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE Site 1738	PROJECT NO. 125201	PROJECT LOCATION (STATE) PA
TAL (LAB) PROJECT MANAGER Jerry Lanier	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM Mark DeJohn	CLIENT PHONE 412-269-6007	CLIENT FAX 375-2996
CLIENT NAME Michael Baker Corp	CLIENT E-MAIL mdejohn@mbakercorp.com	
CLIENT ADDRESS 100 Airside Dr, Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE 1 OF 2

REQUIRED ANALYSIS: BTEX/MTBE (Na6, Meth); TPH-GRO (Na6, Meth); TPH-DRO (—); BTEX/MTBE (HCl); TPH-GRO (HCl); TPH-DRO (HCl)

STANDARD REPORT DELIVERY — DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) — DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	BTEX/MTBE	TPH-GRO	TPH-DRO	BTEX/MTBE	TPH-GRO	TPH-DRO					REMARKS
6/21/12	1600	1738MW16-00			X			3	3	1								
↓	1600	1738MW16-00D			X			3	3	1								
	1620	1738MW16-01			X			3	3	1								
	1700	1738MW16-03			X			3	3	1								
	1700	1738MW16-03 MS			X			3	3	1								
↓	1700	1738MW16-03 MSD			X			3	3	↓								
6/21/12	1815	1738ER12		X							3	3	2					
6/23/12	1000	1738MW08B-00			X			3	3	1								
↓	1010	1738MW08B-01			X			3	3	1								
↓	1020	1738MW08B-03			X			3	3	1								
6/23/12	1020	1738MW08B-03D			X			3	3	1								
6/24/12	—	1738TB05		X							3	3						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	6/25/12	1100						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	6/26/12	0930	YES ◯ NO ◯		680- [illegible]	[illegible] 2.2° / 3.6°

TAL8240-680 (1008)

Serial Number

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
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Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr / Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE 2 OF 2

STANDARD REPORT DELIVERY — DATE DUE

EXPEDITED REPORT DELIVERY (SURCHARGE) — DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS: BTEX/MTBE; TPH-GRO; TPH-DRO; BTEX/MTBE; TPH-GRO; TPH-DRO

Preservative row: HCl MeOH; NaHSO4 MeOH; –; HCl; HCl; HCl

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	BTEX/MTBE	TPH-GRO	TPH-DRO	BTEX/MTBE	TPH-GRO	TPH-DRO				REMARKS
6/29/12	1410	1738MW07B-00			X			3	3	1							
↓	1410	1738MW07B-00D			X			3	3	1							
	1440	1738MW07B-01			X			3	3	1							
↓	1455	1738MW07B-03			X			3	3	1							
6/29/12	1530	~~1738MW~~ 1738ER13		X							3	3	2				

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	6/29/12	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	06/30/12	0930	YES / NO		680-80561	3.2°/2.6°

Serial Number

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
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Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:
Fax:

- PROJECT REFERENCE: Site 1738
- PROJECT NO.: 125201
- PROJECT LOCATION (STATE): PR
- TAL (LAB) PROJECT MANAGER: Terry Lager
- P.O. NUMBER:
- CONTRACT NO.:
- CLIENT (SITE) PM: Mark DeJohn
- CLIENT PHONE: 412-269-6007
- CLIENT FAX: 375-3996
- CLIENT NAME: Michael Baker Corp
- CLIENT E-MAIL:
- CLIENT ADDRESS: 100 Airside Drive / Moon Twp, PA 15108
- COMPANY CONTRACTING THIS WORK (if applicable):
- PAGE 1 OF
- STANDARD REPORT DELIVERY ○ DATE DUE
- EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE
- NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	BTEX/MtBE	TPH-GRO	TPH-DRO	BTEX/MtBE	TPH-GRO	TPH-DRO					REMARKS
								NaB/MeOH	NaB/MeOH	—	HCl	HCl	HCl					
6/27/12	1540	1738SB104-10			X			3	3	1								
6/27/12	1710	1738SB106-01			X			3	3	1								
6/27/12	1710	1738SB106-01 MS			X			3	3	1								
6/27/12	1710	1738SB106-01 MSD			X			3	3	↓								
6/27/12	1750	1738ER14		X							3	3	1					
6/28/12	—	1738TB06		X							1	1						

- RELINQUISHED BY: (SIGNATURE) [signature] DATE 6/28/12 TIME 1000
- RELINQUISHED BY: (SIGNATURE) DATE TIME
- RELINQUISHED BY: (SIGNATURE) DATE TIME
- RECEIVED BY: (SIGNATURE) DATE TIME
- RECEIVED BY: (SIGNATURE) DATE TIME
- RECEIVED BY: (SIGNATURE) DATE TIME

LABORATORY USE ONLY

- RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]
- DATE 06/29/12
- TIME 0907
- CUSTODY INTACT YES ○ NO ○
- CUSTODY SEAL NO.
- SAVANNAH LOG NO. 680 80791
- LABORATORY REMARKS 4.8°C

Serial Number 55660

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

☒ TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr. / Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ○ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS: BTEX/MtBE, TPH GRO, TPH DRO

PRESERVATIVE

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	BTEX/MtBE	TPH GRO	TPH DRO							REMARKS
8/15/12	1220	1738MW13-12C	G	X				3	3	2							Add "12C" to label ID
↓	1435	1738SB108-01	G		X					1							
8/15/12	1600	1738SB108-08	G		X			3	3	1							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/16/12	1100						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/18/12	1125	YES ○ NO ○		680-82163	3.6°c

Serial Number 55661

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

(X) TestAmerica Savannah
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Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp.	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr / Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 OF 2

STANDARD REPORT DELIVERY (X) DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ( ) DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS: BTEX/MtBE (NaBi/MeOH); TPH GRO (NaBi/MeOH); TPH DRO; BTEX/MtBE (HCl); TPH GRO (HCl); TPH DRO

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	C/G	AQUEOUS	SOLID	AIR	NONAQ.	BTEX/MtBE	TPH GRO	TPH DRO	BTEX/MtBE	TPH GRO	TPH DRO	REMARKS
8/17/12	1015	1738ER15	G	X							3	3	2	
↓	1030	1738SB111-08	G		X			3	3	1				
	1140	1738SB111-11	G		X			3	3	1				
	1355	1738SB111-14	G		X			3	3	1				
↓	1208	1738MW14-12C	G	X							3	3	2	
8/17/12	1432	1738MW15-12C	G	X							3	3	2	
8/17/12	1515	1738ER16	G	X							3	3	2	
8/18/12	0840	1738ER17	G	X							3	3	2	
	1050	1738MW01-12C	G	X	X						3	3	2	
	1115	1738MW01A-12C	G	X	X						3	3	2	
↓	1315	1738MW01B-12C	G	X	X						3	3	2	
8/18/12	1400	1738MW02-12C	G	X							3	3	2	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/20/12	1100						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/21/12	0933	YES ( ) NO ( )		680-82205	4.8/5.1/6.0/5.3/5.1/4.8

TAL-8240-680 (1008)

Serial Number 55662

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

(X) TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR	PAGE 2 OF 2
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:	STANDARD REPORT DELIVERY (X) DATE DUE ______
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996	
CLIENT NAME: Michael Baker Corp	CLIENT E-MAIL: mdejohn@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ( ) DATE DUE ______
CLIENT ADDRESS: 100 Airside Dr./Moon Twp, PA 15108			
COMPANY CONTRACTING THIS WORK (if applicable):			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE / AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS: BTEX/MTBE, TPH GRO, TPH DRO, BTEX/MTBE, TPH GRO, TPH DRO

PRESERVATIVE: NaOH, NaOH, Meth, Meth

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	C/G	AQUEOUS	SOLID	AIR	NONAQ.	BTEX/MTBE	TPH GRO	TPH DRO	BTEX/MTBE	TPH GRO	TPH DRO	REMARKS
8/16/12	1620	1738MW03-12C	G	X							3	3	2	** 1738MW12-12C (water)
8/16/12	1555	1738MW04-12C	G	X							3	3	2	08/16/12 @ 16:08 for MTBE, BTEX, GRO, DRO
	1205	1738MW02R-12C	G	X							3	3	2	** 1738ER18 (water)
	1205	1738MW02R-D-12C	G	X							3	3	2	08/19/12 @ 0845 for MTBE, BTEX, GRO, DRO
	1205	1738MW02R-MS-12C	G	X							3	3	2	** added to COC
	1205	1738MW02R-MSD-12C	G	X							3	3	2	per Shannon Raub
	1605	1738MW10-12C	G	X							3	3	2	request. DDM 8/22/12
	1035	1738MW11-12C	G	X							3	3	2	
	1450	1738MW16-12C	G	X							3	3	2	
8/18/12	1450	1738MW16D-12C	G	X							3	3	2	All sample IDs should
8/20/12	—	1738TB07									1	1		have the "-12C"
* 8/16/12	1320	1738SB108-13 (Soil) - BTEX, MTBE, GRO												suffix
* 8/16/12	0950	1738SB108-09 (Soil) - BTEX, MTBE, GRO, DRO												

*added to COC per Shannon Raub request. DDM 8/22/12

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/20/12	1100						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/21/12	0933	YES ( ) NO ( )		680-82205	

Serial Number 55663

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

☒ TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

◯ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp.	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr. / Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ☒ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ◯ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	BTEX/MtBE	TPH GRO	TPH DRO	BTEX/MtBE	TPH GRO	TPH DRO					REMARKS
		PRESERVATIVE						NaBi Meth	NaBi Meth		HCl	HCl	HCl					
								NUMBER OF CONTAINERS SUBMITTED										
8/20/12	1100	1738SB107-09	G		X			3	3	1								
↓	1100	1738SB107-09D	G		X			3	3	1								
	1140	1738SB107-11	G		X			3	3	1								
	1330	1738SB107-14	G		X			3	3	1								
	1420	1738MW09-12C	G	X							3	3	2					
8/20/12	1635	1738MW09B-12C	G	X							3	3	2					
8/21/12	0945	1738MW17-10	G		X			3	3	1								
↓	1107	1738MW09A-12C	G	X	X						3	3	2					
	1350	1738MW08-12C	G	X	X						3	3	2					
	1640	1738MW08B-12C	G	X							3	3	2					
8/21/12	0850	1738ER19	G	X							3	3	2					
8/22/12	—	1738TB08	G	X							1	1						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/22/12	1100						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/23/12	0953	YES ◯ NO ◯		680-82287	5.2/7.8°C

Serial Number 55666

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

☒ TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

◯ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE	OF
Site 1738	125201	PR	1	2

TAL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Jerry Lanier		

CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mark DeJohn	412-269-6007	375-3996

CLIENT NAME	CLIENT E-MAIL
Michael Baker Corp.	mdejohn@mbakercorp.com

CLIENT ADDRESS: 100 Airside Dr. / Moon Twp., PA 15108

COMPANY CONTRACTING THIS WORK (if applicable):

STANDARD REPORT DELIVERY ☒ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ◯ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE / REQUIRED ANALYSIS / PRESERVATIVE / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	BTEX/MtBE	TPH GRO	TPH DRO	Foc (2974)	BTEX/MtBE	TPH GRO	TPH DRO	Moisture			REMARKS
PRESERVATIVE								NaBi Meth	NaBi Meth			HCl	HCl	HCl				
8/24/12	0850	1738ER20	G	X								3	3	2				
	0915 ~~0850~~	1738SB109-10	G		X			3	3		1				1			
	0945	1738SB109-12	G		X			3	3		1				1			
	1130	1738SB110-08	G		X			3	3		1				1			
	1135	1738MW05L-12C	G	X								3	3	2				
	1145	1738SB110-10	G		X			3	3						1			
	1215	1738SB110-12	G		X			3	3						1			
	1220	1738SB110-13	G		X						1							
	1330	1738MW05R-12C	G	X								3	3	2				
	1425	1738ER21	G	X								3	3	2				
	1620	1738MW07A-12C	G	X								3	3	2				
8/24/12	1215	1738SB110-12D	G		X			3	3									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/27/12	1000						

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/28/12	0955	YES ◯ NO ◯		680-82411	

Serial Number 043666

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	Site 1738
PROJECT NO.	125201
PROJECT LOCATION (STATE)	PR
PAGE	2 OF 2
TAL (LAB) PROJECT MANAGER	Jerry Lanier
P.O. NUMBER	
CONTRACT NO.	
CLIENT (SITE) PM	Mark DeJohn
CLIENT PHONE	412-269-6007
CLIENT FAX	375-3996
CLIENT NAME	Michael Baker Corp
CLIENT E-MAIL	mdejohn@mbakercorp.com
CLIENT ADDRESS	100 Airside Dr. / Moon Twp., PA 15108
COMPANY CONTRACTING THIS WORK (if applicable)	

STANDARD REPORT DELIVERY ☒ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

PRESERVATIVE: HCl, HCl

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	C/G	AQUEOUS	SOLID	AIR	NONAQUEOUS	TPH-GRO (HCl)	BTEX/MTBE (HCl)	TPH DRO	TPH-GRO	BTEX/MTBE	TPH DRO	REMARKS
8/25/12	1105	1738MW07-12C	G	X				3	3	2				
8/25/12	1105	1738MW07D-12C	G	X				3	3	2				
↓	1105	1738MW07MS-12C	G	X				3	3	2				
↓	1105	1738MW07MSD-12C	G	X				3	3	2				
8/25/12	1440	1738MW07B-12C	G	X				3	3	2				
8/26/12	0830	1738ER22	G	X				3	3	2				
8/26/12	0850	1738FB04	G	X				3	3	2				
8/27/12	—	1738TB09	G	X				1	1					
8/22/12	1500	1738SB109-01			X						~~3~~ 8/29/12	3	1	These samples
8/22/12	1450	1738MW05-12C		X				3	3	2				added per
8/22/12	1230	1738MW08A-12C		X				3	3	2				Shannon Raub
8/26/12	1105	1738MW06-12C		X				3	3	2				request. 8/29/12

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/27/12	1000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/28/12	0955	YES ○ NO ○		680-82411	

Serial Number 043667

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

(X) TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Site 1738	PROJECT NO.: 125201	PROJECT LOCATION (STATE): PR
TAL (LAB) PROJECT MANAGER: Jerry Lanier	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark DeJohn	CLIENT PHONE: 412-269-6007	CLIENT FAX: 375-3996
CLIENT NAME: Michael Baker Corp.	CLIENT E-MAIL: mdejohn@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr./Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 OF 1

STANDARD REPORT DELIVERY (X)
DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ( )
DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS / PRESERVATIVE / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	TPH GRO (HCl)	BTEX/MTBE (HCl)	TPH PRO (~~HCl~~)	TCLP VOCs	TCLP Metals/Hg	TPH DRO	TPH GRO (NaBi Meth)	Ign/Corr/React.			REMARKS
8/27/12		1738MW17-12C	G	X				3	3	2								
8/28/12	0830	1738IDW03	C	X				3	3	2								No preservative
8/28/12	0840	1738IDW04	C		X						1	1	1	3	1			
8/28/12	—	1738TB10	G	X				1	1									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	8/28/12	1000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	8/29/12	0945	YES ( ) NO ( )		680-82452	4.8°C

TAL 8240-680 (1008)

APPENDIX B
LABORATORY ANALYTICAL RESULTS

2010 Data Tables

Subsurface Soil

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB101	1738SB101	1738SB101	1738SB101	1738SB101	1738SB102	1738SB102	1738SB102
Sample ID	1738SB101-01	1738SB101-01D	1738SB101-04	1738SB101-06	1738SB101-08	1738SB102-01	1738SB102-04	1738SB102-08
Sample Date	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	7.0 - 9.0	11.0 - 13.0	15.0 - 17.0	1.0 - 3.0	7.0 - 9.0	15.0 - 17.0
Volatiles (µg/kg)								
Xylene, m/p-	8.8 U	7.1 U	10 U	8.6 U	9.3 U	9.8 U	9.2 U	8.6 U
Methyl Tert-Butyl Ether (MTBE)	4.4 U	3.6 U	5 U	2.1 J	37	4.9 U	4.6 U	130
Benzene	4.4 U	3.6 U	5 U	4.3 U	4.6 U	4.9 U	4.6 U	4.3 U
Toluene	4.4 U	3.6 U	5 U	4.3 U	4.6 U	4.9 U	4.6 U	4.3 U
Ethylbenzene	4.4 U	3.6 U	5 U	9.6	4.6 U	4.9 U	4.6 U	4.3 U
o-xylene	3.8 U	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U	4.4 U
Xylenes, total	4.4 U	3.6 U	5 U	4.3 U	4.6 U	4.9 U	4.6 U	4.3 U
BTEX (µg/kg)								
Total BTEX	4.4 U	3.6 U	5 U	9.6 U	4.6 U	4.9 U	4.6 U	4.3 U
TPH (mg/kg)								
Diesel Range Organics (DRO)	11 U	11 U	13 U	12 U	12 U	12 U	13 U	12 U
Gasoline Range Organics (GRO)	0.56 R	0.57 R	0.63 R	0.6 R	0.62 R	0.6 R	0.64 R	0.58 R
Total TPH	11 U	11 U	13 U	12 U	12 U	12 U	13 U	12 U

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB103	1738SB103	1738SB104	1738SB104	1738SB104	1738SB104	1738SB105	1738SB105
Sample ID	1738SB103-01	1738SB103-04	1738SB104-01	1738SB104-04	1738SB104-06	1738SB104-08	1738SB105-01	1738SB105-01D
Sample Date	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	7.0 - 9.0	11.0 - 13.0	15.0 - 17.0	1.0 - 3.0	1.0 - 3.0
Volatiles (µg/kg)								
Xylene, m/p-	8.2 U	7.4 U	0.58 J	9.1 U	8.8 U	8.6 U	8.8 U	9.4 U
Methyl Tert-Butyl Ether (MTBE)	4.1 U	3.7 U	4.5 U	13	4.4 U	4.9	4.4 U	4.7 U
Benzene	4.1 U	3.7 U	4.5 U	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U
Toluene	4.1 U	3.7 U	4.5 U	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U
Ethylbenzene	4.1 U	3.7 U	4.5 U	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U
o-xylene	3.6 U	5 U	4.3 U	4.6 U	4.9 U	4.6 U	4.3 U	4.1 U
Xylenes, total	4.1 U	3.7 U	0.58 J	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U
BTEX (µg/kg)								
Total BTEX	4.1 U	3.7 U	0.58 J	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U
TPH (mg/kg)								
Diesel Range Organics (DRO)	12 U	11 U	11 U	17	12 U	11 U	12 U	12 U
Gasoline Range Organics (GRO)	0.59 R	0.56 R	0.55 R	0.64 R	0.6 R	0.57 R	0.61 R	0.6 R
Total TPH	12 U	11 U	11 U	17	12 U	11 U	12 U	12 U

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB105	1738SB105	1738MW11	1738MW11	1738MW11	1738MW12	1738MW12	1738MW12	1738MW12
Sample ID	1738SB105-04	1738SB105-07	1738MW11-01	1738MW11-04	1738MW11-08	1738MW12-01	1738MW12-01D	1738MW12-04	1738MW12-08
Sample Date	9/20/2010	9/20/2010	9/13/2010	9/13/2010	9/13/2010	9/14/2010	9/14/2010	9/14/2010	9/14/2010
Sample Depth (ft bgs)	7.0 - 9.0	13.0 - 15.0	1.0 - 3.0	7.0 - 9.0	15.0 - 17.0	1.0 - 3.0	1.0 - 3.0	7.0 - 9.0	15.0 - 17.0
Volatiles (µg/kg)									
Xylene, m/p-	7.6 U	10 U	7.5 U	9.8 U	9.4 U	8.9 U	9 U	9.8 U	8.5 U
Methyl Tert-Butyl Ether (MTBE)	3.8 U	5.1 U	3.8 U	4.9 U	3.6 J	4.4 U	4.5 U	4.9 U	4.2 U
Benzene	3.8 U	5.1 U	0.61 J	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
Toluene	3.8 U	5.1 U	3.8 U	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
Ethylbenzene	3.8 U	5.1 U	3.8 U	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
o-xylene	3.7 U	4.5 U	4.6 U	4.4 U	4.3 U	4.4 U	4.7 U	3.8 U	5.1 U
Xylenes, total	3.8 U	5.1 U	3.8 U	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
BTEX (µg/kg)									
Total BTEX	3.8 U	5.1 U	0.61 J	4.9 U	4.7 U	4.4 U	4.5 U	4.9 U	4.2 U
TPH (mg/kg)									
Diesel Range Organics (DRO)	11 U	11 U	12 UJ	13 UJ	12 UJ	12 U	12 U	11 U	11 U
Gasoline Range Organics (GRO)	0.53 R	0.54 R	0.6 R	0.63 R	0.6 R	0.61 R	0.59 R	0.57 R	0.54 R
Total TPH	11 U	11 U	12 U	13 U	12 U	12 U	12 U	11 U	11 U

Groundwater

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW01	1738MW02	1738MW02	1738MW03	1738MW04	1738MW04	1738MW05	1738MW05L
Sample ID	1738GW01	1738GW02	1738GW02D	1738GW03	1738GW04	1738GW04D	1738GW05	1738GW05L
Sample Date	9/16/2010	9/16/2010	9/16/2010	9/18/2010	9/16/2010	9/16/2010	9/18/2010	9/18/2010
Volatiles (µg/L)								
Xylene, m/p-	1 U	1 U	1 U	1000 J	1 U	1 U	1 U	0.43 J
Methyl Tert-Butyl Ether (MtBE)	1100	10	11	44000	0.5 U	0.5 U	5100	3400
Benzene	190	0.5 U	0.5 U	17000	0.5 U	0.5 U	0.5 U	2.5
Toluene	0.5 U	0.5 U	0.5 U	1100	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100	0.5 U	0.5 U	1700	0.5 U	0.5 U	0.5 U	0.57
o-xylene	0.5 U	0.5 U	0.5 U	160 J	0.5 U	0.5 U	0.5 U	0.078 J
Xylenes, total	0.5 U	0.5 U	0.5 U	1200	0.5 U	0.5 U	0.5 U	0.51
BTEX (µg/L)								
Total BTEX	290	0.5 U	0.5 U	21,000	0.5 U	0.5 U	0.5 U	3.58
TPH (mg/L)								
Diesel Range Organics (DRO)	0.5 U	0.54 U	0.53 U	3.7	0.5 U	0.5 U	0.5 U	0.54 U
Gasoline Range Organics (GRO)	1.7	0.5 U	0.5 U	36	0.5 U	0.5 U	1.5	1.1
Total TPH	1.7	1.04 U	1.03 U	39.7	1 U	1 U	1.5	1.1

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW05R	1738MW06	1738MW07	1738MW08	1738MW09	1738MW10	1738MW11	1738MW12
Sample ID	1738GW05R	1738GW06	1738GW07	1738GW08	1738GW09	1738GW10	1738GW11	1738GW12
Sample Date	9/20/2010	9/17/2010	9/21/2010	9/21/2010	9/19/2010	9/19/2010	9/17/2010	9/20/2010
Volatiles (µg/L)								
Xylene, m/p-	250 U	1 U	1 U	1 U	1 U	0.15 J	32	1 U
Methyl Tert-Butyl Ether (MtBE)	9700	0.5 U	25	3	6.3	1600	9800	0.5 U
Benzene	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.66	71	0.5 U
Toluene	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.1	0.5 U
o-xylene	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	32	0.5 U
BTEX (µg/L)								
Total BTEX	130 U	0.5 U	0.5 U	0.5 U	0.5 U	0.81	106.1	0.5 U
TPH (mg/L)								
Diesel Range Organics (DRO)	0.54 U	0.51 U	0.5 U	0.51 U	0.5 U	0.56 U	1.1	0.56 U
Gasoline Range Organics (GRO)	2.5	0.5 U	0.5 U	0.5 U	0.5 U	0.8	2.8	0.5 U
Total TPH	2.5	1.01 U	1 U	1.01 U	1 U	0.8	3.9	1.01 U

Additional Data

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - ADDITIONAL DATA
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW05R	1738MW12	1738SB101	1738SB101	1738SB102	1738SB102	1738SB104	1738SB104
Sample ID	1738GW05R	1738GW12	1738SB101-01	1738SB101-06	1738SB102-04	1738SB102-08	1738SB104-06	1738SB104-08
Sample Date	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010	9/20/2010
Depth			1.0 - 3.0	11.0 - 13.0	7.0 - 9.0	15.0 - 17.0	11.0 - 13.0	15.0 - 17.0
Total Inorganics (µg/L)								
Iron	649 J	500 UJ						
Manganese	580 J	583 J						
Dissolved Inorganics (µg/L)								
Manganese	554 J	564 J						
Conventionals (mg/L)								
Chemical Oxygen Demand	96	64						
Nitrate (as N)	0.34	0.67						
General Chemistry								
Total Organic Carbon (mg/kg)			9660	3940	3110	2870	15700	4650
Microbial Plate Counts (# of colonies)								
Actinobacillus	450							
Brevundimonas vesicularis		5000						
Ralstonia		13000						
Pseudomonas resinovorans		28000						
Pseudomonas aeruginosa		2000						
Pasturella		700000						

Qualifiers/Notes:
UJ - Reported quantitation limit is qualified as estimated
J - The analyte was positively identified; the quantitation is an estimation
µg/L - micrograms per liter
mg/L - milligrams per liter
mg/kg - milligrams per kilogram

QA/QC Data

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - QUALITY ASSURANCE / QUALITY CONTROL
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates							
Sample ID	1738ER01	1738ER02	1738ER03	1738ER04	1738ER05	1738ER06	1738ER07	1738ER08
Sample Date	9/13/2010	9/14/2010	9/16/2010	9/17/2010	9/18/2010	9/19/2010	9/20/2010	9/21/2010
Volatiles (µg/L)								
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Tert-Butyl Ether (MtBE)	0.5 U	0.5 U	0.5 U	0.12 J	0.059 J	0.042 J	0.042 J	0.5 U
Benzene	0.5 U	0.5 U	0.5 U	0.27 J	0.2 J	0.17 J	0.13 J	0.071 J
Toluene	0.13 J	0.13 J	0.11 J	0.11 J	0.1 J	0.13 J	0.089 J	0.088 J
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.065 J	0.046 J	0.041 J	0.5 U	0.5 U
o-xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BTEX (µg/L)								
Total BTEX	0.13 J	0.13 J	0.11 J	0.45 J	0.35 J	0.34 J	0.22 J	0.16 J
TPH (mg/L)								
Diesel Range Organics (DRO)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U	0.5 U
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total BTEX	1 U	1 U	1 U	1 U	1 U	1 U	1.01 U	1 U

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - QUALITY ASSURANCE / QUALITY CONTROL
1738 MTBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blank	Trip Blanks		
Sample ID	1738FB01	1738TB01	1738TB02	1738TB03
Sample Date	9/14/2010	9/16/2010	9/17/2010	9/21/2010
Volatiles (µg/L)				
Xylene, m/p-	1 U	1 U	1 U	1 U
Methyl Tert-Butyl Ether (MtBE)	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	0.5 U	0.5 U	0.11 J	0.5 U
Toluene	0.11 J	0.093 J	0.091 J	0.1 J
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U
BTEX (µg/L)				
Total BTEX	0.11 J	0.09 J	0.2 J	0.1 J
TPH (mg/L)				
Diesel Range Organics (DRO)	0.091 J	NA	NA	NA
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U
Total BTEX	0.09 J	0.5 U	0.5 U	0.5 U

ANALYSIS DATA SHEET
EPA 8015C DRO

1738IDW01

Client: BAKER ENVIRONMENTAL, INC. SDG 1009240 Project: NAPR AOCF 1738/N62470-10-D-3000

Matrix: Water Extraction: EPA 3510C_GC File ID: 076k1009240-01.d Sampled: 09/21/10 09:30

Initial/Final: 975mL / 2500uL Sulfur Cleanup: N Lab ID: 1009240-01 Received: 09/22/10 08:58

Dilution: 1 pH: Florisil Cleanup: N Prepared: 09/23/10 17:45

% Moisture: NA GPC Cleanup: N GPC Cleanup Factor: N Analyzed: 09/25/10 04:58

Batch: 0092305 Sequence: 0I29007 Calibration: 0092405 Instrument: varian44

CAS NO.	COMPOUND	CONC. (mg/L)	DL	LOD	LOQ	Q
9999-99-5	Diesel Range Organics (DRO)	0.12	0.093	0.15	0.51	J

SURROGATE RECOVERY RESULTS	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
o-Terphenyl	0.2564	0.2546	99	47 - 112	

Environmental Testing Laboratories CompuChem A Division Of Liberty Analytical Corp.

ANALYSIS DATA SHEET

EPA 8015C GRO

1738IDW01

Client: BAKER ENVIRONMENTAL, INC. SDG 1009240 Project: NAPR AOCF 1738/N62470-10-D-3000

Matrix: Water Preparation: SW 5030A/5030B File ID: 116d1009240-01.d Sampled: 09/21/10 09:30

Initial/Final: 5mL / 5mL Lab ID: 1009240-01 Received: 09/22/10 08:58

Dilution: 1 pH: Assoc Blank: 0092807-BLK1 Prepared: 09/28/10 09:01

% Moisture: NA Analyzed: 09/28/10 16:25

Batch: 0092807 Sequence: 0I28003 Calibration: 0082703 Instrument: 5890hp55-56

CAS NO.	COMPOUND	CONC. (mg/L)	DL	LOD	LOQ	Q
9999-99-7	Gasoline	0.94	0.17	0.42	0.50	

SURROGATE RECOVERY RESULTS	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
1,4-Dichlorobutane	5.000	4.772	95	40 - 160	

Environmental Testing Laboratories

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ANALYSIS DATA SHEET

EPA 8015C DRO

1738IDW02

Client: BAKER ENVIRONMENTAL, INC. SDG 1009241 Project: NAPR AOCF 1738/N62470-10-D-3000

Matrix: Soil Extraction: EPA 3550B_GC File ID: 215k1009241-02.d Sampled: 09/21/10 09:40

Initial/Final: 20g / 1000uL Sulfur Cleanup: N Lab ID: 1009241-02 Received: 09/22/10 08:58

Dilution: 1 pH: Florisil Cleanup: N Prepared: 09/28/10 22:00

% Moisture: 14 GPC Cleanup: N GPC Cleanup Factor: N Analyzed: 10/05/10 19:33

Batch: 0092701 Sequence: 0J06020 Calibration: 0092405 Instrument: varian44

CAS NO.	COMPOUND	CONC. (mg/kg dry)	DL	LOD	LOQ	Q
9999-99-5	Diesel Range Organics (DRO)	6.3	0.90	4.1	12	J

SURROGATE RECOVERY RESULTS	ADDED (mg/kg dry)	CONC (mg/kg dry)	% REC	QC LIMITS	Q
o-Terphenyl	14.60	13.14	90	30 - 127	

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ANALYSIS DATA SHEET

EPA 8015C GRO

1738IDW02

Client: BAKER ENVIRONMENTAL, INC. SDG 1009241 Project: NAPR AOCF 1738/N62470-10-D-3000

Matrix: Soil Preparation: SW 5035/5035A File ID: 077e1009241-02.d Sampled: 09/21/10 09:40

Initial/Final: 5g / 5mL Lab ID: 1009241-02 Received: 09/22/10 08:58

Dilution: 1 pH: Assoc Blank: 0093004-BLK1 Prepared: 09/30/10 09:29

% Moisture: 14 Analyzed: 09/30/10 21:32

Batch: 0093004 Sequence: 0I30007 Calibration: 0101301 Instrument: 5890hp55-56

CAS NO.	COMPOUND	CONC. (mg/kg dry)	DL	LOD	LOQ	Q
9999-99-7	Gasoline		0.12	0.43	0.58	U

SURROGATE RECOVERY RESULTS	ADDED (mg/kg dry)	CONC (mg/kg dry)	% REC	QC LIMITS	Q
1,4-Dichlorobutane	5.838	4.360	75	40 - 160	

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ANALYSIS DATA SHEET

1738IDW02

Client: BAKER ENVIRONMENTAL, INC. SDG: 1009241 Project: NAPR AOCF 1738/N62470-10-D-3000

Lab ID: 1009241-01 % Solid: Matrix: Soil Sampled: 09/21/10 Received: 09/22/10

CAS NO.	Analyte	Conc. (ug/L)	DL	LOD	LOQ	D.F.	Q	Method	Sequence	Analyzed
7440-38-2	Arsenic	2.9	2.4	5.0	10	1	J	EPA 6010C	0J20010	10/19/10 13:40:07
7440-39-3	Barium	120	15	100	200	1	J	EPA 6010C	0J20010	10/19/10 13:40:07
7440-43-9	Cadmium		0.64	2.5	5.0	1	U	EPA 6010C	0J20010	10/19/10 13:40:07
7440-47-3	Chromium	3.9	0.75	5.0	10	1	J	EPA 6010C	0J20010	10/19/10 13:40:07
7439-92-1	Lead	2.2	1.6	5.0	10	1	J	EPA 6010C	0J20010	10/19/10 13:40:07
7439-97-6	Mercury		0.0910	0.180	0.200	1	U	EPA 7470A	0J21008	10/11/10 17:02:06
7782-49-2	Selenium	9.1	2.0	2.5	10	1	J	EPA 6010C	0J20010	10/19/10 13:40:07
7440-22-4	Silver		0.63	2.5	5.0	1	U	EPA 6010C	0J20010	10/19/10 13:40:07

ANALYSIS DATA SHEET

SW 8260B

1738IDW02

Client: BAKER ENVIRONMENTAL, INC. SDG 1009241 Project: NAPR AOCF 1738/N62470-10-D-3000

Matrix: Soil Preparation: SW 5030A/5030B File ID: 1009241-0191.d Sampled: 09/21/10 09:40

Initial/Final: 5mL / 5mL Lab ID: 1009241-01 Received: 09/22/10 08:58

Dilution: 5 pH: 5 Assoc Blank: 0100503-BLK1 Prepared: 10/05/10 12:26

% Moisture: NA Analyzed: 10/05/10 18:54

Batch: 0100503 Sequence: 0J05005 Calibration: 0100708 Instrument: 5975hpms91

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
75-01-4	Vinyl chloride		2.4	2.5	25	U
75-35-4	1,1-Dichloroethene		2.7	10	25	U
78-93-3	2-Butanone		7.5	25	63	U
67-66-3	Chloroform		1.4	2.5	25	U
56-23-5	Carbon tetrachloride		1.6	2.5	25	U
107-06-2	1,2-Dichloroethane		1.2	2.5	25	U
71-43-2	Benzene		1.4	2.5	25	U
79-01-6	Trichloroethene	17	1.4	2.5	25	JD
127-18-4	Tetrachloroethene		2.1	2.5	25	U
108-90-7	Chlorobenzene		1.4	2.5	25	U

SURROGATE RECOVERY RESULTS	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Dibromofluoromethane	50.00	46.5	93	85 - 115	
1,2-Dichloroethane-d4	50.00	44.6	89	70 - 120	
Toluene-d8	50.00	42.6	85	85 - 120	
Bromofluorobenzene	50.00	40.9	82	75 - 120	

CAS NO.	TICS	CONC. (ug/L)	Response	R.T.	% Match	Q
NA	Tentatively Identified Compounds	0.0				U

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ANALYSIS DATA SHEET

1738IDW02

Client: BAKER ENVIRONMENTAL, INC. SDG: 1009241 Project: NAPR AOCF 1738/N62470-10-D-3000

Lab ID: 1009241-02 % Solid: 85.6 Matrix: Soil Sampled: 09/21/10 Received: 09/22/10

CAS NO.	Analyte	Conc. (pH Units)	DL	LOD	LOQ	D.F.	Q	Method	Sequence	Analyzed
CORROSIVI	Corrosivity-pH	8.75				1		EPA 9040B		10/01/10 16:53
CAS NO.	**Analyte**	**Conc. (mg/kg dry)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Sequence**	**Analyzed**
RCYAN	Reactive Cyanide		1.17		146	1	U	9014		10/01/10 16:54
RSULF	Reactive Sulfide		146		146	1	U	EPA 9034		10/01/10 16:55
CAS NO.	**Analyte**	**Conc. (degree F dry)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Sequence**	**Analyzed**
IGNIT	Ignitability by Flashpoint	>140				1		EPA 1010A		10/01/10 14:45

2012 Data Tables

Surface Soil

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW01B		1738MW02R		1738MW07B		1738MW07B		1738MW08B		1738MW09B	
Sample ID	1738MW01B-00		1738MW02R-00		1738MW07B-00		1738MW07B-00D		1738MW08B-00		1738MW09B-00	
Date	6/13/2012		6/16/2012		6/24/2012		6/24/2012		6/23/2012		6/17/2012	
Depth Range (ft bgs)	0.0 - 1.0		0.0 - 1.0		0.0 - 1.0		0.0 - 1.0		0.0 - 1.0		0.0 - 1.0	
Volatile Organics (µg/kg)												
Benzene	1.3	U	0.99	U	0.96	U	0.93	U	1	U	1	U
Ethylbenzene	1.7	U	1.3	U	1.2	U	1.2	U	1.3	U	1.3	U
Methyl tert-butyl ether	2.7	U	2	U	1.9	U	1.9	U	2	U	2.1	U
Toluene	1.3	U	0.99	U	0.96	U	0.93	U	1	U	1	U
Xylenes, Total	1.5	U	1.1	U	1.1	U	1	U	1.1	U	1.1	U
BTEX (µg/kg)												
Total BTEX	1.7	U	1.3	U	1.2	U	1.2	U	1.3	U	1.3	U
TPH DRO and GRO (mg/kg)												
Diesel Range Organics	36		20		13		9.6		24		28	
Gasoline Range Organics	0.077	J	0.06	U	0.049	UJ	0.066	J	0.056	U	0.053	U
Total TPH	36.077	J	20		13		9.666	J	24		28	

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW13		1738MW14		1738MW15		1738MW16		1738MW16	
Sample ID	1738MW13-00		1738MW14-00		1738MW15-00		1738MW16-00		1738MW16-00D	
Date	6/15/2012		6/16/2012		6/16/2012		6/21/2012		6/21/2012	
Depth Range (ft bgs)	0.0 - 1.0		0.0 - 1.0		0.0 - 1.0		0.0 - 1.0		0.0 - 1.0	
Volatile Organics (µg/kg)										
Benzene	1.3	J	0.93	U	1	U	1.1	U	1.1	U
Ethylbenzene	1.5	U	1.2	U	1.3	U	1.5	U	1.4	U
Methyl tert-butyl ether	2.4	U	1.9	U	2	U	2.3	U	2.2	U
Toluene	1.2	U	0.93	U	1	U	1.1	U	1.1	U
Xylenes, Total	1.3	U	1	U	1.1	U	1.2	U	1.2	U
BTEX (µg/kg)										
Total BTEX	1.3	J	1.2	U	1.2	U	1.5	U	1.4	U
TPH DRO and GRO (mg/kg)										
Diesel Range Organics	25		56		14		17		16	
Gasoline Range Organics	0.048	U	0.054	U	0.24	J	0.12	J	0.14	J
Total TPH	25		56		14.24	J	17.12	J	16.14	J

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Note/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.
U - Non detected at the Limit of Detection.
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
ft bgs - feet below ground surface
GRO - Gasoline Range Organics
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
MtBE - Methyl tert-butyl ether
TPH - Total Petroleum Hydrocarbons

Subsurface Soil

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW01B	1738MW01B	1738MW01B	1738MW02R	1738MW02R	1738MW02R
Sample ID	1738MW01B-01	1738MW01B-06	1738MW01B-11	1738MW02R-01	1738MW02R-07	1738MW02R-10
Date	6/13/2012	6/13/2012	6/13/2012	6/16/2012	6/16/2012	6/16/2012
Depth Range (ft bgs)	1.0 - 3.0	11.0 - 13.0	21.0 - 23.0	1.0 - 3.0	13.0 - 15.0	19.0 - 20.0
Volatile Organics (µg/mg)						
Benzene	1 U	0.98 U	100 U	1.2 U	1.1 U	12000
Ethylbenzene	1.4 U	1.3 U	4500	1.5 U	1.4 U	19000
Methyl tert-butyl ether	2.1 U	2 U	200 U	2.3 U	2.2 U	12000
Toluene	1 U	0.98 U	100 U	1.2 U	1.1 U	3400
Xylenes, Total	1.1 U	1.1 U	110 U	1.3 U	1.2 U	91000
BTEX (µg/kg)						
Total BTEX	1.4 U	1.3 U	4500	1.5 U	1.4 U	125400
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	22 U	33	42	14	5.9	210
Gasoline Range Organics	0.056 U	0.11 J	11	0.049 U	1.3	1000 J
Total TPH	22	33.11 J	53	14	7.2	1210
General Chemistry						
FOC (%)	NA	NA	NA	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW02R	1738MW07B	1738MW07B	1738MW08B	1738MW08B	1738MW08B
Sample ID	1738MW02R-17	1738MW07B-01	1738MW07B-03	1738MW08B-01	1738MW08B-03	1738MW08B-03D
Date	6/16/2012	6/24/2012	6/24/2012	6/23/2012	6/23/2012	6/23/2012
Depth Range (ft bgs)	33.0 - 35.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	5.0 - 7.0	5.0 - 7.0
Volatile Organics (µg/mg)						
Benzene	4.8	0.96 U	1 U	0.93 U	0.98 U	1 U
Ethylbenzene	1.2 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U
Methyl tert-butyl ether	120	1.9 U	29	1.9 U	8.3 J	17 J
Toluene	4.9	0.96 U	1 U	0.93 U	0.98 U	1 U
Xylenes, Total	5.6 J	1.1 U	1.1 U	1 U	1.1 U	1.1 U
BTEX (µg/kg)						
Total BTEX	15.3	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	4.4 U	6.2 U	4.5 U	6.9 U	5.3 U	2.8 U
Gasoline Range Organics	0.05 U	0.063 J	0.057 U	0.048 U	0.047 U	0.053 U
Total TPH	4.4	6.263 J	4.5	6.9	5.3	2.8 U
General Chemistry						
FOC (%)	NA	NA	NA	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW09B		1738MW09B		1738MW09B		1738MW13		1738MW13		1738MW13	
Sample ID	1738MW09B-01		1738MW09B-03		1738MW09B-03D		1738MW13-01		1738MW13-03		1738MW13-12	
Date	6/17/2012		6/17/2012		6/17/2012		6/14/2012		6/14/2012		6/14/2012	
Depth Range (ft bgs)	1.0 - 3.0		5.0 - 7.0		5.0 - 7.0		1.0 - 3.0		5.0 - 7.0		23.0 - 24.0	
Volatile Organics (µg/mg)												
Benzene	0.93	U	0.98	U	0.99	U	0.89	U	0.98	U	140	U
Ethylbenzene	1.2	U	1.3	U	1.3	U	1.2	U	1.3	U	2900	
Methyl tert-butyl ether	1.9	U	46		32		1.8	U	2	U	280	U
Toluene	0.93	U	0.98	U	0.99	U	0.89	U	0.98	U	140	U
Xylenes, Total	1	U	1.1	U	1.1	U	0.98	U	1.1	U	3200	
BTEX (µg/kg)												
Total BTEX	1.2	U			1.3	U	1.2	U	1.3	U	6100	
TPH DRO and GRO (mg/kg)												
Diesel Range Organics	4.8	U	1.3	U	5.6	U	9	U	6.5	U	31	
Gasoline Range Organics	0.046	U	0.047	U	0.047	U	0.054	U	0.053	U	260	
Total TPH	4.8		13	J	5.6	J	9		6.5		291	
General Chemistry												
FOC (%)	NA		NA		NA		NA		NA		NA	
TOD (g/kg)	NA		NA		NA		NA		NA		NA	

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW14	1738MW14	1738MW14	1738MW14	1738MW15	1738MW15
Sample ID	1738MW14-01	1738MW14-01D	1738MW14-09	1738MW14-11	1738MW15-01	1738MW15-05
Date	6/16/2012	6/16/2012	6/16/2012	6/16/2012	6/16/2012	6/16/2012
Depth Range (ft bgs)	1.0 - 3.0	1.0 - 3.0	17-19	21.0 - 23.0	1.0 - 3.0	9.0 - 11.0
Volatile Organics (µg/mg)						
Benzene	0.86 U	0.82 U	0.96 U	0.92 U	0.88 U	0.81 U
Ethylbenzene	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U
Methyl tert-butyl ether	1.7 U	1.6 U	1.9 U	1.8 U	1.8 U	1.6 U
Toluene	0.86 U	0.82 U	0.96 U	0.92 U	0.88 U	0.81 U
Xylenes, Total	0.95 U	0.91 U	1.1 U	1 U	0.96 U	0.89 U
BTEX (µg/kg)						
Total BTEX	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	12	8.4	6.9	5.1 U	7	10
Gasoline Range Organics	0.04 U	0.041 U	0.038 U	0.042 U	0.046 U	0.073 J
Total TPH	12	8.4	6.9	5.1	7	10.073
General Chemistry						
FOC (%)	NA	NA	NA	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA

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SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW15	1738MW16	1738MW16	1738MW17	1738SB104	1738SB106
Sample ID	1738MW15-10	1738MW16-01	1738MW16-03	1738MW17-10	1738SB104-10	1738SB106-01
Date	6/16/2012	6/21/2012	6/21/2012	8/21/2012	6/27/2012	6/27/2012
Depth Range (ft bgs)	19.0 - 21.0	1.0 - 3.0	5.0 - 7.0	19.0 - 20.0	19.0 - 20.0	1.0 - 3.0
Volatile Organics (µg/mg)						
Benzene	0.92 U	1 U	1.1 U	1.1 U	35 U	0.89 U
Ethylbenzene	1.2 U	1.3 U	1.4 U	1.4 U	2200	1.2 U
Methyl tert-butyl ether	1.8 U	2 U	2.2 U	3.3 J	70 U	1.8 U
Toluene	0.92 U	1 U	1.1 U	1.1 U	35 U	0.89 U
Xylenes, Total	1 U	1.1 U	1.2 U	1.2 U	2900	0.98 U
BTEX (µg/kg)						
Total BTEX	1.2 U	1.3 U	1.4 U	1.4 U	5100	1.2 U
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	4.1 U	10	7.8 U	2.5 U	27 J	5.7 U
Gasoline Range Organics	0.043 U	0.048 U	0.056 U	0.047 U	63	0.042 U
Total TPH	4.1	10	7.8	2.5 U	90 J	5.7
General Chemistry						
FOC (%)	NA	NA	NA	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA

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SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB107	1738SB107	1738SB107	1738SB107	17386B108	1738SB108
Sample ID	1738SB107-09	1738SB107-09D	1738SB107-11	1738SB107-14	1738SB108-01	1738SB108-08
Date	8/20/2012	8/20/2012	8/20/2012	8/20/2012	8/15/2012	8/15/2012
Depth Range (ft bgs)	17.0 - 18.0	17.0 - 18.0	21.0 - 22.0	27.0 - 28.0	1.0 - 3.0	15.0 - 16.0
Volatile Organics (µg/mg)						
Benzene	4100 J	5100 J	17000	150 J	NA	530
Ethylbenzene	24000 J	47000 J	46000	51 U	NA	110 J
Methyl tert-butyl ether	3600 J	3700 J	32000	8100	NA	3400
Toluene	950 J	2900 U	970 U	40 U	NA	35 U
Xylenes, Total	120000 J	240000 J	49000	43 U	NA	39 U
BTEX (µg/kg)						
Total BTEX	149050	292100	112000	150 J	NA	640 J
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	100	77	48	2.5 U	63	4 U
Gasoline Range Organics	780	560	330	0.47	NA	0.57
Total TPH	880	637	378	0.47	NA	4.57
General Chemistry						
FOC (%)	NA	NA	NA	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA

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SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB108	1738SB108	1738SB109	1738SB109	1738SB109	1738SB110
Sample ID	1738SB108-09	1738SB108-13	1738SB109-01	1738SB109-10	1738SB109-12	1738SB110-08
Date	8/16/2012	8/16/2012	8/22/2012	8/24/2012	8/24/2012	8/24/2012
Depth Range (ft bgs)	17.0 - 18.0	26.0 - 27.0	1.0 - 3.0	19.0 - 20.0	23.0 - 25.0	16.0 - 17.0
Volatile Organics (µg/mg)						
Benzene	1600	32 U	1.1 U	0.9 U	0.84 U	190 J
Ethylbenzene	7800	41 U	1.5 U	1.2 U	1.1 U	510
Methyl tert-butyl ether	3400	490	1.2 J	2.9 J	8 J	3000
Toluene	190 J	32 U	1.1 U	0.9 U	0.84 U	41 U
Xylenes, Total	32000	35 U	1.2 U	0.99 U	0.92 U	2400
BTEX (µg/kg)						
Total BTEX	41590 J	41 U	1.5 U	1.2 U	1.1 U	3100 J
TPH DRO and GRO (mg/kg)						
Diesel Range Organics	46	NA	10	NA	NA	NA
Gasoline Range Organics	580	0.038 U	0.058 U	0.05 U	0.048 U	220
Total TPH	626	NA	10	NA	NA	NA
General Chemistry						
FOC (%)	NA	NA	NA	0.51	0.93	0.63
TOD (g/kg)	NA	NA	NA	3.6	NA	1.3

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SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738SB110	1738SB110	1738SB110	1738SB110	1738SB111	1738SB111	1738SB111
Sample ID	1738SB110-10	1738SB110-12	1738SB110-12D	1738SB110-13	1738SB111-08	1738SB111-11	1738SB111-14
Date	8/24/2012	8/24/2012	8/24/2012	8/24/2012	8/17/2012	8/17/2012	8/17/2012
Depth Range (ft bgs)	20.0 - 21.0	24.0 - 25.0	24.0 - 25.0	26.0 - 27.0	17.0 - 18.0	21.0 - 22.0	28.0 - 29.0
Volatile Organics (µg/mg)							
Benzene	7600	40 J	38 J	NA	7000	9200	280
Ethylbenzene	18000	67 J	50 UJ	NA	26000	4900	72 J
Methyl tert-butyl ether	5700 J	1800	1900	NA	15000	48000	6400
Toluene	59000	190 J	65 J	NA	8000	2000	140 J
Xylenes, Total	110000	410 J	43 UJ	NA	120000	19000	270 J
BTEX (µg/kg)							
Total BTEX	194600	707 J	103 J	NA	161000	35100	762 J
TPH DRO and GRO (mg/kg)							
Diesel Range Organics	NA	NA	NA	NA	170	8.8 U	2.4 U
Gasoline Range Organics	1900	0.18 J	0.1 J	NA	790	39	0.33
Total TPH	NA	NA	NA	NA	960	47.8	0.33
General Chemistry							
FOC (%)	NA	NA	NA	1	NA	NA	NA
TOD (g/kg)	NA	NA	NA	NA	NA	NA	NA

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SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVTY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated: The analyte was postiviely identified; the quantitation is an estimation.
U - Non detected at the Limit of Detection.
UJ - Reported quantitation limit is qualified as estimated.
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
DRO - Diesel Range Organics
FOC - Fractional Organics Carbon
ft bgs - feet below ground surface
g/kg - gram per kilogram
GRO - Gasoline Range Organics
µg/kg - microgram per kilogram
mg/kg - milligram per kilogram
MtBE - Methyl tert-butyl ether
NA - Not Analyzed
% - Percent
TOD - Total Oxidant Demand
TPH - Total Petroleum Hydrocarbons

Groundwater

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW01	1738MW01A	1738MW01B	1738MW02	1738MW02R	1738MW02R	1738MW03
Sample ID	1738MW01-12C	1738MW01A-12C	1738MW01B-12C	1738MW02-12C	1738MW02R-12C	1738MW02R-D-12C	1738MW03-12C
Date	8/18/2012	8/18/2012	8/18/2012	8/18/2012	8/18/2012	8/18/2012	8/18/2012
Volatile Organics (µg/L)							
Benzene	1.2	2.4	0.25 U	2.5	4200	3900	19000
Ethylbenzene	1.9	9.5	0.25 U	0.66 J	570	540	1700
Methyl tert-butyl ether	210	170	5600	3.2 J	39000	39000	43000
Toluene	0.33 U	0.33 U	0.33 U	0.33 U	610	550	1500
Xylenes, Total	0.75 U	9.6	0.75 U	0.75 U	2500	2600	2100
BTEX (µg/L)							
Total BTEX	3.1	21.5	0.75 U	3.16 J	7880	7590	24300
TPH DRO and GRO (mg/L)							
Diesel Range Organics	0.65	2.5	0.19 U	0.35	4.4 J	3.9	4.9
Gasoline Range Organics	0.071	0.29	0.44	0.3	17	19	40
Total TPH	0.721	2.79	0.44	0.65	21.4 J	22.9	44.9

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SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW04		1738MW05		1738MW05L		1738MW05R		1738MW06		1738MW07		1738MW07	
Sample ID	1738MW04-12C		1738MW05-12C		1738MW05L-12C		1738MW05R-12C		1738MW06-12C		1738MW07-12C		1738MW07D-12C	
Date	8/18/2012		8/22/2012		8/24/2012		8/24/2012		8/26/2012		8/25/2012		8/25/2012	
Volatile Organics (µg/L)														
Benzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Methyl tert-butyl ether	0.5	U	6700		2400		14000		0.5	U	69		69	
Toluene	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
Xylenes, Total	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
BTEX (µg/L)														
Total BTEX	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
TPH DRO and GRO (mg/L)														
Diesel Range Organics	0.07	U	0.077	U	0.05	U	0.05	U	0.049	U	0.05	U	0.051	U
Gasoline Range Organics	0.025	U	0.12		0.2		0.62		0.038	J	0.025	U	0.025	U
Total TPH	0.07	U	0.12		0.2		0.62		0.038	J	0.05	U	0.051	U

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SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW07A		1738MW07B		1738MW08		1738MW08A		1738MW08B		1738MW09		1738MW09A	
Sample ID	1738MW07A-12C		1738MW07B-12C		1738MW08-12C		1738MW08A-12C		1738MW08B-12C		1738MW09-12C		1738MW09A-12C	
Date	8/24/2012		8/25/2012		8/21/2012		8/22/2012		8/21/2012		8/20/2012		8/21/2012	
Volatile Organics (µg/L)														
Benzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Methyl tert-butyl ether	130		93		130		0.5	U	590		31		28	
Toluene	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
Xylenes, Total	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
BTEX (µg/L)														
Total BTEX	0.75	U	0.75	U	0.75	U	75	U	0.75	U	0.75	U	0.75	U
TPH DRO and GRO (mg/L)														
Diesel Range Organics	0.24		0.1		0.061	U	0.06	U	0.087	U	0.073	U	0.28	
Gasoline Range Organics	0.025	U	0.025	U	0.014	J	0.025	U	0.061		0.025	U	0.025	U
Total TPH	0.24		0.1		0.014	J	0.06	U	0.061		0.073	U	0.28	

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SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW09B		1738MW10		1738MW11		1738MW12		1738MW13		1738MW14		1738MW15	
Sample ID	1738MW09B-12C		1738MW10-12C		1738MW11-12C		1738MW12-12C		1738MW13-12C		1738MW14-12C		1738MW15-12C	
Date	8/20/2012		8/18/2012		8/18/2012		8/16/2012		8/15/2012		8/17/2012		8/17/2012	
Volatile Organics (µg/L)														
Benzene	0.25	U	0.51	J	16	J	0.25	U	0.48	J	0.25	U	0.25	U
Ethylbenzene	0.25	U	0.19	J	13	U	0.25	U	0.25	U	0.25	U	0.25	U
Methyl tert-butyl ether	260		1300		6900		0.5	U	44		0.38	J	160	
Toluene	0.33	U	0.33	U	20	J	0.33	U	0.33	U	0.33	U	0.33	U
Xylenes, Total	0.75	U	0.87	J	38	U	0.75	U	0.75	U	0.75	U	0.75	U
BTEX (µg/L)														
Total BTEX	0.75	U	1.57	J	36	J	0.75	U	0.75	U	0.75	U	0.75	U
TPH DRO and GRO (mg/L)														
Diesel Range Organics	0.066	U	0.074	U	1.2		0.055	U	0.2	U	0.067	U	0.43	
Gasoline Range Organics	0.019	J	0.12		0.62		0.025	U	0.024	J	0.025	U	0.011	J
Total TPH	0.019	J	0.12		1.82		0.055	U	0.024	J	0.067	U	0.441	J

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SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	1738MW16	1738MW16	1738MW17
Sample ID	1738MW16-12C	1738MW16D-12C	1738MW17-12C
Date	8/18/2012	8/18/2012	8/27/2012
Volatile Organics (µg/L)			
Benzene	0.25 UJ	1.1 J	0.25 U
Ethylbenzene	0.25 U	0.5 U	0.11 J
Methyl tert-butyl ether	180	200	1.1 J
Toluene	0.33 UJ	1.4 J	0.33 U
Xylenes, Total	0.75 U	1.5 U	0.22 J
BTEX (µg/L)			
Total BTEX	0.75 U	2.5 J	0.33 J
TPH DRO and GRO (mg/L)			
Diesel Range Organics	0.17 U	0.19 U	0.25 J
Gasoline Range Organics	0.015 J	0.013 J	0.025 U
Total TPH	0.015 J	0.013 J	0.25 J

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SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.
U - Non detected at the Limit of Detection.
UJ - Reported quantitation limit is qualified as estimated.
BTEX - Benzene, toluene, ethylbenzene, xyelene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
MCLs - Maximum Contaminant Levels
µg/L - microgram per liter
mg/L - milligram per liter
MtBE - Methyl tert-butyl ether
TPH - Total Petroleum Hydrocarbons

QA/QC Data

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - QA/QC
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates											
Site ID	1738ER09	1738ER10	1738ER11	1738ER12	1738ER13	1738ER14	1738ER15	1738ER16	1738ER17	1738ER18	1738ER19	1738ER20
Date	6/15/2012	6/16/2012	6/17/2012	6/21/2012	6/24/2012	6/27/2012	8/17/2012	8/17/2012	8/18/2012	8/19/2012	8/21/2012	8/24/2012
Volatile Organics (µg/L)												
Benzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Ethylbenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.34 J	0.33 U	0.33 U	0.33 U
Xylenes, Total	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)												
Total BTEX	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.72 U	0.34 J	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)												
Diesel Range Organics	0.66	0.14	0.21	0.12	0.16	0.29	0.29	0.42	0.31	0.25	0.19	0.15
Gasoline Range Organics	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Total TPH	0.66	0.14	0.21	0.12	0.16	0.29	0.29	0.42	0.31	0.25	0.19	0.15

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SUMMARY OF ANALYTICAL RESULTS - QA/QC
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		Field Blanks		Trip Blanks						
Site ID	1738ER21	1738ER22	1738FB03	1738FB04	1738TB04	1738TB05	1738TB06	1738TB07	1738TB08	1738TB09	1738TB10
Date	8/24/2012	8/26/2012	6/15/2012	8/26/2012	6/18/2012	6/24/2012	6/28/2012	8/20/2012	8/22/2012	8/27/2012	8/28/2012
Volatile Organics (µg/L)											
Benzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Ethylbenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Methyl tert-butyl ether	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.33 U	0.36 J	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Xylenes, Total	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
BTEX (µg/L)											
Total BTEX	0.75 U	0.36 J	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
TPH DRO and GRO (mg/L)											
Diesel Range Organics	0.14	0.081 J	0.18	0.057 J	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Total TPH	0.14	0.081 J	0.18	0.057 J	NA	NA	NA	NA	NA	NA	NA

Notes/Qualifiers:

J - Estimated: The analyte was positively identified; the quantitation is an estimation.
U - Non detected at the limit of detection.
BTEX - Benzene, toluene, ethylbenzene, xylene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
µg/L - microgram per liter
mg/L - milligram per liter
MtBE - Methyl tert-butyl ether
QA/QC - Quality Assurance/Quality Control
TPH - Total Petroleum Hydrocarbons

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - IDW
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	1738IDW03		1738IDW04	
Date	8/28/2012		8/28/2012	
	Aqueous		Solid	
Volatile Organics	µg/L			
Benzene	0.25	U	NA	
Ethylbenzene	0.25	U	NA	
Methyl tert-butyl ether	10		NA	
Toluene	0.33	U	NA	
Xylenes, Total	0.75	U	NA	
TCLP Metals			mg/L	
Arsenic	NA		0.2	U
Barium	NA		1	U
Cadmium	NA		0.1	U
Chromium	NA		0.2	U
Lead	NA		0.2	U
Mercury	NA		0.02	UJ
Selenium	NA		0.5	U
Silver	NA		0.1	U
TCLP Volatile Organics			mg/L	
1,1-Dichloroethene	NA		0.02	U
1,2-Dichloroethane	NA		0.02	U
1,4-Dichlorobenzene	NA		0.02	U
2-Butanone	NA		0.2	U
Benzene	NA		0.02	U
Carbon tetrachloride	NA		0.02	U
Chlorobenzene	NA		0.02	U
Chloroform	NA		0.02	U
Hexachlorobutadiene	NA		0.02	U
Tetrachloroethene	NA		0.02	U
Trichloroethene	NA		0.02	U
Vinyl chloride	NA		0.02	U
TPH DRO and GRO	mg/L		mg/kg	
Diesel Range Organics	0.31	M	27	M
Gasoline Range Organics	0.025	U	1.1	
RCI				
Cyanide, Total (mg/kg)	NA		0.34	U
Ignitability (mm/sec)	NA			NB
pH	NA		8.59	
Sulfide (mg/kg)	NA		73	UH

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS - IDW
AOC F - SITE 1738
MtBE INVESTIGATION REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

U - Non detected at the limit of detection.
UJ - Reported quantitation limit is qualified as estimated.
M -
NB -
UH -
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
IDW - Investigation Derived Waste
µg/L - micorgram per liter
mg/kg - milligram per kilogram
mg/L - milligram per liter
mm/sec - millimeter per second
MtBE - Methyl tert-butyl ether
NA - Not Analyzed
RCI - Reactivity, Corrosivity, Ignitability
TCLP - Toxicity Characteristic Leach Procedure
TPH - Total Petroleum Hydrocarbons

APPENDIX C
2010 DATA VALIDATION SUMMARIES

DataQual
Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

October 29, 2010
SDG# 1009153, CompuChem
NAPR AOC-F Site 1738, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1009153. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, August 2008- SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic parameters (SW-846 methods 8015_DRO and 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA	DRO	GRO
1738ER01	1009153-02	water	X	X	X
1738ER02	1009153-03	water	X	X	X
1738ER03	1009153-12	water	X	X	X
1738ER04	1009153-19	water	X	X	X
1738ER05	1009153-20	water	X	X	X
1738ER06	1009153-21	water	X	X	X
1738ER07	1009153-22	water	X	X	X
1738FB01	1009153-01	water	X	X	X
1738GW01	1009153-04	water	X	X	X
1738GW02	1009153-05	water	X	X	X
1738GW02D	1009153-06	water	X	X	X
1738GW03	1009153-15	water	X	X	X
1738GW04	1009153-08	water	X	X	X
1738GW04D	1009153-09	water	X	X	X
1738GW05	1009153-13	water	X	X	X
1738GW05L	1009153-16	water	X	X	X
1738GW06	1009153-10	water	X	X	X
1738GW09	1009153-18	water	X	X	X
1738GW10	1009153-17	water	X	X	X
1738GW11	1009153-14	water	X	X	X
1738TB01	1009153-11	water	X		X
1738TB02	1009153-23	water	X		X
1738GW04MS	1009153-08MS	water	X	X	X
1738GW04MSD	1009153-08MSD	water	X	X	X

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

The following quality control samples were provided with this SDG: samples 1738TB01 and 1738TB02-trip blanks; sample 1738FB01-field blank and samples 1738ER01, 1738ER02, 1738ER03, 1738ER04, 1738ER05, 1738ER06 and 1738ER07-equipment blanks; sample 1738GW02D-field duplicate of sample 1738GW02; and sample 1738GW04D-field duplicate of sample 1738GW04.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- CRI Standards NA
- Initial/Continuing Calibrations *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs NA
- Serial Dilutions NA
- Field Duplicates *
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Dilutions were required to obtain results within the calibration range.

GRO

No qualifications to the data were required.

DRO

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 9/13-20/10 and samples were received at the laboratory 9/15-21/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Reporting Limit
VBLKHB	toluene	0.12J ug/L	0.50 ug/L
VBLKHO	toluene	0.060J	0.50
VBLKHR	toluene	0.089J	0.50
1738TB01	toluene	0.093J	0.50
1738TB02	benzene	0.11J	0.50
	toluene	0.091J	0.50
1738FB01	toluene	0.11J	0.50
1738ER03	toluene	0.11J	0.50
1738ER04	toluene	0.11J	0.50
1738ER05	benzene	0.20J	0.50
	toluene	0.10J	0.50
	ethylbenzene	0.046J	0.50
1738ER06	toluene	0.13J	0.50
	ethylbenzene	0.041J	0.50

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738GW01, 1738GW02, 1738GW02D, 1738GW04, 1738GW04D, 1738GW05, 1738GW05L, 1738GW06, 1738GW09, 1738GW10, 1738GW11	toluene	U at RL
1738GW05	benzene	U at RL
1738GW05, 1738GW10	ethylbenzene	U at RL

Blanks

DRO

The associated field blank exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
1738FB01	DRO	0.091 mg/L	LOQ	U at LOQ

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738GW01	DRO	U at LOQ

Identification/Quantitation

VOA

Samples 1738GW01, 1738GW03, 1738GW05, 1738GW05L, 1738GW10 and 1738GW11 were analyzed at a dilution to obtain results within the calibration range. For these samples, the E-flagged results in the initial analysis were rejected in favor of the corresponding D-flagged result in the diluted analysis.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738GW01, 1738GW02, 1738GW02D, 1738GW04, 1738GW04D, 1738GW05, 1738GW05L, 1738GW06, 1738GW09, 1738GW10, 1738GW11	toluene	+	U at RL
1738GW05	benzene	+	U at RL
1738GW05, 1738GW10	ethylbenzene	+	U at RL
1738GW01, 1738GW03, 1738GW05, 1738GW05L, 1738GW10, 1738GW11	all E-flagged results	+	R
1738GW01DL, 1738GW03DL, 1738GW05DL, 1738GW05DL, 1738GW10DL, 1738GW11DL	all results except corresponding D-flagged results	+	R

GRO

Sample ID	Compound	Results	Q flag
No qualifications were required			

DRO

Sample ID	Compound	Results	Q flag
1738GW01	DRO	+J	U at LOQ

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL/LOQ	reporting limit/level of quantitation
IDL	instrument detection limit
MDL	method detection limit
+	positive result
-	non-detect result

CompuChem SDG 1009155

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

October 29, 2010
SDG# 1009155, CompuChem
NAPR AOC-F Site 1738, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1009155. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, August 2008- SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic parameters (SW-846 methods 8015_DRO and 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA	DRO	GRO
1738MW11-01	1009155-03	soil	X	X	X
1738MW11-04	1009155-04	soil	X	X	X
1738MW11-08	1009155-05	soil	X	X	X
1738MW12-01	1009155-01	soil	X	X	X
1738MW12-01D	1009155-02	soil	X	X	X
1738MW12-04	1009155-06	soil	X	X	X
1738MW12-08	1009155-07	soil	X	X	X
1738SB101-04	1009155-08	soil	X	X	X
1738SB101-08	1009155-10	soil	X	X	X
1738SB102-01	1009155-11	soil	X	X	X
1738SB103-01	1009155-14	soil	X	X	X
1738SB103-04	1009155-15	soil	X	X	X
1738SB104-01	1009155-16	soil	X	X	X
1738SB104-04	1009155-17	soil	X	X	X
1738SB105-01	1009155-18	soil	X	X	X
1738SB105-01D	1009155-09	soil	X	X	X
1738SB105-04	1009155-12	soil	X	X	X
1738SB105-07	1009155-13	soil	X	X	X
1738MW12-01 MS	1009155-01MS	soil	X	X	X
1738MW12-01 MSD	1009155-01MSD	soil	X	X	X

The following quality control samples were provided with this SDG: sample 1738MW12-01D-field duplicate of sample 1738MW12-01; and sample 1738SB105-01D-field duplicate of sample 1738SB105-01.

The samples were evaluated based on the following criteria:

• Data Completeness	*
• Sample Condition	
• Technical Holding Times	
• GC/MS Tuning	*
• GC Performance	*
• CRI Standards	NA
• Initial/Continuing Calibrations	*
• Blanks	
• Internal Standards	*
• Surrogate Recoveries	*
• Laboratory Control Samples	*
• Matrix Spike Recoveries	*
• Matrix Duplicate RPDs	NA
• Serial Dilutions	NA
• Field Duplicates	*
• Identification/Quantitation	*
• Reporting Limits	*
• Tentatively Identified Compounds	NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

GRO

According to the field notes and chain of custody, soil samples were not collected and preserved in accordance with SW-846 method 5035; therefore qualifications were applied to the data.

DRO

Three samples were extracted one day outside the extraction holding time of fourteen days from sampling. Qualifications were required.

Blank contamination was noted in the blanks associated with these soil samples. Qualifications were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Sample Condition

GRO

According to the field notes and chain of custody, soil samples were not collected and preserved in accordance with SW-846 method 5035; therefore positive results were qualified as estimated (J) and non-detect results were rejected (R).

Technical Holding Times

According to chain of custody records, sampling was performed on 9/13-20/10 and samples were received at the laboratory 9/21/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exception.

DRO

The samples 1738MW11-01, 1738MW11-04, and1738MW11-08 were extracted 1 day outside the 14 day soil extraction holding time. The reported DRO results in these samples were qualified as estimated J/UJ.

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Reporting Limit
VBLKHJ	toluene	0.48J ug/Kg	5.0 ug/kg
VBLKIB	toluene	0.62J	5.0
1738TB01	toluene	0.093J	0.50 ug/L
1738TB02	toluene	0.091J	0.50
1738FB01	toluene	0.11J	0.50
1738ER01	toluene	0.13J	0.50
1738ER02	toluene	0.13J	0.50

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW11-01, 1738MW11-08, 1738MW12-01, 1738MW12-01D, 1738MW12-04, 1738MW12-08, 1738SB103-01, 1738SB103-04, 1738SB104-01, 1738SB104-04	toluene	U at RL

Blanks

DRO

The associated field blank exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
1738FB01	DRO	0.091J mg/L	LOQ	U at LOQ
PBLKYI	DRO	2.6J mg/Kg	LOQ	U at LOQ

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples except 1738SB104-04	DRO	U at LOQ

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738MW11-01, 1738MW11-08, 1738MW12-01, 1738MW12-01D, 1738MW12-04, 1738MW12-08, 1738SB103-01, 1738SB103-04, 1738SB104-01, 1738SB104-04	toluene	+	U at RL

GRO

Sample ID	Compound	Results	Q flag
all samples	all results	+/-	J/R

DRO

Sample ID	Compound	Results	Q flag
1738MW11-01, 1738MW11-04, 1738MW11-08	DRO	+/-	J/UJ
all samples except 1738SB104-04	DRO	+J	U at LOQ

CompuChem SDG 1009220

DataQual
Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

October 29, 2010
SDG# 1009220, CompuChem
NAPR AOC-F Site 1738, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1009220. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, August 2008- SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic parameters (SW-846 methods 8015_DRO and 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA	DRO	GRO
1738SB101-01	1009220-01	soil	X	X	X
1738SB101-01D	1009220-02	soil	X	X	X
1738SB101-06	1009220-03	soil	X	X	X
1738SB102-04	1009220-04	soil	X	X	X
1738SB102-08	1009220-05	soil	X	X	X
1738SB104-06	1009220-06	soil	X	X	X
1738SB104-08	1009220-07	soil	X	X	X
1738SB101-01MS	1009220-01MS	soil	X	X	X
1738SB101-01MSD	1009220-01MSD	soil	X	X	X

The following quality control samples were provided with this SDG: sample 1738SB101-01D- field duplicate of sample 1738SB101-01.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- CRI Standards NA
- Initial/Continuing Calibrations *
- Blanks

- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs NA
- Serial Dilutions NA
- Field Duplicates *
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

GRO

According to the field notes and chain of custody, soil samples were not collected and preserved in accordance with SW-846 method 5035; therefore qualifications were applied to the data.

DRO

Contamination was noted in the associated blanks. Qualifications were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Sample Condition

GRO

According to the field notes and chain of custody, soil samples were not collected and preserved in accordance with SW-846 method 5035; therefore positive results were qualified as estimated (J) and non-detect results were rejected (R).

Technical Holding Times

According to chain of custody records, sampling was performed on 9/20/10 and samples were received at the laboratory 9/21/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Reporting Limit
VBLKBC	toluene	0.51J ug/Kg	5.0 ug/kg
1738TB02	toluene	0.091J ug/L	0.50 ug/L
1738FB01	toluene	0.11J	0.50
1738ER02	toluene	0.13J	0.50

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738SB101-01, 1738SB101-01D, 1738SB101-06, 1738SB102-04, 1738SB102-08, 1738SB104-06, 1738SB104-08	toluene	U at RL

DRO

The associated field blank exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
1738FB01	DRO	0.091J mg/L	LOQ	U at LOQ
PBLKZQ	DRO	1.3J mg/Kg	LOQ	U at LOQ

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	DRO	U at LOQ

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738SB101-01, 1738SB101-01D, 1738SB101-06, 1738SB102-04, 1738SB102-08, 1738SB104-06, 1738SB104-08	toluene	+	U at RL

GRO

Sample ID	Compound	Results	Q flag
all samples	all results	+/-	J/R

DRO

Sample ID	Compound	Results	Q flag
all samples	DRO	+J	U at LOQ

CompuChem SDG 1009222 & 1009223

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

November 9, 2010
SDG# 1009222 & 1009223, CompuChem
NAPR AOC-F Site 1738, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1009222 & 1009223. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, August 2008- SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic parameters (SW-846 methods 8015_DRO and 8015_GRO) or for the inorganic metals analytes (SW-846 method 6010C). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA	GRO	DRO	TMetals	DMetals
1738ER08	1009222-03	water	X	X	X		
1738GW05R	1009222-01	water	X	X	X	X	X
1738GW07	1009222-04	water	X	X	X		
1738GW08	1009222-05	water	X	X	X		
1738GW12	1009222-02	water	X	X	X	X	X
1738TB03	1009222-06	water	X	X			

The following quality control samples were provided with this SDG: sample 1738ER08-equipment blank and sample 1738TB03-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- CRI Standards *
- Initial/Continuing Calibrations *
- Blanks
- Internal Standards *
- Surrogate Recoveries *

- Laboratory Control Samples *
- Matrix Spike Recoveries NA
- Matrix Duplicate RPDs NA
- Post-Digestion Spike
- Serial Dilutions
- Field Duplicates NA
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Total Metals (Fe & Mn only)

Blank contamination was noted and qualification was required in one sample.

The associated Post Digestion Spike (PDS) exhibited a low recovery for manganese. Although there are no guidelines for qualifying results based on the PDS it is the professional opinion of the validator that the reported results for manganese be qualified as estimated J/UJ because there is no matrix spike pair available by which to assess matrix effects.

The serial dilution was high for iron and all results were qualified in the field samples.

Dissolved Metals (Fe & Mn only)

The associated Post Digestion Spike (PDS) exhibited a low recovery for manganese. Although there are no guidelines for qualifying results based on the PDS it is the professional opinion of the validator that the reported results for manganese be qualified as estimated J/UJ because there is no matrix spike pair available by which to assess matrix effects.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 9/20-21/10 and samples were received at the laboratory 9/21-22/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Reporting Limit
VBLKHW	toluene	0.072J ug/L	0.50 ug/L
1738ER08	benzene	0.071J	0.50
	toluene	0.088J	0.50
1738TB03	toluene	0.10J	0.50

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738GW05R, 1738GW07, 1738GW08, 1738GW12	toluene	U at RL
1738GW08, 1738GW12	benzene	U at RL

Total & Dissolved Metals

The associated preparation blank exhibited contamination as noted in the following table.

Blank ID	Analyte	Concentration	Action Level
PBW Total	iron	20.5J ug/L	LOQ

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
1738GW12 Total	iron	U at LOQ

Post-Digestion Spike

Total & Dissolved Metals

The associated Post Digestion Spike (PDS) exhibited a low recovery for manganese. Although there are no guidelines for qualifying results based on the PDS it is the professional opinion of the validator that the reported results for manganese be qualified as estimated J/UJ because there is no matrix spike pair available by which to assess matrix effects. A summary of this non-compliance and affected samples and actions are noted in the following table.

PDS	Analytes	Samples	%R	Q Flag
1738GW05R	manganese	all total & dissolved field samples	37.3	J/UJ

Serial Dilution

Total & Dissolved Metals

The associated total metals serial dilution exhibited a high RPD for iron. A summary of this non-compliance and affected samples and actions are noted in the following table.

SD	Analytes	Samples	%D	Q Flag
1738GW05R	iron	all total metals field samples	50.5	J/UJ

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff

Laura Maschhoff
President

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738GW05R, 1738GW07, 1738GW08, 1738GW12	toluene	+	U at RL
1738GW08, 1738GW12	benzene	+	U at RL

GRO

Sample ID	Compound	Results	Q flag
No qualifications were required			

DRO

Sample ID	Compound	Results	Q flag
No qualifications were required			

Total & Dissolved Metals (Fe & Mn only)

Sample ID	Analyte	Results	Q flag
1738GW12 total	iron	+J	U at LOQ
all total and dissolved field samples	manganese	+/-	J/UJ
all total field samples	iron	+/-	J/UJ

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action - The sample result is greater than the RL and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL/LOQ	reporting limit/level of quantitation
LOD	level of detection
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

Puerto Rican Chemist Certification

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009153 Project NAPR AOCF 1738/N62470-10-D-3000 for TPH- GRO, TPH-DRO and VOA and Laboratory ID Numbers:

1009153-01- 1738FB01
1009153-02 - 1738ER01
1009153-03 - 1738ER02
1009153-04 - 1738GW01
1009153-05 - 1738GW02
1009153-06 - 1738GW02D
1009153-08 - 1738GW04
1009153-09 - 1738GW04D
1009153-10 - 1738GW06
1009153-11 - 1738TB01
1009153-12 - 1738ER03

1009153-13 - 1738GW05
1009153-14 - 1738GW11
1009153-15 - 1738GW03
1009153-16 - 1738GW05L
1009153-17 - 1738GW10
1009153-18 - 171738GW09
1009153-19 - 171738ER04
1009153-20 - 1738ER05
1009153-21 - 1738ER06
1009153-22 - 1738ER07
1009153-23 - 1738TB02

Estado Libre Asociado de P.R.
Lcda. Miriam Estrada
Miriam Estrada
Rodríguez
Lic. #1074
QUIMICO LICENCIADO
A 1334938

11/29/10
Date

Analytical Environmental Services International Inc.
Atlanta, Georgia U.S.A. • Tel.: 770.396.8449 • Fax.: 770.551.9704
611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009155 Project NAPR AOCF 1738/N62470-10-D-3000 for TPH- GRO, TPH-DRO and VOA and Laboratory ID Numbers:

1009155-01- 1738MW12-01	1009155-10 - 1738SBB101-08
1009155-02 - 1738MW12-01D	1009155-11 - 1738SB102-01
1009155-03 - 1738MW11-01	1009155-12 - 1738SB105-04
1009155-04 - 1738MW11-04	1009155-13 - 1738SB105-07
1009155-05 - 1738MW11-08	1009155-14 - 1738SB103-01
1009155-06 - 1738MW12-04	1009155-15 - 1738SB103-04
1009155-07 - 1738MW12-08	1009155 -16 - 1738SB104-01
1009155-08 -1738SB101-04	1009155-17 – 1738SB104-04
1009155-09 - 1738SB105-01D	1009155-18 – 1738SB105-01

Estado Libre Asociado de P.R.
Lcda. Miriam Estrada
Miriam Estrada
Rodriguez
Lic. #1074
QUIMICO LICENCIADO
A 1334939

11/29/10
Date

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611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009220 Project NAPR AOCF 1738/N62470-10-D-3000 for TPH- GRO, TPH-DRO, VOA and TOC and Laboratory ID Numbers:

1009220-01- 1738SB101-01
1009220-02 - 1738SB101-01D
1009220-03 - 1738SB101-06
1009220-04 - 1738SB102-04
1009220-05 - 1738SB102-08
1009220-06 – 1738SB104-06
1009220-07 – 1738SB104-08

Estado Libre Asociado de P.R.
Miriam Estrada Rodríguez Lic. #1074
QUÍMICO LICENCIADO
A01130940

Lcda. Miriam Estrada

11/29/10
Date

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611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009222 Project NAPR AOCF 1738/N62470-10-D-3000 for TPH- GRO, TPH-DRO, VOA and Metals and Laboratory ID Numbers:

1009222-01- 1738GW05R
1009222-02 - 1738GW12
1009222-03 - 1738ER08
1009222-04 - 1738GW07
1009222-05 - 1738GW08
1009222-06 – 1738TB03

Estado Libre Asociado de P.R.
Miriam Estrada
Rodríguez
Lic. #1074
QUIMICO LICENCIADO
$1.00 $1.00
A 1334941

Lcda. Miriam Estrada

11/29/10
Date

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Atlanta, Georgia U.S.A. • Tel.: 770.396.8449 • Fax.: 770.551.9704
611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009223 Project NAPR AOCF 1738/N62470-10-D-3000 for Metals and Laboratory ID Numbers:

1009223-01- 1738GW05R
1009223-02 - 1738GW12

Estado Libre Asociado de P.R.
Miriam Estrada Rodríguez
Lic. #1074
QUIMICO LICENCIADO
$1.00 $1.00
A 1334942

Lcda. Miriam Estrada

11/29/10
Date

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Atlanta, Georgia U.S.A. • Tel.: 770.396.8449 • Fax.: 770.551.9704
611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009224 Project NAPR AOCF 1738/N62470-10-D-3000 for COD and Laboratory ID Numbers:

1009224-01- 1738GW05R
1009224-02 - 1738GW12

Estado Libre Asociado de P.R.
MCA
Miriam Estrada
Rodríguez
Lic. #1074
QUIMICO LICENCIADO
$1.00 $1.00
A 1334943

Lcda. Miriam Estrada

11/29/10
Date

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611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009240 Project NAPR AOCF 1738/N62470-10-D-3000 for TPH-DRO and TPH-GRO and Laboratory ID Number:

1009240-01- 1738IDW01

Estado Libre Asociado de P.R.
Miriam Estrada Rodríguez
Lic. #1074
QUIMICO LICENCIADO
$1.00 $1.00
A 1334944

Lcda. Miriam Estrada

11/29/10
Date

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611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

AES International Inc.

To Whom It May Concern:

I, Miriam Estrada, in my capacity as Puerto Rico Certified Chemist, I hereby certify the attached Analytical Results from Work Order Number 1009241 Project NAPR AOCF 1738/N62470-10-D-3000 for RCI, TCLP Metals, TCLP VOA, TPH-GRO and TPH-DRO and Laboratory ID Numbers:

1009241-01-17381DW02
1009242-01-17381DW02
1009243-01 - ZHEBKAK

Estado Libre Asociado de P.R.
Miriam Estrada Rodríguez
Lic. #1074
QUIMICO LICENCIADO
$1.00
A 1334945

Lcda. Miriam Estrada

11/29/10
Date

Analytical Environmental Services International Inc.
Atlanta, Georgia U.S.A. • Tel.: 770.396.8449 • Fax.: 770.551.9704
611 Monserrate Street, 2nd. Floor, Santurce, PR 00907 • Tel.: 787.722.0220 • Fax.: 787.724.5788

2012 DATA VALIDATION SUMMARIES

TA-Savannah SDG 680-80447-2

DataQual
Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

August 17, 2012
SDG# 680-80447-2, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-80447-2. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO & 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX/ MtBE	GRO	DRO
1738MW01B-00	680-80447-19	soil	X	X	X
1738MW01B-01	680-80447-20	soil	X	X	X
1738MW01B-06	680-80447-21	soil	X	X	X
1738MW01B-11	680-80447-22	soil	X	X	X
1738MW13-01	680-80447-23	soil	X	X	X
1738MW13-12	680-80447-24	soil	X	X	X
1738MW13-03	680-80447-25	soil	X	X	X
1738MW13-00	680-80447-26	soil	X	X	X
1738ER09	680-80447-27	water	X	X	X
1738FB03	680-80447-28	water	X	X	X
1738MW02R-00	680-80447-29	soil	X	X	X
1738MW14-00	680-80447-30	soil	X	X	X
1738MW15-00	680-80447-31	soil	X	X	X
1738MW02R-01	680-80447-32	soil	X	X	X
1738MW14-01	680-80447-33	soil	X	X	X
1738MW14-01D	680-80447-34	soil	X	X	X
1738MW15-01	680-80447-35	soil	X	X	X
1738MW02R-07	680-80447-36	soil	X	X	X
1738MW02R-10	680-80447-37	soil	X	X	X
1738MW14-09	680-80447-38	soil	X	X	X

The following quality control samples were provided with this SDG: sample 1738MW14-01D-field duplicate of sample 1738MW14-01; sample 1738ER09-equipment blank; and sample 1738FB03-field blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

No qualifications to the data were required.

GRO

One sample was analyzed out of holding time and therefore the positive GRO result was qualified as estimated.

One sample exhibited a non-compliant surrogate recovery; qualifications were applied to the results.

Two samples were re-analyzed out of holding time and therefore were not used.

One sample required a dilution to obtain results within the calibration range.

DRO

Blank qualifications were required due to field QC blank contamination.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 6/13-16/12 and samples were received at the laboratory 6/19/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exception.

GRO

Sample 1738MW02R-10DL was analyzed three days out of holding time; therefore the positive GRO result was qualified as estimated (J).

Blanks

DRO

Contamination was noted in the associated field QC blanks. Qualifications were made based on blank association matrix and Region II recommendations.

Blank ID	Compound	Concentration	Action Level
1738ER09	DRO	0.66 mg/L >LOQ	22 mg/Kg

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW01B-01, 1738MW13-01, 1738MW13-03	DRO	U at reported value

Surrogates

GRO

003 Rev JRE

The following sample exhibited non-compliant surrogate recoveries, qualifications were applied as stated.

Sample ID	Non-compliant Surrogate	% Rec	QC limit	Qualifier
1738MW15-00	a,a,a-trifluorotoluene	135	70-131	J

Identification/Quantitation

GRO

Samples 1738MW01B-00RA and 1738MW01B-06RA were analyzed out of holding time and therefore not used in favor of the initial analysis. The samples were re-analyzed as the associated LCSD exhibited a slightly high recovery result; however the associated LCS exhibited a recovery with QC criteria and therefore no qualifications were applied to the data in the initial analysis.

A dilution was required for sample 1738MW02R-10 to obtain results within the calibration range; therefore, the E-flagged result in the initial analysis was rejected in favor of the corresponding D-flagged result in the dilution analysis.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Rev JAC

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
no qualifications			

GRO

Sample ID	Compound	Results	Q flag
1738MW02R-10DL	GRO	+	J
1738MW15-00	GRO	+	J
1738MW01B-00RA, 1738MW01B-06RA	GRO	+/-	R
1738MW02R-10	GRO	+	R

DRO

Sample ID	Compound	Results	Q flag
1738MW01B-01, 1738MW13-01, 1738MW13-03	DRO	+ up to action level	U at reported value

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

August 17, 2012
SDG# 680-80447-3, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-80447-3. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO & 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738MW14-11	680-80447-39	soil	X	X	X
1738MW15-05	680-80447-40	soil	X	X	X
1738ER10	680-80447-41	water	X	X	X
1738MW02R-17	680-80447-42	soil	X	X	X
1738MW09B-00	680-80447-43	soil	X	X	X
1738MW09B-01	680-80447-44	soil	X	X	X
1738MW09B-03	680-80447-45	soil	X	X	X
1738ER11	680-80447-46	water	X	X	X
1738TB04	680-80447-47	water	X	X	X
1738MW09B-03D	680-80447-48	soil	X	X	X
1738MW15-10	680-80447-49	soil	X	X	X
1738MW09B-00 MS	680-80447-43MS	soil	X	X	X
1738MW09B-00 MSD	680-80447-43MSD	soil	X	X	X
1738MW15-05 MS	680-80447-40MS	soil			X
1738MW15-05 MSD	680-80447-40MSD	soil			X

The following quality control samples were provided with this SDG: sample 1738MW09B-03D-field duplicate of sample 1738MW09B-03; sample 1738ER10 and 1738ER11-equipment blank; and sample 1738TB04-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Field Duplicates
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

DRO was qualified in the field duplicate pair due to a high RPD.

002 REV QAC

Blank qualifications were required due to field blank contamination.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 6/16-18/12 and samples were received at the laboratory 6/19/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

Contamination was noted in the associated field QC blanks. Qualifications were made based on blank association matrix and Region II recommendations.

Blank ID	Compound	Concentration	Action Level	Q Flag
1738ER10	DRO	0.14 mg/L	4.2 mg/Kg (>LOQ)	U up to action level
1738ER11	DRO	0.21 mg/L	7.0 mg/Kg (>LOQ)	U up to action level
1738FB03	DRO	0.18 mg/L	6.0 mg/Kg (>LOQ)	U up to action level

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW14-11, 1738MW02R-17, 1738MW09B-01, 1738MW09B-03D, 1738MW15-10	DRO	U at reported concentration

Field Duplicates

DRO

The field duplicate pair of samples 1738MW09B-03 AND 1738MW09B-03D exhibited a RPD of 80%. The reported positive results in the field duplicate pair were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

003 JAC

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
no qualifications			

GRO

Sample ID	Compound	Results	Q flag
no qualifications			

DRO

Sample ID	Compound	Results	Q flag
1738MW14-11, 1738MW02R-17, 1738MW09B-01, 1738MW09B-03D, 1738MW15-10	DRO	+	U
1738MW09B-03 AND 1738MW09B-03D	DRO	+	J

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

August 17, 2012
SDG# 680-80651-1, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-80651-1. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO and 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738MW16-00	680-80651-1	soil	X	X	X
1738MW16-00D	680-80651-2	soil	X	X	X
1738MW16-01	680-80651-3	soil	X	X	X
1738MW16-03	680-80651-4	soil	X	X	X
1738ER12	680-80651-5	water	X	X	X
1738MW08B-00	680-80651-6	soil	X	X	X
1738MW08B-01	680-80651-7	soil	X	X	X
1738MW08B-03	680-80651-8	soil	X	X	X
1738MW08B-03D	680-80651-9	soil	X	X	X
1738TB05	680-80651-10	water	X	X	
1738MW07B-00	680-80651-11	soil	X	X	X
1738MW07B-00D	680-80651-12	soil	X	X	X
1738MW07B-01	680-80651-13	soil	X	X	X
1738MW07B-03	680-80651-14	soil	X	X	X
1738ER13	680-80651-15	water	X	X	X
1738MW16-03 MS	680-80651-4MS	soil	X	X	X
1738MW16-03 MSD	680-80651-4MSD	soil	X	X	X

The following quality control samples were provided with this SDG: sample 1738MW16-00D-field duplicate of sample 1738MW16-00; sample 1738MW08B-03D - field duplicate of sample 1738MW08B-03; sample 1738MW07B-00D-field duplicate of sample 1738MW07B-00; sample 1738ER12 and 1738ER13-equipment blank; and sample 1738TB05-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Field Duplicates
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

One of the field duplicate pairs exhibited non-compliant reproducibility; therefore results were qualified as estimated.

GRO

One of the field duplicate pairs exhibited non-compliant reproducibility; therefore results were qualified as estimated.

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DRO

Blank qualifications were required due to field QC blank contamination.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 6/21-24/12 and samples were received at the laboratory 6/26/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

DRO

Contamination was noted in the associated field QC blanks. Qualifications were made based on blank association matrix and Region II recommendations.

Blank ID	Compound	Concentration	Action Level
1738FB03	DRO	0.18 mg/L >LOQ	6.0 mg/Kg

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW16-03, 1738MW08B-01, 1738MW08B-03, 1738MW07B-01, 1738MW07B-03	DRO	U at reported value

Field Duplicate

VOA

Sample 1738MW08B-03 and duplicate sample 1738MW08B-03D exhibited non-compliant field duplicate reproducibility for methyl tert-butyl ether with 69% RPD; therefore the results for this compound were qualified as estimated (J).

GRO

Sample 1738MW07B-00 and duplicate sample 1738MW07B-00D exhibited non-compliant field duplicate reproducibility for GRO with 200% RPD; therefore the results for this compound were qualified as estimated (J/UJ).

003 [illegible]

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

JCleveland

Jacqueline Cleveland
Vice President

004 rev QC

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738MW08B-03, 1738MW08B-03D	MtBE	+	J

GRO

Sample ID	Compound	Results	Q flag
1738MW07B-00, 1738MW07B-00D	GRO	+/-	J/UJ

DRO

Sample ID	Compound	Results	Q flag
1738MW16-03, 1738MW08B-01, 1738MW08B-03, 1738MW07B-01, 1738MW07B-03	DRO	+ up to action level	U

005 ew gac

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual
Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

August 17, 2012
SDG# 680-80791-1, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-80791-1. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO & 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738SB104-10	680-80791-1	soil	X	X	X
1738SB106-01	680-80791-2	soil	X	X	X
1738ER14	680-80791-3	water	X	X	X
1738TB06	680-80791-4	water	X	X	
1738SB106-01 MS	680-80791-2MS	soil	X	X	X
1738SB106-01 MSD	680-80791-2MSD	soil	X	X	X

The following quality control samples were provided with this SDG: sample 1738ER14-equipment blank; sample 1738TB06-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries *

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 Rev JAC

- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Field Duplicates *
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

Blank qualifications were required due to field QC blank contamination.

One re-extracted sample required qualification for holding time issues.

One sample was re-extracted and analyzed because of low surrogate recoveries in the original analyses. The original analysis was rejected in favor of the re-extraction result due to low surrogate recoveries.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

002 rev gac

Technical Holding Times

According to chain of custody records, sampling was performed on 6/27-28/12 and samples were received at the laboratory 6/29/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exception.

Blanks

DRO

Contamination was noted in the associated field QC blanks. Qualifications were made based on blank association matrix and Region II recommendations.

Blank ID	Compound	Concentration	Action Level
1738ER14	DRO	0.29 mg/L >LOQ	9.7 mg/Kg

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738SB106-01	DRO	U at reported value

DRO

Sample 1738SB104-10 RE was extracted on the 22nd day after sampling which is 8 days outside the extraction holding time of 14 days for soil samples. The RE was reported as the surrogate recovery was acceptable in the RE and DRO tends to be a relatively stable compound in soil samples. The reported result was flagged as estimated J because of the exceeded holding time.

Identification/Quantitation

DRO

The sample 1738SB106-01was rejected in favor of the RE analysis. Sample 1738SB106-01 was not used because the original analysis exhibited a low surrogate recovery but above 10%.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
no qualifications			

GRO

Sample ID	Compound	Results	Q flag
no qualifications			

DRO

Sample ID	Compound	Results	Q flag
1738SB104-10 RE	DRO	+	J
1738SB104-10	DRO	+	R

004 rev JMC

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

TA-Savannah SDG 680-82163-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

November 20, 2012
SDG# 680-82163-1, Test America-Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Ms. Raub,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-82163-1. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO, 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738MW13-12C	680-82163-1	water	X	X	X
1738SB108-01	680-82163-2	soil			X
1738MW108-08	680-82163-3	water	X	X	X
1738ER15	680-82205-1	water	X	X	X
1738SB111-08	680-82205-2	soil	X	X	X
1738SB111-11	680-82205-3	soil	X	X	X
1738SB111-14	680-82205-4	soil	X	X	X
1738MW14-12C	680-82205-5	water	X	X	X
1738MW15-12C	680-82205-6	water	X	X	X
1738ER16	680-82205-7	water	X	X	X
1738ER17	680-82205-8	water	X	X	X
1738MW01-12C	680-82205-9	water	X	X	X
1738MW01A-12C	680-82205-10	water	X	X	X
1738MW01B-12C	680-82205-11	water	X	X	X
1738MW02-12C	680-82205-12	water	X	X	X
1738MW03-12C	680-82205-13	water	X	X	X
1738MW04-12C	680-82205-14	water	X	X	X
1738MW02R-12C	680-82205-15	water	X	X	X
1738MW02R-D-12C	680-82205-16	water	X	X	X
1738MW10-12C	680-82205-17	water	X	X	X
1738MW11-12C	680-82205-18	water	X	X	X
1738MW16-12C	680-82205-19	water	X	X	X
1738MW16D-12C	680-82205-20	water	X	X	X
1738TB07	680-82205-21	water	X	X	
1738SB108-13	680-82205-22	soil	X	X	
1738SB108-09	680-82205-23	water	X	X	X

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738MW12-12C	680-82205-24	water	X	X	X
1738ER18	680-82205-25	water	X	X	X
1738MW02R-12C MS	680-82205-15MS	water	X	X	X
1738MW02R-12C MSD	680-82205-15MSD	water	X	X	X
1738MW13-12C MS	680-82163-1MS	water			X
1738MW13-12C MSD	680-82163-1MSD	water			X
1738SB108-09 MS	680-82205-23MS	water			X
1738SB108-09 MSD	680-82205-23MSD	water			X

The following quality control samples were provided with this SDG: sample 1738MW02R-D-12C-field duplicate of sample 1738MW02R-12C; sample 1738MW16D-12C-field duplicate of sample 1738MW16-12C; sample 1738ER15, 1738ER16, 1738ER17 and 1738ER18-equipment blanks; and sample 1738TB07-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Low Level Standards *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

One of the field duplicate pairs exhibited non-compliant field duplicate reproducibility which resulted in qualification to the data.

Several samples required a dilution to obtain results within the calibration range.

GRO

No qualifications were required to the data.

DRO

Blank contamination was noted in the QC blanks associated with samples in this batch. Qualifications were added to the data.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for two issues. Pages were missing from the associated chain of custody. These were requested and received. The volatile fraction required a resubmission as the initial analysis of one sample did not exhibit a compound result that was seen in the dilution. The lab was asked to investigate and found that there was an error in processing the initial analysis. Corrections were received. Copies of the correspondences with the laboratory are found in the worksheets attached with this report. Issues were noted with the reporting of the instrument blank results for the DRO fraction. The laboratory was contacted and they will be reviewing the way the IBLKs are reported. There was no impact to the analytical data because of these reporting issues.

Technical Holding Times

According to chain of custody records, sampling was performed on 8/15-19/12 and samples were received at the laboratory 8/18-21/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

DRO

The associated QC blanks exhibited contamination as stated in the table below.

Blank ID	Compound	Concentration	Action Level
1738ER15	DRO	0.29 mg/L (>LOQ)	0.29 mg/L or 9.7 mg/Kg
1738ER16	DRO	0.42 mg/L (>LOQ)	0.42 mg/L or 14.0 mg/Kg
1738ER17	DRO	0.31 mg/L (>LOQ)	0.31mg/L or 10.3 mg/Kg
1738ER18	DRO	0.25 mg/L (>LOQ)	0.25mg/L or 8.33 mg/Kg
1738FB04	DRO	0.057J mg/L	0.057 mg/L or 1.9 mg/Kg

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW13-12C, 1738MW14-12C, 1738MW01B-12C, 1738MW04-12C, 1738MW10-12C, 1738MW16-12C, 1738MW16D-12C, 1738MW12-12C, 1738SB108-08, 1738SB111-11	DRO	U at value
1738SB111-14	DRO	U at RL

Field Duplicate

VOA

Sample 1738MW16-12C and 1738MW16D-12C exhibited non-compliant field duplicate reproducibility for toluene with 200% RPD and benzene with 200% RPD; therefore the results for these compounds were qualified as estimated (J/UJ) in these samples.

Identification/Quantitation

VOA

A dilution was required for samples 1738MW01B-12C, 1738MW02R-12C, 1738MW02R-D-12C and 1738MW10-12C to obtain results within the calibration range; therefore, the J-flagged result in the initial analysis was rejected in favor of the corresponding D-flagged result in the diluted analysis.

004

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff

Laura Maschhoff
President

Jacqueline Cleveland

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738MW16-12C, 1738MW16D-12C	toluene benzene	+/-	J/UJ
1738MW01B-12C, 1738MW02R-12C, 1738MW02R-D-12C, 1738MW10-12C	all J-flagged compounds with results above the calibration range	+	R
1738MW01B-12CDDL, 1738MW02R-12CDL, 1738MW02R-D-12CDL, 1738MW10-12CDL	all results except corresponding D-flagged compounds	+/-	R

GRO

Sample ID	Compound	Results	Q flag
no qualifications			

DRO

Sample ID	Compound	Results	Q flag
1738MW13-12C, 1738MW14-12C, 1738MW01B-12C, 1738MW04-12C, 1738MW10-12C, 1738MW16-12C, 1738MW16D-12C, 1738MW12-12C, 1738SB108-08, 1738SB111-11	DRO	+	U at value
1738SB111-14	DRO	+	U at RL

006

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.

R - Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.

J - Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

November 20, 2012
SDG# 680-82287-1, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Ms. Raub,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-82287-1. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO, 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738SB107-09	680-82287-1	soil	X	X	X
1738SB107-09D	680-82287-2	soil	X	X	X
1738SB107-11	680-82287-3	soil	X	X	X
1738SB107-14	680-82287-4	soil	X	X	X
1738MW09-12C	680-82287-5	water	X	X	X
1738MW09B-12C	680-82287-6	water	X	X	X
1738MW17-10	680-82287-7	water	X	X	X
1738MW09A-12C	680-82287-8	water	X	X	X
1738MW08-12C	680-82287-9	water	X	X	X
1738MW08B-12C	680-82287-10	water	X	X	X
1738ER19	680-82287-11	water	X	X	X
1738TB08	680-82287-12	water	X	X	
1738MW09-12C MS	680-82287-5MS	water			X
1738MW09-12C MSD	680-82287-5MSD	water			X
1738SB107-09 MS	680-82287-1MS	soil			X
1738SB107-09 MSD	680-82287-1MSD	soil			X

The following quality control samples were provided with this SDG: sample 1738SB107-09D - field duplicate of sample 1738SB107-09; sample 1738ER19- equipment blank; sample 1738TB08 – trip blank.

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The samples were evaluated based on the following criteria:

• Data Completeness	*
• Sample Condition	*
• Technical Holding Times	*
• GC/MS Tuning	*
• GC Performance	*
• Initial/Continuing Calibrations	*
• Low Level Standards	*
• Blanks	
• GC/MS Internal Standards	*
• Surrogate Recoveries	*
• Laboratory Control Samples	*
• Matrix Spike Recoveries	*
• Field Duplicates	
• Identification/Quantitation	
• Reporting Limits	*
• Tentatively Identified Compounds	NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

The field duplicate pair exhibited non-compliant field duplicate reproducibility which resulted in qualification to the data.

One sample required a dilution to obtain results within the calibration range.

GRO

No qualifications to the data were required.

DRO

Blank contamination was noted in the QC blanks associated with samples in this batch. Qualifications were added to the data.

Specific Evaluation of Data

Data Completeness

Issues were noted with the reporting of the instrument blank results for the DRO fraction. The laboratory was contacted and they will be reviewing the way the IBLKs are reported. There was no impact to the analytical data because of these reporting issues.

Technical Holding Times

According to chain of custody records, sampling was performed on 8/20-22/12 and samples were received at the laboratory 8/23/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

DRO

The associated QC blanks exhibited contamination as stated in the table below.

Blank ID	Compound	Concentration	Reporting Limit
1738ER19	DRO	0.19 mg/L	0.050 mg/L
1738ER21	DRO	0.14	0.048

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW09-12C, 1738MW09B-12C, 1738MW08-12C, 1738MW08B-12C	DRO	U at value

Field Duplicate

VOA

Sample 1738SB107-09 and 1738SB107-09D exhibited non-compliant field duplicate reproducibility for xylene total with 67% RPD and ethylbenzene with 65% RPD; therefore the results for these compounds were qualified as estimated (J) in these samples.

Identification/Quantitation

VOA

A dilution was required for sample 1738MW08B-12C to obtain results within the calibration range; therefore, the J-flagged result in the initial analysis was rejected in favor of the corresponding D-flagged result in the diluted analysis.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff

Laura Maschhoff
President

Jacqueline Cleveland

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738SB107-09, 1738SB107-09D	xylene total ethylbenzene	+	J
1738MW08B-12C	all J-flagged compounds with results above the calibration range	+	R
1738MW08B-12CDL	all results except corresponding D-flagged compounds	+/-	R

GRO

Sample ID	Compound	Results	Q flag
no qualifications			

DRO

Sample ID	Compound	Results	Q flag
1738MW09-12C, 1738MW09B-12C, 1738MW08-12C, 1738MW08B-12C	DRO	+	U at value

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U not detected above the reported sample quantitation limit
J estimated value
UJ reported quantitation limit is qualified as estimated
N analyte has been tentatively identified
JN analyte has been tentatively identified, estimated value
R result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.

LOD The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.

R - Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.

J - Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.

J/UJ - Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual
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100 Airside Drive
Moon Township, PA 15108

November 20, 2012
SDG# 680-82411-3, Test America- Savannah
NAPR Ceiba, Puerto Rico- AOC F Site 1738

Dear Ms. Raub,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-82411-3. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO, 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738ER20	680-82411-31	water	X	X	X
1738SB109-10	680-82411-32	soil	X	X	
1738SB109-12	680-82411-33	soil	X	X	
1738SB110-08	680-82411-34	soil	X	X	
1738MW05L-12C	680-82411-35	water	X	X	X
1738SB110-10	680-82411-36	soil	X	X	
1738SB110-12	680-82411-37	soil	X	X	
1738MW05R-12C	680-82411-39	water	X	X	X
1738ER21	680-82411-40	water	X	X	X
1738MW07A-12C	680-82411-41	water	X	X	X
1738SB110-12D	680-82411-42	soil	X	X	
1738MW07-12C	680-82411-43	water	X	X	X
1738MW07D-12C	680-82411-44	water	X	X	X
1738MW07B-12C	680-82411-45	water	X	X	X
1738ER22	680-82411-46	water	X	X	X
1738FB04	680-82411-47	water	X	X	X
1738TB09	680-82411-48	water	X	X	
1738SB109-01	680-82411-49	soil	X	X	X
1738MW05-12C	680-82411-50	water	X	X	X
1738MW08A-12C	680-82411-51	water	X	X	X
1738MW06-12C	680-82411-52	water	X	X	X
1738MW07-12C MS	680-82411-43MS	water	X	X	X
1738MW07-12C MSD	680-82411-43MSD	water	X	X	X

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The following quality control samples were provided with this SDG: sample 1738MW07D-12C-field duplicate of sample 1738MW07-12C; sample 1738SB110-12D-field duplicate of sample 1738SB110-12; sample 1738ER20, 1738ER21 and 1738ER22-equipment blanks; sample 1738FB04-field blank; and sample 1738TB09-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Low Level Standards *
- Blanks
- GC/MS Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs *
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

One of the field duplicate pairs exhibited non-compliant field duplicate reproducibility which resulted in qualification to the data.

Several samples required a dilution to obtain results within the calibration range.

GRO

One of the field duplicate pairs exhibited non-compliant field duplicate reproducibility which resulted in qualification to the data.

DRO

Blank contamination was noted in the QC blanks associated with samples in this batch. Qualifications were added to the data.

Specific Evaluation of Data

Data Completeness

Resubmissions were required as raw data for one sample was missing from the volatile fraction. Copies of the correspondences with the laboratory are found in the worksheets attached with this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 8/22-27/12 and samples were received at the laboratory 8/28/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

DRO

The associated QC blanks exhibited contamination as stated in the table below.

Blank ID	Compound	Concentration	Reporting Limit
1738ER20	DRO	0.15 mg/L	0.048 mg/L
1738ER19	DRO	0.19	0.05

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
1738MW05-12C, 1738MW08A-12C	DRO	U at value

Field Duplicate

VOA

Sample 1738SB110-12 and duplicate sample 1738SB110-12D exhibited non-compliant field duplicate reproducibility for xylene total with 200% RPD, toluene with 98% RPD and ethylbenzene with 200% RPD; therefore the results for these compounds were qualified as estimated (J/UJ) in these samples.

GRO

Sample 1738SB110-12 and duplicate sample 1738SB110-12D exhibited non-compliant field duplicate reproducibility for GRO with 57% RPD; therefore the results for these compounds were qualified as estimated (J/UJ) in these samples.

Identification/Quantitation

VOA

A dilution was required for samples 1738MW05L-12C, 1738MW05R-12C and 1738MW05-12C to obtain results within the calibration range; therefore, the J-flagged result in the initial analysis was rejected in favor of the corresponding D-flagged result in the diluted analysis.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff

Laura Maschhoff
President

Jacqueline Cleveland

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
1738SB110-12, 1738SB110-12D	xylene total toluene ethylbenzene	+/-	J/UJ
1738MW05L-12C, 1738MW05R-12C, 1738MW05-12C	all J-flagged compounds with results above the calibration range	+	R
1738MW05L-12CDL, 1738MW05R-12CDL, 1738MW05-12CDL	all compounds except corresponding D-flagged results	+/-	R

GRO

Sample ID	Compound	Results	Q flag
1738SB110-12, 1738SB110-12D	GRO	+	J

DRO

Sample ID	Compound	Results	Q flag
1738MW05-12C, 1738MW08A-12C	DRO	+	U at value

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.
Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
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100 Airside Drive
Moon Township, PA 15108

November 20, 2012
SDG# 680-82452-1, Test America- Savannah
NAPR Ceiba, Puerto Rico-AOC F Site 1738

Dear Ms. Raub,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 680-82452-1. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Method (8260B-Rev 2, August 2008-SOP #HW-24) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons in this SDG (SW-846 methods 8015_DRO, 8015_GRO). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	BTEX MtBE	GRO	DRO
1738MW17-12C	680-82452-1	water	X	X	X
1738TB10	680-82452-4	water	X	X	
1738MW17-12C MS	680-82452-1MS	water			X
1738MW17-12C MSD	680-82452-1MSD	water			X

The following quality control samples were provided with this SDG: sample 1738TB10-trip blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations *
- Low Level Standards *
- Blanks *
- GC/MS Internal Standards *
- Surrogate Recoveries
- Laboratory Control Samples *

- Matrix Spike Recoveries *
- Field Duplicates NA
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

VOA

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

One sample required qualification due to low surrogate recoveries.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required. Issues were noted with the reporting of the instrument blank results for the DRO fraction. The laboratory was contacted and they will be reviewing the way the IBLKs are reported. There was no impact to the analytical data because of these reporting issues.

Technical Holding Times

According to chain of custody records, sampling was performed on 8/27-28/12 and samples were received at the laboratory 8/29/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Surrogates

DRO

Sample 1738MW17-12C exhibited a low surrogate recovery of 57% (QC limit 62-130%); the reported positive result for DRO was qualified as estimated (J).

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff

Laura Maschhoff
President

Jacqueline Cleveland

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
no qualifications			

GRO

Sample ID	Compound	Results	Q flag
no qualifications			

DRO

Sample ID	Compound	Results	Q flag
1738MW17-12C	DRO	+	J

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.

R - Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.

J - Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

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I Herby certify that I have reviewed the Quality Assurance Data for Project Number 680-80447-2, and to the best of my knowledge, the results are correct and reliable.

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Lic. Abraham Ortiz Charriez

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