

**Demonstration for Compliance with
“Unstable Areas” Requirement in
Coal Combustion Residuals Rule
Cell 1 of Horizontal Expansion of
Original Combustion Waste Storage Area**

**Orlando Utilities Commission
Stanton Energy Center
Orange County, Florida**

January 11, 2019



Ardaman & Associates, Inc.

Geotechnical, Environmental, and
Materials Consultants
A Tetra Tech Company

CORPORATE HEADQUARTERS

8008 S. Orange Avenue, Orlando, FL 32809 - Phone: (407) 855-3860 Fax: (407) 859-8121

Branch Office Locations

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Orlando Utilities Commission
P.O. Box 3193
Orlando, FL 32802-2723

Attention: Mr. Charles W. Doud, P.E.
Senior Environmental Engineer

Subject: Demonstration for Compliance with “Unstable Areas” Requirement in Coal Combustion Residuals Rule, Cell 1 of Horizontal Expansion of Original Combustion Waste Storage Area, Orlando Utilities Commission, Stanton Energy Center, Orange County, Florida

Gentlemen/Ladies:

As requested by Orlando Utilities Commission (OUC), Ardaman & Associates, Inc., a Tetra Tech Company (TT-AAI) has completed an engineering study to evaluate whether Cell 1 of the horizontal expansion of the original Combustion Waste Storage Area (original CWSA) at the Stanton Energy Center complies with the “unstable areas” requirement in the coal combustion residuals rule (CCR Rule) promulgated by the United States Environmental Protection Agency (EPA) and published in the Federal Register on April 17, 2015, with an effective date of October 14, 2015. The “unstable areas” requirement is one of the five “location restrictions” requirements in the CCR Rule. At this time, Cell 1 is the only coal combustion residuals (CCR) landfill cell at the Stanton Energy Center that is subjected to the provisions of the CCR Rule.

Regulatory Requirements

As required by 40 CFR § 257.60 to 40 CFR § 257.64 of the CCR Rule, all facility owners must provide demonstrations that new CCR landfills¹ can meet all “location restrictions” requirements, which consist of: (i) placement above the uppermost aquifer; (ii) wetlands; (iii) fault areas; (iv) seismic impact zones; (v) unstable areas. However, for existing CCR landfills¹, facility owners only need to demonstrate that the landfill cells can comply with the “unstable areas” requirement in the CCR Rule. Relevant excerpts of the CCR Rule under 40 CFR § 257.64 that relate to “unstable areas” are as follows:

(a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

¹ “Existing CCR Landfills” are defined in the CCR Rule as landfills that first receive CCR or commence construction on or before October 14, 2015 (i.e., the effective date of the CCR Rule), whereas “New CCR Landfills” are landfills that first receive CCR or commence construction after October 14, 2015.

(b) The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features; and

(3) On-site or local human-made features or events (both surface and subsurface).

(c) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of paragraph (a) of this section.

For an existing landfill, the CCR Rule requires the facility owner or operator to complete the demonstration of compliance no later than October 17, 2018. The demonstration is considered to be completed when the facility owner or operator has placed the demonstration into the facility's operating record. If a CCR landfill cannot be demonstrated to meet the "unstable areas" requirement within six months from October 17, 2018, the landfill will have to cease receiving CCR and will have to be closed. A facility owner or operator is required to comply with the recordkeeping requirements specified in § 257.105(e), the notification requirements specified in § 257.106(e), and the internet posting requirements specified in § 257.107(e).

Although Cell 1 was designed and constructed prior to promulgation of the CCR Rule, it complied with applicable requirements of 62-701 of the Florida Administration Code (F.A.C.), which governs the design, construction, and operation of solid waste management facilities in Florida. Evaluations of the potentials for sinkholes and sinkhole activities, as defined in Section 627.706(2) of the Florida Statutes (F.S.) and for "unstable areas", as described in 40 CFR 285.15 and incorporated by reference in 62-701, F.A.C., were performed during design of Cell 1. The design was subsequently approved by the Florida Department of Environmental Protection (FDEP) on March 16, 2012 as a post-certification submittal under the Conditions of Certification issued under the Electrical Power Plant Siting Act (403.501-403.518, F.S.), with the supporting regulations contained in Part I of 62-17, F.A.C. Specifically, 62-701, F.A.C., requires performance of site exploration(s) for identifying "unstable areas" and, if necessary, development of engineering measures to provide reasonable assurance that any identified "unstable areas" can adequately support a proposed landfill cell without adversely affecting the performance of its bottom liner and leachate collection system. Although evaluations for fault areas and seismic impact zones are not specifically required for an existing CCR landfill, these two factors may cause the foundations of Cell 1 to become unstable and, therefore, are also discussed in this report.

CCR Disposal Facility

A map that shows the location of the Stanton Energy Center is presented in Figure 1. As shown, the facility is located approximately 13 miles southeast of downtown Orlando and approximately 9 miles east of the Orlando International Airport. The street address of the Stanton Energy Center is 5100 S. Alafaya Trail, Orlando, FL 32831.

An annotated January 2017 aerial photograph of the facility is shown in Figure 2. As shown, the area that was designated for disposal of CCR generated at the Stanton Energy Center is located on the west side of the facility. Initially, the entire combustion waste storage area (CWSA) occupied approximately 312 acres. However, construction of Innovation Way to the west of the Stanton Energy Center and development of the solar energy site in the northern part of the CWSA had reduced the footprint of the designated CWSA to approximately 250 acres. Figure 2 also shows the existing and proposed CCR landfill units, which are all located on the southern part of the designated CWSA footprint. As shown, these landfill units consist of the original combustion

waste storage area (original CWSA), the vertical expansion above the original CWSA (vertical expansion), and the horizontal expansion on the west side of the original CWSA (horizontal expansion).

The original CWSA, which was placed in service in 1987 when the Stanton Energy Center began commercial operation, was lined with a layer of ProMat² with a typical thickness of approximately 5 feet and a hydraulic conductivity of less than 1×10^{-7} cm/sec across the entire cell bottom. It occupies an area of approximately 90 acres and was designed to have a top elevation of approximately +150 feet (NAVD88). In 2010, OUC planned to construct and operate a lined horizontal expansion on the west side of the original CWSA. To ensure uninterrupted waste disposal operation during planning, design, permitting, and construction of the horizontal expansion, OUC constructed a vertical expansion on top of the original CWSA. The vertical expansion had a top elevation of approximately +175 feet (NAVD88), a base area of approximately 34 acres, and a top area of approximately 20 acres. Final closure of the original CWSA and vertical expansion was completed in January 2016 and was documented in a TT-AAI report titled "Certification of Closure of Original Combustion Waste Storage Area at the Orlando Utilities Commission, Stanton Energy Center," dated March 12, 2016. Because the original CWSA and vertical expansion ceased receiving wastes on August 28, 2015 (i.e., more than one month before the effective date of the CCR Rule), these two landfill units are exempted from the CCR Rule requirements.

The horizontal expansion consists of three landfill cells designated Cells 1, 2, and 3. Designs of these landfill cells were completed in December 2011 (i.e., more than three years before promulgation of the CCR Rule), with each of the three cells having a base area of approximately 30 acres and extending on top of approximately 8 acres of the west slope of the original CWSA and vertical expansion. As noted previously, the designs of Cells 1, 2, and 3 complied with applicable requirements of 62-701, F.A.C., and had been approved by the FDEP. The design incorporated a double geomembrane liner system with leachate collection and leak detection systems at the base of the landfill cell, and a single geomembrane liner with a leachate collection system on the west slope of the original CWSA. Construction of Cell 1 was completed on December 31, 2012 (i.e., more than two years before promulgation of the CCR Rule). The construction completion report for Cell 1 was submitted to the FDEP on October 16, 2013. Upon approval by the FDEP, Cell 1 began to receive CCR on May 28, 2015 (i.e., more than one month after promulgation of the CCR Rule). Because Cells 2 and 3 have not yet been constructed, they will be considered as new CCR landfills and will be subjected to all provisions of the CCR Rule.

Subsurface Explorations

The subsurface condition beneath Cell 1 was explored in 1980-1981 during design of the Stanton Energy Center and in 2010-2011 during design of the horizontal expansion. These subsurface explorations and the findings are presented in the following paragraphs and section.

In support of the design and permitting of the Stanton Energy Center, Black & Veatch performed two field exploration programs to evaluate the subsurface condition at the facility. The first field exploration program was conducted in May and June 1980 and consisted of the drilling of eleven Standard Penetration Test (SPT) soil borings designated B-1 through B-11. Two of the soil borings (B-6 and B-7) were drilled to a depth of approximately 210 feet below land surface. The remaining nine soil borings were terminated at a depth of approximately 50 feet. In addition, temporary piezometers were installed to document groundwater elevations at selected soil boring locations. Of the eleven soil borings performed by Black & Veatch, only B-3 was drilled within the

² Promat is a stabilized mixture of flue gas desulfurization (FGD) sludge, fly ash, and lime.

designated CWSA. The second field exploration program, which was conducted in November 1981, focused primarily in the designated CWSA. It consisted of the performance of ten SPT soil borings designated B-18 through B-22, B-24, B-26, B-27, B-29, and B-30. These soil borings were drilled to depths varying from 50 to 75 feet below land surface. The soil boring location map and soil boring logs from these two field exploration programs performed by Black & Veatch are included in Appendix 1.

A limited field exploration program was conducted by TT-AAI within the then proposed Cell 1 area in January 2010, with the objective of providing a general assessment of the subsurface soil condition for preliminary determination of appropriate landfill base grade elevations and estimation of fill quantity for construction. After TT-AAI was retained by OUC to design the horizontal expansion, a comprehensive field exploration program was conducted in June and July 2011 within the horizontal expansion area and the stormwater management area located south of the CWSA.

The 2010 field exploration program consisted of performance of five SPT soil borings designated TH-01 through TH-05. Except for TH-05, the other four soil borings were drilled within the footprint of the then proposed Cell 1. TH-05 was drilled on the west slope of the original CWSA. The locations of these SPT soil borings are identified in Figure 3. TH-01 was advanced to a depth of 125 feet below land surface, whereas TH-02, TH-03, and TH-04 were terminated at a depth of 75 feet. TH-05 was drilled to a depth of 80 feet below the landfill surface, corresponding to approximately 6 feet below natural ground.

The 2011 field exploration program consisted of performance of 22 SPT soil borings, designated TH-06 through TH-27, within the horizontal expansion area, and eight SPT soil borings, designated SP-01 through SP-08, within the stormwater management area. The locations of these SPT borings are also identified in Figure 3. TH-06 through TH-27 were advanced to depths ranging between 75 and 125 feet below land surface. SP-01 through SP-08 were terminated at depths varying from 20 to 50 feet.

Except for TH-01, continuous SPTs and associated split-spoon soil sampling were performed for all deep SPT soil borings that were drilled to a depth of 125 feet below land surface in the horizontal expansion area. TH-01, as well as all shallow SPT soil borings that were terminated at a depth of 75 feet, were sampled continuously in the upper 10.5 feet and at 5-foot vertical intervals thereafter unless the field crew felt a change in soil strata in which case additional split-spoon soil samples were obtained. TH-05 was a core boring that was drilled on the west slope of the original CWSA. This boring was advanced to the bottom of the landfill, which was encountered at a depth of 74 feet, using an HQ core barrel, followed by performance of SPTs and associated soil sampling to a depth of 6 feet below natural ground. All SPT soil borings performed in the stormwater management area were continuously sampled from land surface to the terminated boring depths that varied from 20 to 50 feet below land surface.

In addition to the disturbed split-spoon soil samples obtained during performance of the SPTs, undisturbed soil samples were recovered from the clayey soil strata encountered in the SPT soil borings for laboratory index, strength, and consolidation testing. A total of 42 undisturbed samples were obtained at 18 of the SPT boring locations.

As part of the field exploration program, ten temporary piezometers were installed within the horizontal expansion and stormwater management areas to allow measurements of groundwater levels. The five piezometers installed within the horizontal expansion area, designated PZ-1T through PZ-5T, were screened from 20 to 30 feet below land surface. The five piezometers

installed within the stormwater management area, designated PZ-6T through PZ-10T, were screened from 15 to 20 feet below natural grade. The locations of these temporary piezometers are shown in Figure 4 along with other existing nearby monitor wells.

All soil samples recovered from the field exploration programs were visually classified in TT-AAI's soil testing laboratory using the procedures outlined in ASTM D2487. Furthermore, index and classification tests were performed on selected representative SPT soil samples. These tests included moisture content determinations (ASTM D2216), fines content determinations (ASTM D1140), sieve analyses (ASTM D421 and D422), Atterberg limits determinations (ASTM D4318), and organic content determinations (ASTM D2974). The index and classification tests were used to characterize the materials encountered in the soil borings and to aid in establishing a subsurface soil profile for engineering evaluations and analyses. In addition to the index and classification tests, consolidation tests (ASTM D2435) and unconsolidated-undrained (UU) triaxial tests (ASTM D2850) were performed on selected representative undisturbed Shelby tube soil samples to determine the strength and consolidation properties of the clayey soils.

Subsurface Condition

Results of the SPT soil borings performed in the horizontal expansion and stormwater management areas are shown on the individual soil boring logs included in Appendices 2 and 3, respectively. Individual soil boring profiles generated from the soil boring logs are provided in Appendix 4. The depths to groundwater encountered in the soil borings at the time of drilling are indicated on the individual soil boring logs. Groundwater levels in the ten temporary piezometers were recorded on August 1, August 16, and September 22, 2011.

A review of the July 2011 topographic survey of the CWSA revealed that the existing land surface elevations within the horizontal expansion area typically varied from approximately +81 to +83 feet (NAVD88). The groundwater elevations on the dates of measurement typically ranged from approximately +80 to +82 feet (NAVD88), corresponding to an average water table depth of approximately one foot below land surface.

A generalized subsurface soil profile extending from land surface to a depth of 125 feet (i.e., the maximum depth of the soil borings) was developed based on soil boring data obtained by TT-AAI within the horizontal expansion area as well as previous soil boring data reported by others within and outside the CWSA. The subsurface soil profile was relatively uniform within the horizontal expansion area, and a generalized soil profile was developed to represent the subsurface condition beneath Cells 1 through 3 for stability and settlement analyses. The generalized soil profile is depicted in Figure 5. As shown, the subsurface soil profile from land surface to a depth of 125 feet was divided into nine layers, designated Layers 1 through 9, with each layer having its own distinct soil characteristics and engineering properties.

Layers 1 through 3 combined represent an approximately 30-foot thick soil stratum consisting predominantly of sand (SP)³ and sand with silt (SP-SM). Soil samples recovered from this upper 30 feet of the soil profile had typical moisture contents in the range of 20 to 35 percent, and typical fines contents of less than 12 percent. Based on the standard penetration resistance (i.e., N-values), the sandy soils in both Layers 1 and 2 could generally be described as medium dense to dense, with Layer 1 having N-values typically between 10 and 20 blows per foot, and Layer 2 having N-values typically between 20 and 30 blows per foot. The sandy soils in Layer 3 could generally be described as loose to medium dense. Beginning at a depth of 30 feet, the fines contents of the soil deposits increased gradually to a depth of approximately 56 feet.

³ Soil material symbol in accordance with the Unified Soil Classification System (USCS).

Layer 4 was encountered from 30 to 44 feet below land surface. This 14-foot thick soil layer consisted predominantly of silty sand (SM) and clayey sand (SC), with occasional interbedded layers of sandy clay and clay. The soil samples recovered from this layer had typical moisture contents in the range of 25 to 35 percent, and typical fines contents in the range of 12 to 45 percent. Based on the standard penetration resistance, the soil deposits in Layer 4 could generally be described as very loose to loose.

Layer 5 was encountered from 44 to 56 feet below land surface. This 12-foot thick soil layer consisted predominantly of low plasticity sandy clay (CL) to high plasticity clay (CH) and was the first substantially clayey stratum encountered at the site. Occasional interbedded layers of silty and clayey sands occurred within this soil layer, and the presence of shell fragments became noticeable. The sandy clay and clay deposits had typical fines contents ranging from 60 to 99 percent, whereas the interbedded silty and clayey sands had typical fines contents ranging from 20 to 45 percent. The clayey soils in this layer had typical plastic limits (i.e., the moisture contents below which the soil samples behave like “solids”) in the range of 15 to 35 percent, typical liquid limits (i.e., the moisture contents above which the soil samples behave like “liquid”) in the range of 30 to 145 percent, and typical moisture contents in the range of 35 to 95 percent. The moisture content of a soil sample recovered from this layer was typically between its plastic limit and liquid limit. Results of laboratory consolidation tests indicated that the pre-consolidation pressures (i.e., the maximum past pressure that a soil sample has previously experienced) of the clayey soils in this layer ranged between 4,600 and 11,000 lbs/ft², with over-consolidation ratios (OCR) (i.e., the ratio between the pre-consolidation pressure and the existing overburden pressure of a soil sample) varying from 2 to 4. The consolidation test results further indicated that the clayey soils had compression ratios (CR) (i.e., the compressibility of a soil sample at a stress level greater than the pre-consolidation pressure) in the range of 0.21 to 0.51, and recompression ratios (RR) (i.e., the compressibility of a soil sample at a stress level below the pre-consolidation pressure) in the range of 0.015 to 0.084. Laboratory strength measurements performed on undisturbed samples of the clayey soils recovered from this layer exhibited undrained shear strengths that typically ranged from 1,000 to 2,000 lbs/ft², characteristic of a stiff clayey soil. This soil layer was also referred to as the shallow clay layer.

Layer 6 consisted of an 18-foot thick layer of silty sand (SM) intermixed with deposits of clayey sand (SC). Some cementation and the presence of shell fragments were observed within this soil layer. The soil samples recovered from this layer had typical moisture contents in the range of 25 to 40 percent, and typical fines contents in the range of 10 to 30 percent. The silty to clayey sands in this soil layer could generally be described as loose to medium dense.

Layer 7 was encountered from approximately 74 to 80 feet below land surface. This 6-foot thick stratum consisted predominantly of clayey sand (SC) and clay (CL, CH). The fines contents of the soil samples recovered from this layer varied considerably, ranging from a low of approximately 30 to 40 percent to a high of approximately 90 percent. The clayey soils had typical plastic limits of 14 to 22 percent, typical liquid limits of 30 to 60 percent, and typical moisture contents of 30 to 55 percent. Results of laboratory consolidation tests indicated that the pre-consolidation pressures of the clayey soils in this layer ranged between 6,200 and 18,000 lbs/ft², with an OCR of 1.5 to 4. The consolidation test results further indicated that the clayey soils had CR in the range of 0.21 to 0.40, and RR in the range of 0.025 to 0.054. Laboratory strength measurements performed on undisturbed samples of the clayey soils recovered from this layer exhibited undrained shear strengths that typically ranged from about 1,980 to 2,110 lbs/ft², characteristic of a stiff to very stiff clayey soil. This soil layer was also referred to as the deep clay layer.

Layer 8, which occurred from 80 to 110 feet below land surface, consisted of an approximately 30-foot thick layer of silty sand (SM) intermixed with clayey sand (SC). The soil deposit typically had fines contents ranging between 12 and 40 percent. Some cementation and the presence of shell fragments were observed within this soil stratum. Based on the standard penetration resistance, the sandy soils in this soil stratum could generally be described as loose to medium dense.

Layer 9 was encountered from approximately 110 to 125 feet below existing grade and consisted predominantly of sand with silt (SP-SM), sand with clay (SP-SC), and silty to clayey sand (SM, SC). This soil layer had very high standard penetration resistance and thus can be considered effectively rigid. The soil samples recovered from this layer had typical moisture contents in the range of 20 to 40 percent, and typical fines contents in the range of 5 to 20 percent.

Engineering Analyses

As part of the site preparation procedures prior to dike construction and bottom liner system installation, the designated construction area was cleared, grubbed, and stripped, any deleterious materials near the surface was excavated, and any loose surficial soils was compacted to meet the requirements of the technical specifications. Therefore, the near-surface soils encountered in the soil borings were improved as part of Cell 1 construction.

Stability of the landfill design sections was analyzed considering both the circular arc and sliding block modes of failure through the foundation soils and along the weakest interface of the different components of the bottom liner system. The analyses were performed using the computer program SLOPE/W developed by GEO-SLOPE International of Calgary, Alberta, Canada. The program employs an iteration scheme to determine the critical slip surface and the corresponding minimum factors of safety.

The stability analyses were performed for two critical cross sections, one in the east-west direction and the other in the north-south direction of the horizontal expansion. The subsurface soil layers and selected material properties used in the stability analyses for these two cross sections are displayed in Figures 6 and 7. Specifically, the following key material properties were used for stability analyses:

- The landfill material was considered to have a unit weight of 103 lbs/ft³, based on laboratory measurements of core samples recovered from TH-05, which was drilled on the west slope of the original CWSA.
- The landfill material was considered to have an internal friction angle of 35 degrees, which represents a very conservative strength value considering the cementitious nature of the fixated materials in the landfill.
- The weakest material interface in the bottom liner system is expected to occur between the geocomposite and textured HDPE liner, with a typical interface friction angle in the range of 21 to 28 degrees. To be conservative, an interface friction angle of 21 degrees was used to represent the weakest interface of the bottom liner system.
- The internal friction angles of the sandy deposits in the different soil layers were selected based on the standard penetration blow count values.

- The shallow clay layer (Layer 5) was considered to have an undrained shear strength of 1,100 lbs/ft².
- The deep clay layer (Layer 7) was considered to have an undrained shear strength of 2,000 lbs/ft².
- The soil profile was considered to be effectively rigid at a depth of 110 feet below land surface (i.e., at the top of Layer 9), with an assigned internal friction angle of 40 degrees.
- The water table was considered to be at an elevation of +83 feet (NAVD88).
- The head in the leachate collection layer was considered to be at 1 foot above the bottom liner system, which is the maximum head allowed by Rule 62-701, F.A.C.

As shown in Figure 6, the stability analyses for the east-west cross section in the horizontal expansion area with a landfill crest elevation of +175 feet (NAVD88) yielded factors of safety of 1.71, 1.53, and 2.40 for the circular arc mode of failure through the foundation soils, sliding block mode of failure through the shallow clay layer, and sliding block mode of failure along the bottom liner system interface, respectively. As shown in Figure 7, the stability analyses for the north-south cross section yielded comparable factors of safety of 1.73, 1.56, and 2.40 for the circular arc mode of failure through the foundation soils, sliding block mode of failure through the shallow clay layer, and sliding block mode of failure along the bottom liner system interface, respectively. A minimum factor of safety of 1.5 is generally required for these types of analyses.

As noted previously, an interface friction angle of 21 degrees for the bottom liner system, as used in the stability analyses, represents a conservative value. It should further be noted that the stability analyses were performed based on the lower bound of the existing measured undrained shear strength values documented for the shallow clay layer (Layer 5). In reality, the clayey soils will consolidate and gain strength as the landfill is raised, which will result in an even higher factor of safety than computed.

The magnitude of foundation soil settlement under the applied landfill load dictates the minimum liner design grade that must be provided to maintain positive gravity drainage for the leachate after predicted settlement has occurred. Rule 62-701, F.A.C., requires minimum post-settlement slopes of 1.0 percent for areas that drain to the leachate collection pipe trench and 0.3 percent along the leachate collection pipe trench that drains into the sump. The most rapid change in landfill load and, therefore, the largest differential settlement was expected to occur between the toe and crest of the landfill slope. This situation was especially critical for the liner subgrade below the slope area adjacent to the sump where significant differential settlement between the toe and crest of the landfill slope could result in grade reversal if foundation soil settlement was not properly accounted for in design of the liner subgrade.

As stated previously, the subsurface soil profile was relatively uniform across the horizontal landfill expansion area, and the generalized soil profile shown in Figure 5 was selected to represent the subsurface condition beneath Cells 1 through 3 for settlement analysis. For settlement analyses, the very dense stratum (Layer 9) that was encountered at a depth of approximately 110 feet below land surface was considered to be effectively rigid and incompressible. The compressibility of the sandy soil layers above Layer 9 was estimated based on the standard penetration blow count values. Settlements of the shallow (i.e., Layer 5) and deep (i.e., Layer 7) clay layers was estimated based on the upper limits of the ranges of compression ratio (CR) and recompression ratio (RR) values documented from the laboratory consolidation tests. Because the dimensions

of the landfill cells are much larger than the thickness of the foundation soils, compression of the subsurface soil layers was expected to occur in one dimension, and the applied landfill load at the surface will practically be experienced at the bottom of the soil profile.

Foundation soils settlements beneath the landfill cells were calculated based on a maximum design height of approximately 93 feet (i.e. a landfill with a base elevation of +82 feet (NAVD88) and a maximum crest elevation of +175 feet (NAVD88)) above natural grade and an average unit weight of 103 lbs/ft³ for the landfill material, corresponding to a maximum applied load of approximately 9,500 lbs/ft².

The foundation soils settlement below the crest of the landfill was computed to be approximately 48 inches, and the settlement below the toe of the landfill slope was computed to be approximately 3 inches, which, including the 20-foot wide setback, translates to a differential settlement of 45 inches⁴ over a horizontal slope distance of approximately 275 feet. The settlement profiles are depicted in Figure 8.

Considering a liner length of 275 feet beneath the landfill slope, a maximum differential settlement of 45 inches between the toe and crest of the landfill slope corresponds to a settlement slope of approximately 1.4 percent. The strain induced in the HDPE geomembrane liner from this differential settlement was computed to be less than 0.01 percent. Similarly, the strain induced in the HDPE liner on the west slope of the original CWSA was computed to be approximately 1.5 percent. These strain values are well below the yield strain of HDPE liner material, which is typically in the range of 12 to 15 percent.

To maintain the minimum required slopes for gravity drainage of leachate after predicted foundation soils settlements have occurred, a liner design grade of 2.8 percent was designed for the area below the landfill slope in the vicinity of the sump area where differential settlement would result in flattening of the liner design grade, and a liner design grade of 1.2 percent was designed for the area towards the interior part of the landfill away from the sump area. Along the leachate collection pipe trench, a design grade of 2.4 percent was provided for the segment below the landfill slope in the vicinity of the sump area where differential settlement would result in flattening of the trench grade, and 0.3 percent for the segment towards the interior part of the landfill away from the sump area.

Seismic Potential

Title 40, Part 258.14 of the Code of Federal Regulations (CFR), which is incorporated by reference in Rule 62-701.410(2)(c), F.A.C., prohibits construction of solid waste landfills in seismic impact zones unless the facility owner or operator can demonstrate that all containment structures, including liners, leachate collection systems, and surface water control systems, have been designed to resist the maximum horizontal acceleration induced by an earthquake. Seismic impact zones are defined as areas “... *with a ten percent or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a percentage of the earth’s gravitational pull (g), will exceed 0.10g in 250 years.*”

⁴ In reality, the stress imposed by the landfill materials on the foundation soils beneath the crest of the landfill slope will be slightly lower than the landfill load directly above it because of the “slope effect” on one side. Similarly, the stress imposed by the landfill materials on the foundation soils beneath the toe of the landfill slope will be slightly higher than the landfill load directly above it. This effect will result in a lower differential settlement than calculated between the toe and the crest of the landfill slope.

Based on the 2008 national seismic hazard maps and database prepared by the United States Geological Survey (USGS)⁵, the peak horizontal ground acceleration at the Stanton Energy Center, with a 2 percent probability of exceedance in 50 years, is approximately 0.036g. A reproduction of the USGS seismic map for Florida is presented in Figure 9. A 2 percent probability of occurrence in 50 years is equivalent to a 10 percent probability of occurrence in 250 years, which is referenced in Title 40, Part 258.14 of the CFR. Accordingly, the entire Stanton Energy Center, including the horizontal expansion, is not located within a seismic impact zone and design for seismic activity was deemed unnecessary.

Fault Evaluation

Title 40 Part 258.13 of the CFR, which is incorporated by reference in Rule 62-701.410(2)(c), F.A.C., prohibits construction of new landfill units within 200 feet of a fault that has had displacement in the Holocene epoch (i.e., within the past approximately 10,000 years).

The USGS⁶ compiles information on faults and associated folds in the United States that are believed to be sources of earthquakes with a magnitude of greater than 6 on the Richter scale during the Quaternary Period (i.e., within the past 1,600,000 years). Maps of these geologic structures are linked to a database containing detailed descriptions and references. The database is intended to be USGS's archive for historical and ancient earthquake sources used in current and future probabilistic seismic hazard analyses. Based on the information published by the USGS, no such fault exists within Florida. Accordingly, this factor was irrelevant for design of the horizontal expansion, including Cell 1.

Sinkhole Potential

Sinkholes are closed depressions formed in areas underlain by soluble rock such as limestone, dolostone, or gypsum. Sinkholes occur when surface sediments subside or collapse into underground voids created by the dissolving action of groundwater in the underlying bedrock. Other subterranean events may also cause holes, depressions, or subsidence of the land surface that are similar to those caused by sinkhole activities. These other causes include expansive clays or organic materials that compress as water is removed, collapsed or broken sewer and drain pipes, improperly compacted soils after excavation work, and buried trash, logs, debris, etc.

The Florida Geological Survey (FGS) maintains a database⁷ of reported subsidence incidents state-wide. It should be noted that while the data may include some true sinkholes, many of the reported incidents have not been field-verified and potential causes of subsidence have not been investigated. The current database includes subsidence incidents that have been reported to the FGS through August 10, 2011.

The reported subsidence incidents in the FGS database for Orange County and nearby adjoining counties are shown in Figure 10. As shown, a total of 194 subsidence incidents have been reported for Orange County. There is only one subsidence incident (75-593) reported in east Orange County. This reported depression, which was located more than 4 miles east of the

⁵ Petersen, M.D., Frankel, A.D., Harmsen, S.C., Mueller, C.S., Haller, K.M., Wheeler, R.L., Wesson, R.L., Zeng, Y., Boyd, O.S., Perkins, D.M., Luco, N., Field, E.H., Wills, C.J., and Rukstales, K.S. 2008. Documentation for the 2008 Update of the United States National Seismic Hazard Maps. U.S. Geological Survey Open-File Report 2008-1128. 61 p.

⁶ <http://earthquake.usgs.gov/hazards/qfaults/>

⁷ http://www.dep.state.fl.us/geology/gisdatamaps/SIRs_database.htm

Stanton Energy Center, had a diameter of approximately 2 feet and a depth of approximately 2 feet.

According to the map prepared by Sinclair and Stewart (1985)⁸, the Stanton Energy Center is located within an area of Florida where the soil cover over limestone is 30 to 200 feet thick and consists mainly of cohesionless soils and permeable sand. In this area of the state, sinkholes typically are few and, if developed, are mostly small cover-subsidence sinkholes.

Based on the above considerations, the potential for sinkhole occurrence in the horizontal expansion, including Cell 1, was judged to be very low.

Closure

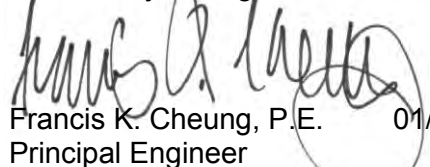
Based on the above demonstrations, it is our professional opinion the horizontal expansion, including the existing Cell 1, complies with the "unstable areas" requirement in the CCR Rule. However, further engineering evaluations will be required to determine compliance with other "location restrictions" requirements, which will be applicable to all future CCR landfill cells, including the proposed Cells 2 and 3.

TT-AAI appreciates the opportunity of providing engineering services to OUC. If you have any questions or need additional information, please contact us.

Very truly yours,
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Certificate of Authorization No. 5950



Jeyisanker Mathiyaparanam, P.E.
Senior Project Engineer



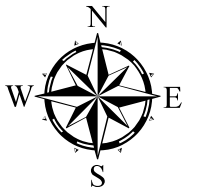
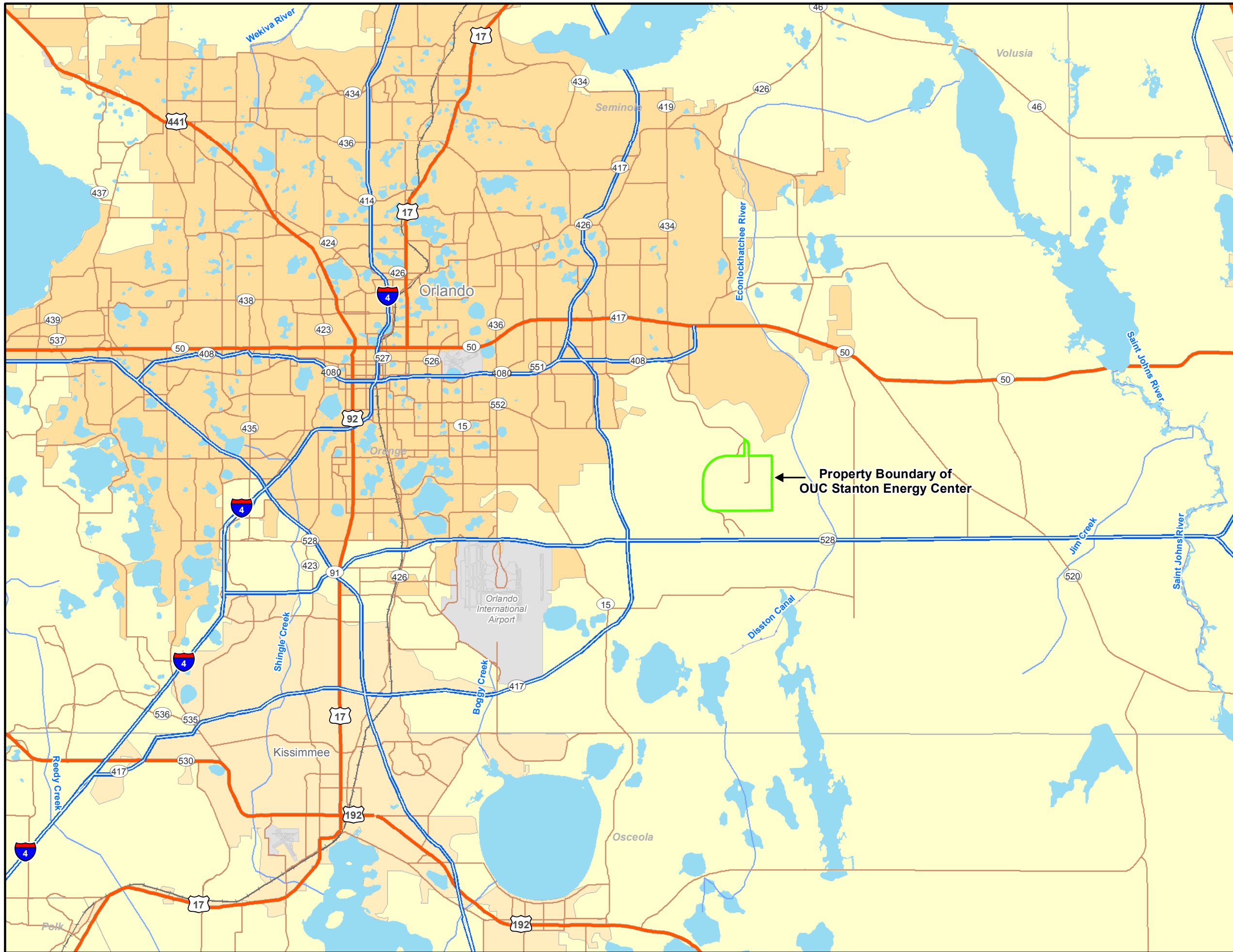
Francis K. Cheung, P.E. 01/11/19
Principal Engineer
Florida License Number 36382



Enclosures

⁸ Sinclair, W.C. and Stewart, J.W. 1985. Sinkhole Type, Development and Distribution in Florida. U.S. Geological Survey Map Series No. 110. Tallahassee, Florida.

W:\Projects\2019\19-13-0002 OUC\ArcGIS\ArcLayouts\20190104SiteLocationMap.mxd



0 9,000 18,000

Scale: 1" = 18,000'

Source: ESRI

Legend

 SEC Property Boundary

SITE LOCATION MAP



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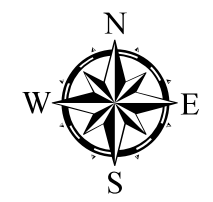
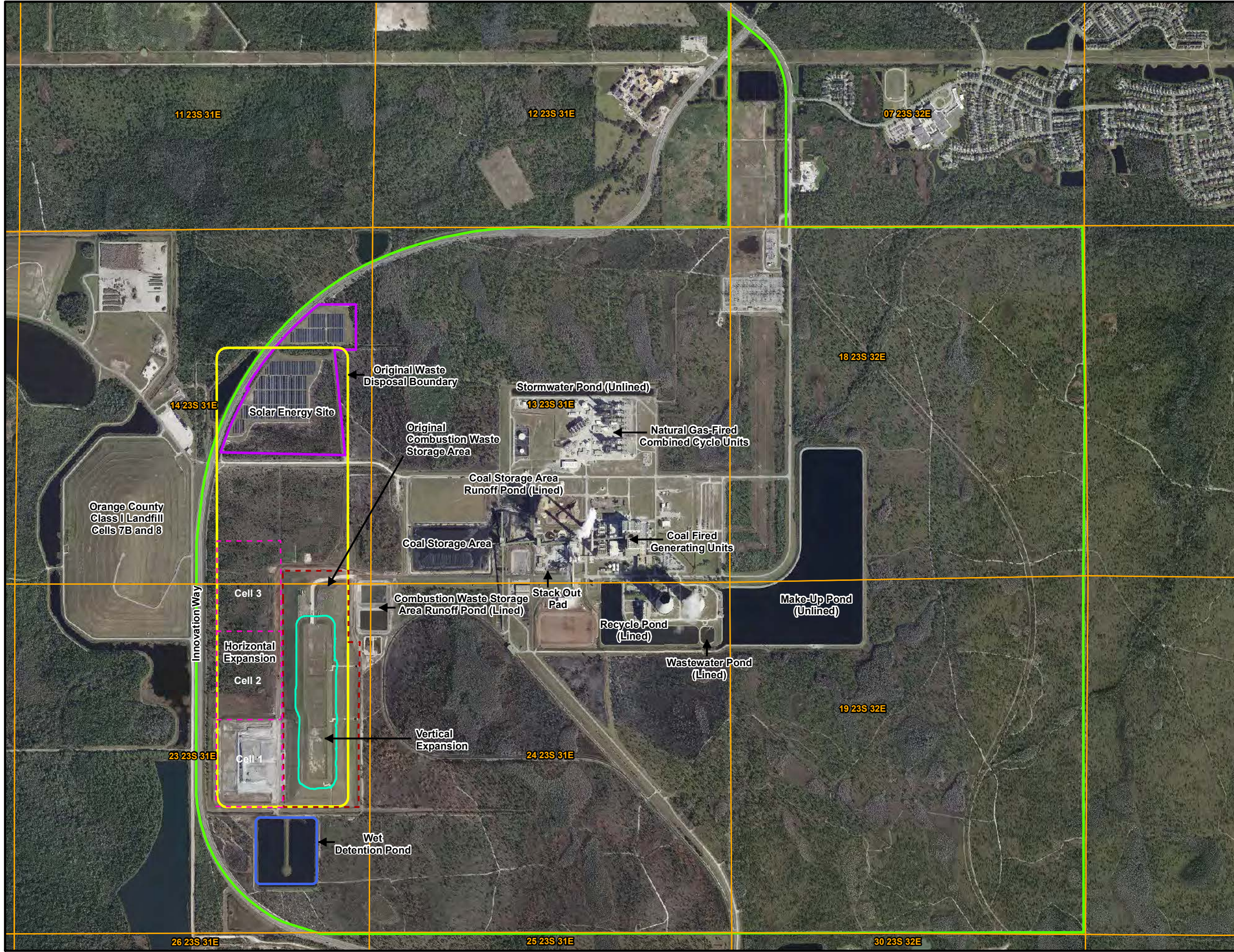
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OUC STANTON ENERGY CENTER
ORANGE COUNTY, FLORIDA

"UNSTABLE AREAS" DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA

DRAWN BY: RMC	CHECKED BY: MJ	DATE: 1/2/19
FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 1

W:\Projects\2019\19-13-0002 OUC\ArcGIS\ArcLayouts\20190104\AerialMap.mxd



0 700 1,400
Scale: 1" = 1,400'

Imagery Source: OCPA
Date: January 2017

Legend

- Vertical Expansion
- Horizontal Expansion
- Original CWSA
- Original Waste Disposal Boundary
- PLSS
- Solar Energy Site
- Wet Detention Pond
- SEC Property Boundary

**AERIAL PHOTOGRAPH OF
OUC STANTON ENERGY CENTER**



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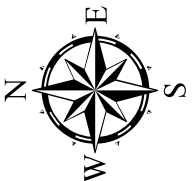
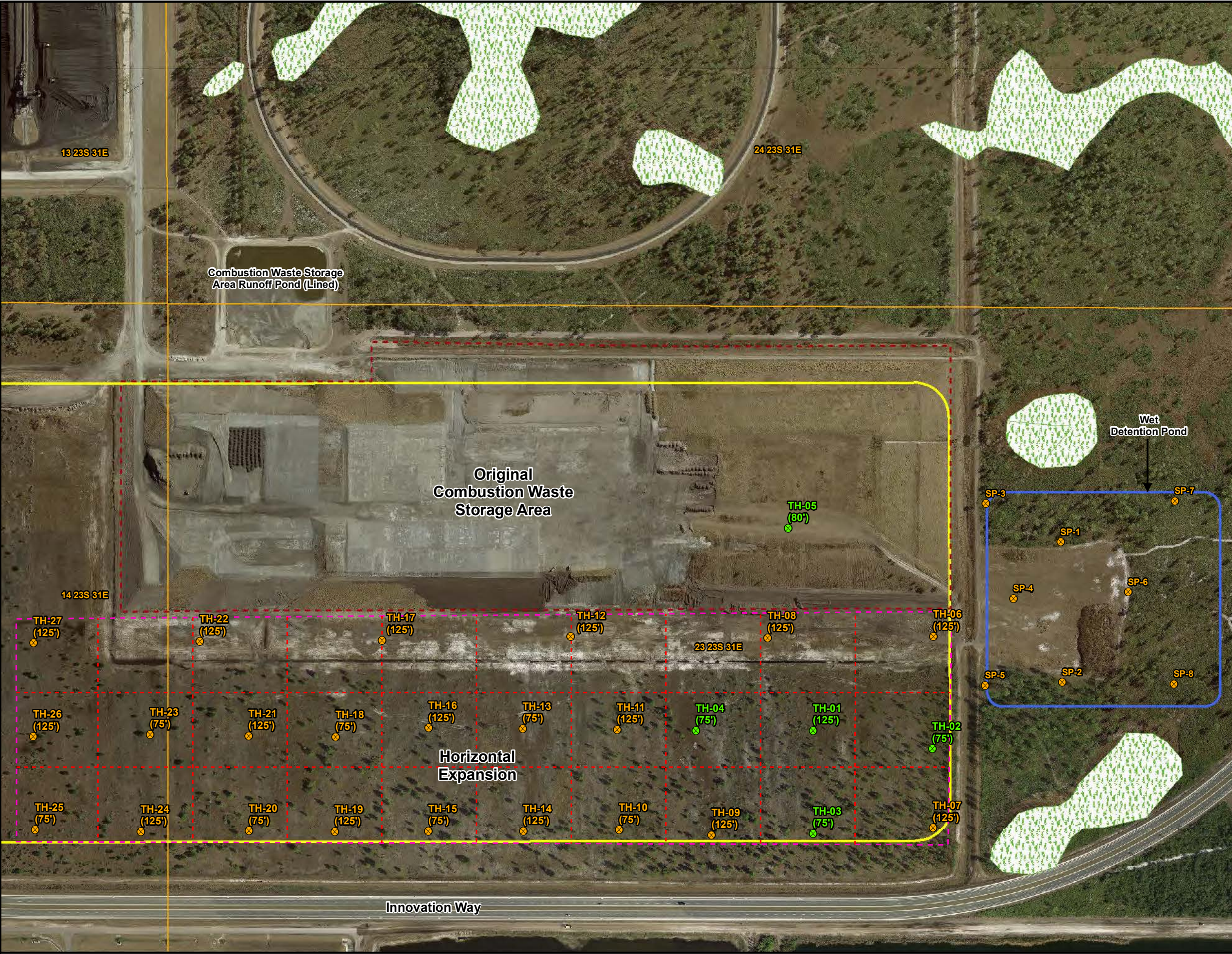


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"UNSTABLE AREAS" DEMONSTRATION
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FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 2

W:\Projects\2019\19-13-0002 OUC\ArcGIS\Arclayouts\20190104GridBoringsMap.mxd



0 200 400
Scale: 1" = 400'

Imagery Source: OCPA
Date: January 2011

Legend

- Ardaman Borings (June/July 2011)
- Ardaman Borings (Jan 2010)
- Grid Lines
- Original Waste Disposal Boundary
- Original CWSA
- Horizontal Expansion
- PLSS
- Solar Energy Site
- Wet Detention Pond
- NWI

LOCATION OF SPT BORINGS



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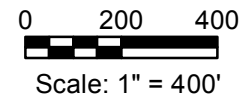
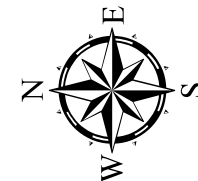
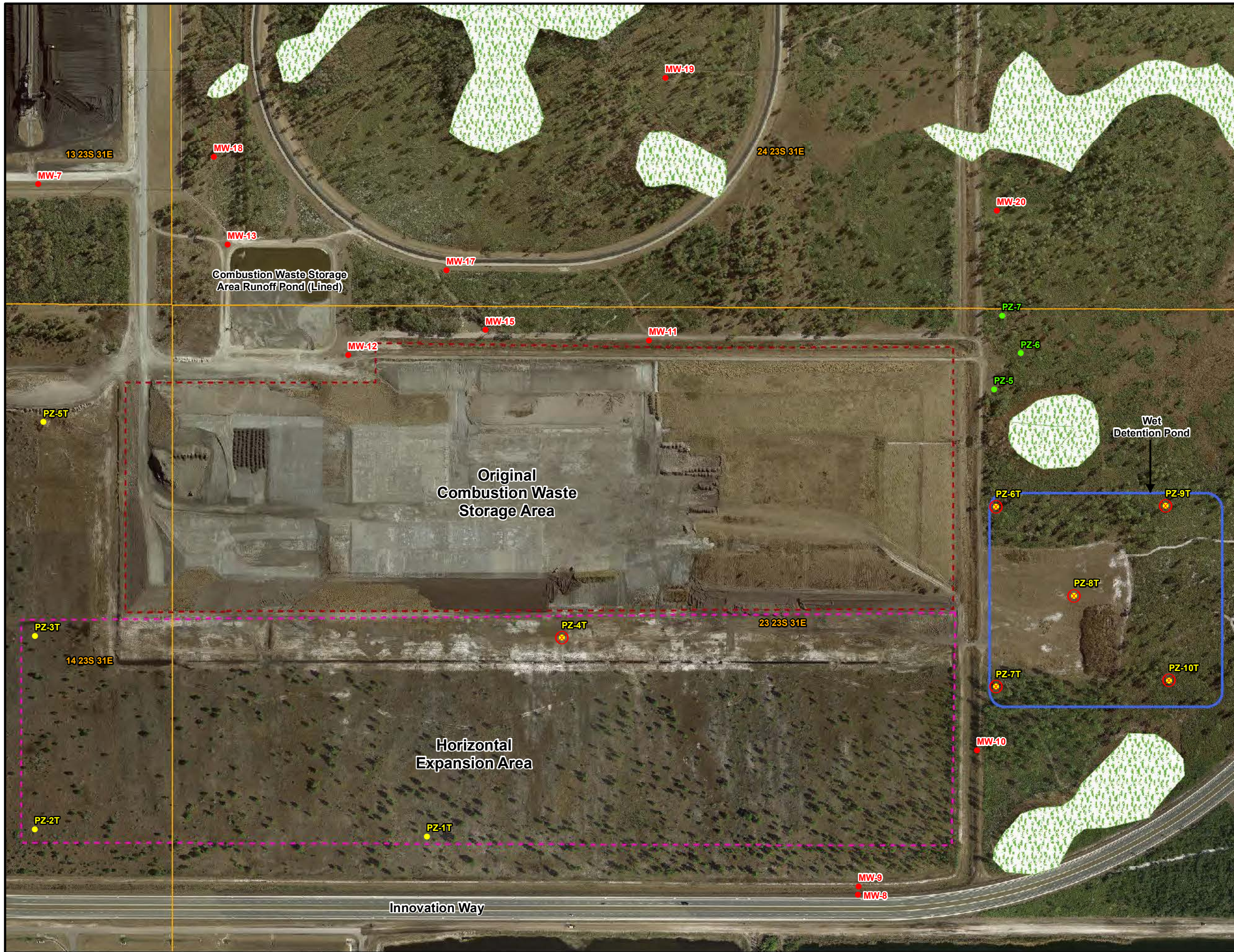


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"UNSTABLE AREAS" DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA

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FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 3

W:\Projects\2019\19-13-0002 OUC\ArcGIS\Ardam\ayouts\20190104\PiezometerMap.mxd



Imagery Source: OCPA
Date: January 2011

- Legend**
- Existing Monitor Wells
 - Temporary Piezometers Installed by Others
 - Temporary Piezometers Installed by Ardaman
 - Abandoned Piezometers
 - NWI
 - PLSS

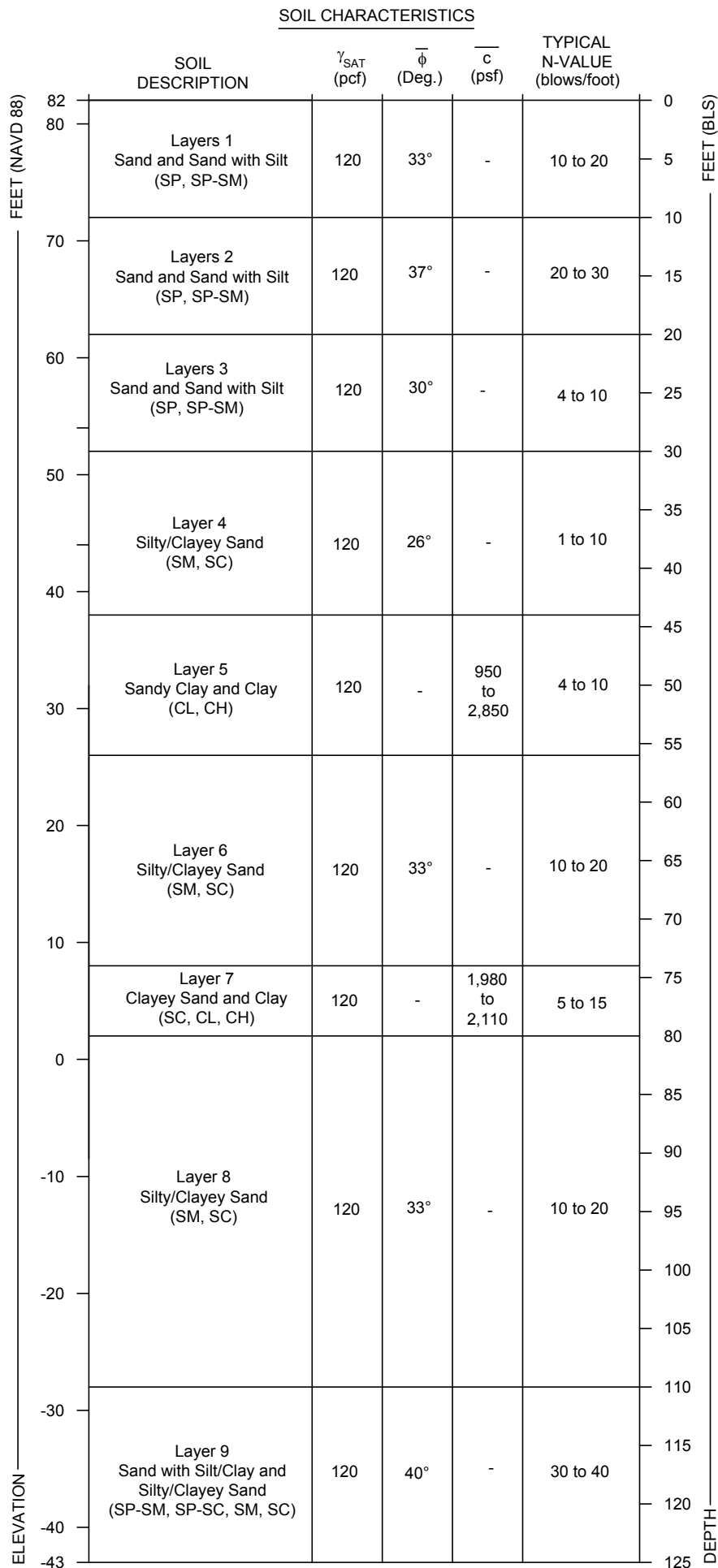
LOCATIONS OF PIEZOMETERS

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FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 4

**NOTE:** γ_{SAT} TOTAL UNIT WEIGHT ϕ INTERNAL FRICTION ANGLE c UNDRAINED SHEAR STRENGTH**GENERALIZED SOIL PROFILE**

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**"UNSTABLE AREAS" DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA**

DRAWN BY: BTW CHECKED BY: JM DATE: 01/02/19

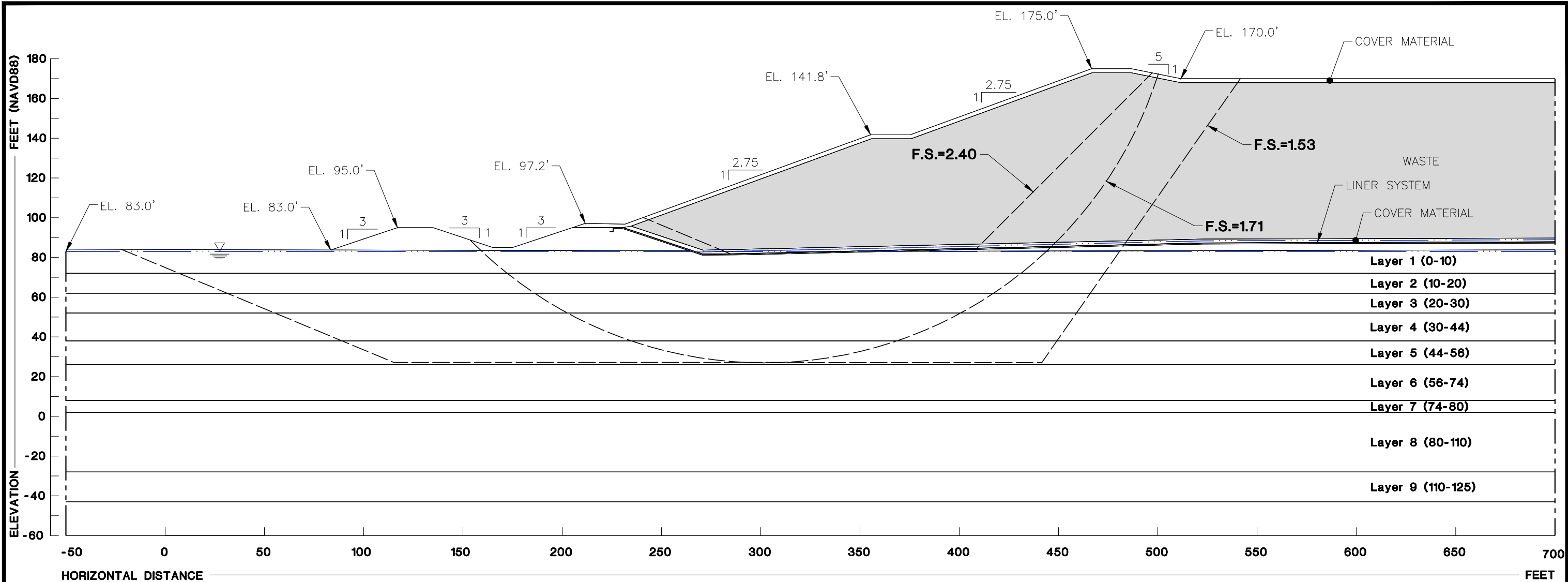
FILE NO.
19-13-0002

APPROVED BY:

FIGURE:

5

R:\Corporate\19\19-13-0002\Geotech Report\6 EAST-WEST LANDFILL CROSS SECTION.dwg 1/04/2019 1:30:14 PM, ben.vu



HORIZONTAL DISTANCE
SCALE: 1"=50'

MATERIALS	DEPTH (ft)	DESCRIPTION	TOTAL UNIT WEIGHT (pcf)	STRENGTH PARAMETERS
COVER MATERIALS	-	SP, SP-SM	120	$\phi = 33^\circ$
WASTE	-	PROMAT	103	$\phi = 35^\circ$
DOUBLE LINER SYSTEM INTERFACE	-	-	120	$\phi = 21^\circ$
LINER SUBBASE	-	SC	130	$\phi = 33^\circ$
LAYER 1	0-10	SP, SP-SM	120	$\phi = 33^\circ$
LAYER 2	10-20	SP, SP-SM	120	$\phi = 37^\circ$
LAYER 3	20-30	SP, SP-SM	120	$\phi = 30^\circ$
LAYER 4	30-44	SM, SC	120	$\phi = 26^\circ$
LAYER 5	44-56	CL, CH	120	$S_u = 1100 \text{ psf}$
LAYER 6	56-74	SM, SC	120	$\phi = 33^\circ$
LAYER 7	74-80	CL, CH, SC	120	$S_u = 2000 \text{ psf}$
LAYER 8	80-110	SM, SC	120	$\phi = 33^\circ$
LAYER 9	110-125	SP-SM, SP-SC, SC, SM	120	$\phi = 40^\circ$

LEGEND



PHREATIC SURFACE/WATER LEVEL

RESULTS OF STABILITY
ANALYSES FOR EAST-WEST
LANDFILL CROSS SECTION

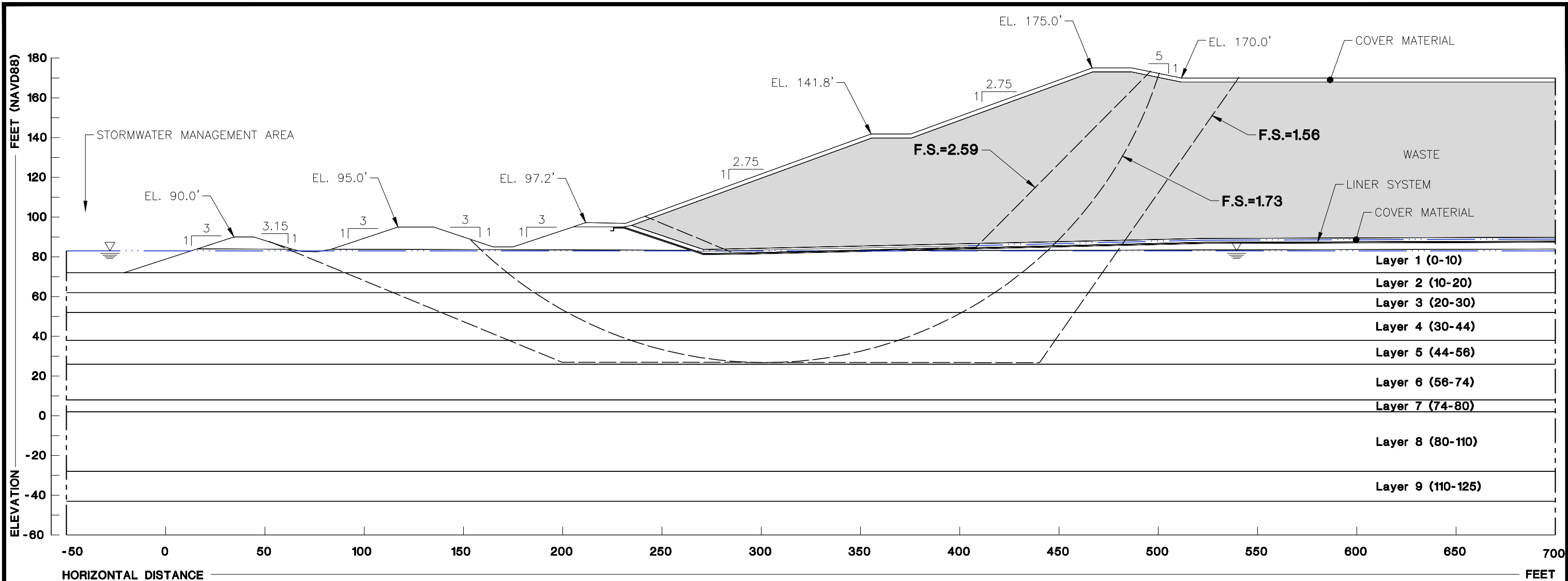


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'UNSTABLE AREAS' DEMONSTRATION
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COMBUSTION WASTE STORAGE AREA

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FILE NO. 19-13-0002	APPROVED BY:	FIGURE: 6

R:\Corporate\19\19-13-0002\Geotech Report\7 NORTH-SOUTH CROSS SECTION.dwg 1/04/2019 1:31:31 PM, ben.vu



HORIZONTAL DISTANCE
SCALE: 1"=50'

MATERIALS	DEPTH (ft)	DESCRIPTION	TOTAL UNIT WEIGHT (pcf)	STRENGTH PARAMETERS
COVER MATERIALS	-	SP, SP-SM	120	$\phi = 33^\circ$
WASTE	-	PROMAT	103	$\phi = 35^\circ$
DOUBLE LINER SYSTEM INTERFACE	-	-	120	$\phi = 21^\circ$
LINER SUBBASE	-	SC	130	$\phi = 33^\circ$
LAYER 1	0-10	SP, SP-SM	120	$\phi = 33^\circ$
LAYER 2	10-20	SP, SP-SM	120	$\phi = 37^\circ$
LAYER 3	20-30	SP, SP-SM	120	$\phi = 30^\circ$
LAYER 4	30-44	SM, SC	120	$\phi = 26^\circ$
LAYER 5	44-56	CL, CH	120	$S_u = 1100 \text{ psf}$
LAYER 6	56-74	SM, SC	120	$\phi = 33^\circ$
LAYER 7	74-80	CL, CH, SC	120	$S_u = 2000 \text{ psf}$
LAYER 8	80-110	SM, SC	120	$\phi = 33^\circ$
LAYER 9	110-125	SP-SM, SP-SC, SC, SM	120	$\phi = 40^\circ$

LEGEND



PHREATIC SURFACE/WATER LEVEL

RESULTS OF STABILITY
ANALYSES FOR NORTH-SOUTH
LANDFILL CROSS SECTION



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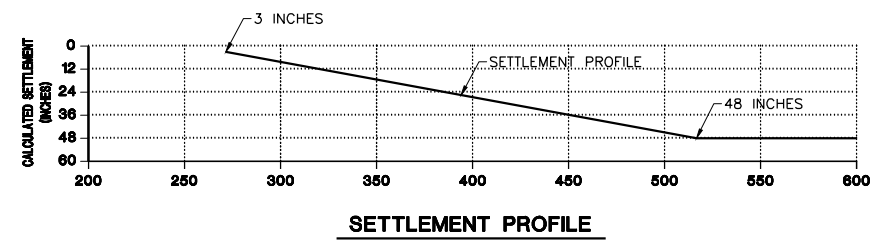
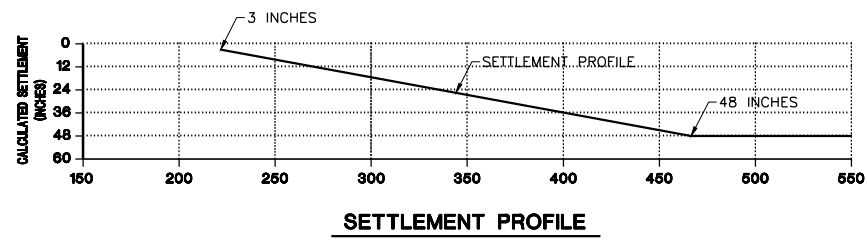
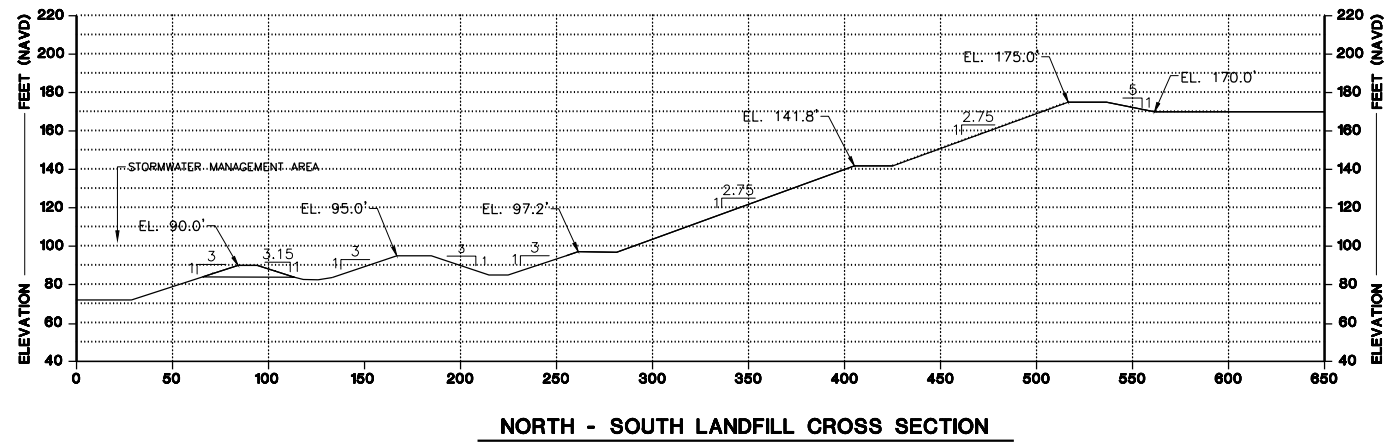
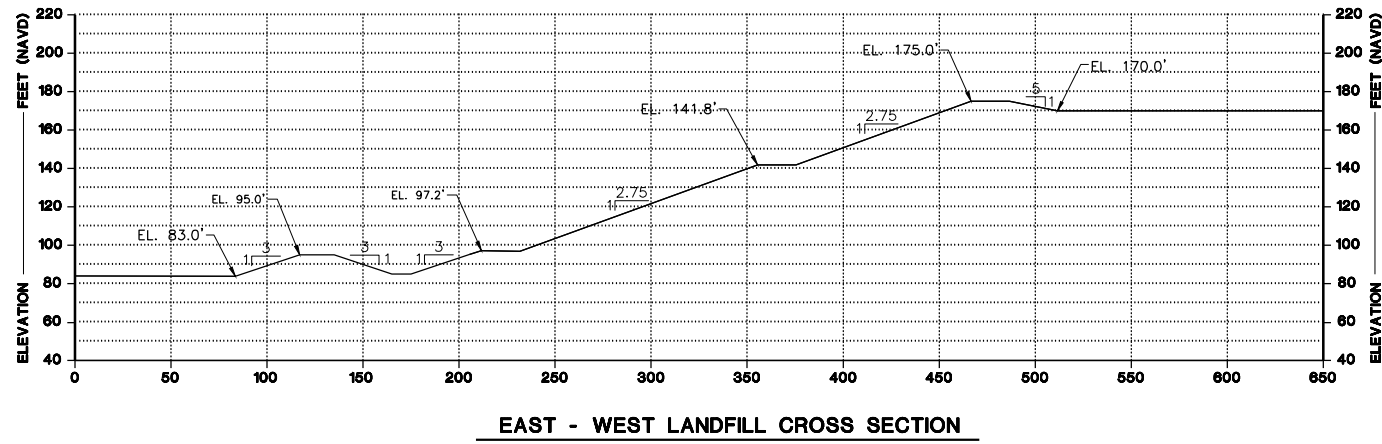


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'UNSTABLE AREAS' DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA

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FILE NO. 19-13-0002	APPROVED BY:	FIGURE: 7

R:\Corporate\19\19-13-0002\Geotech Report\8 FOUNDATION SOIL SETTLEMENT PROFILE.dwg 1/04/2019 1:32:58 PM, ben.vu



FOUNDATION SOIL SETTLEMENT PROFILE

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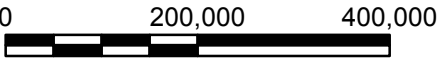
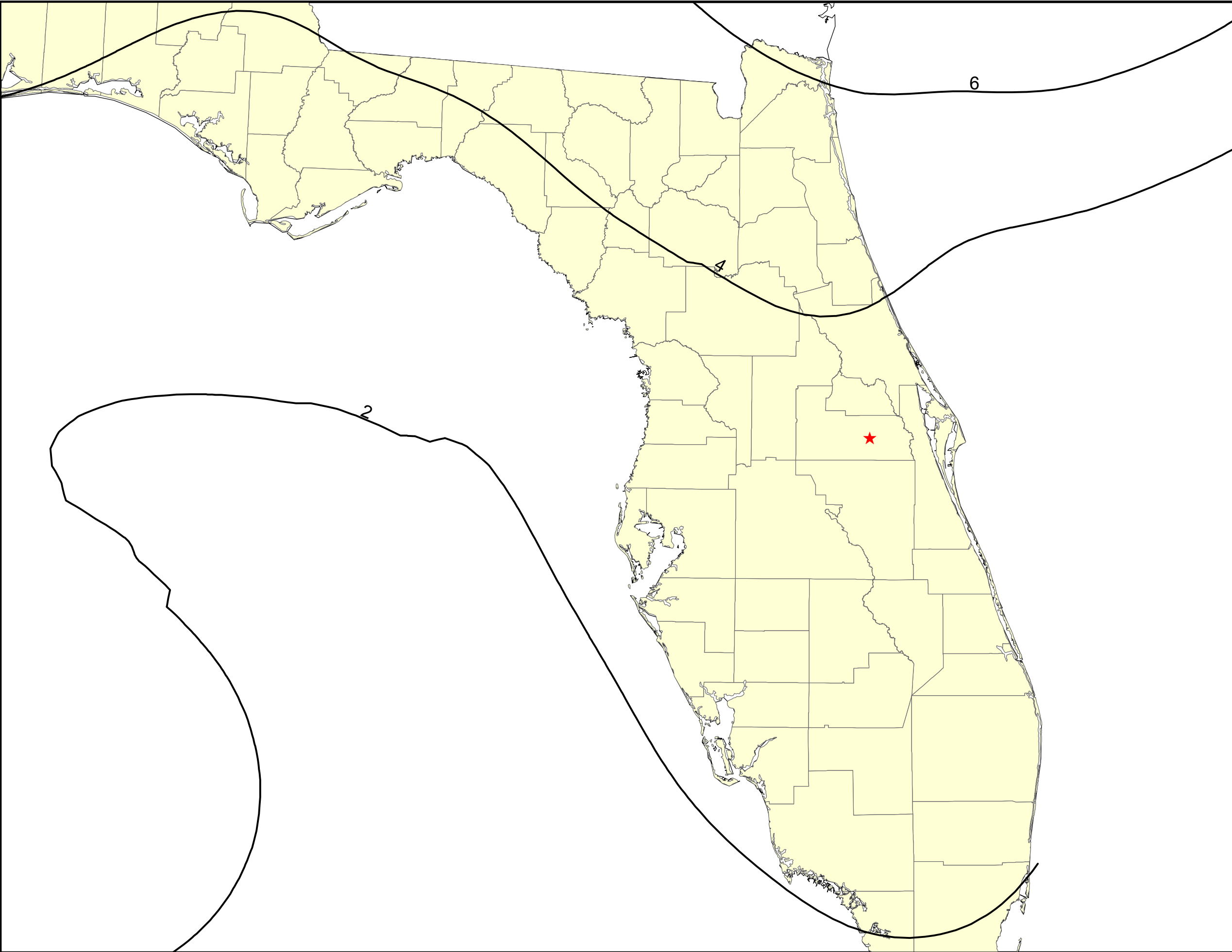
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**'UNSTABLE AREAS' DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA**

DRAWN BY: BTW CHECKED BY: JM DATE: 01/02/19

FILE NO. 19-13-0002 APPROVED BY: FIGURE: 8

W:\Projects\2019\19-13-0002 OUC ArcGIS\ArcLayouts\20190104\Seismic.mxd



Scale: 1" = 20,000'

Source: 2008 U.S. Geological Survey
National Seismic Hazard Maps
Open-File Report 2008-1128

Legend

 Peak Ground Acceleration
in %g

 SEC Site Location

Note:
Peak Horizontal Ground Acceleration
with 2% Probability of Exceedance in
50 Years

SEISMIC HAZARD MAP



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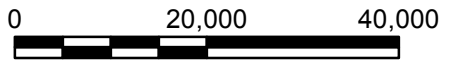
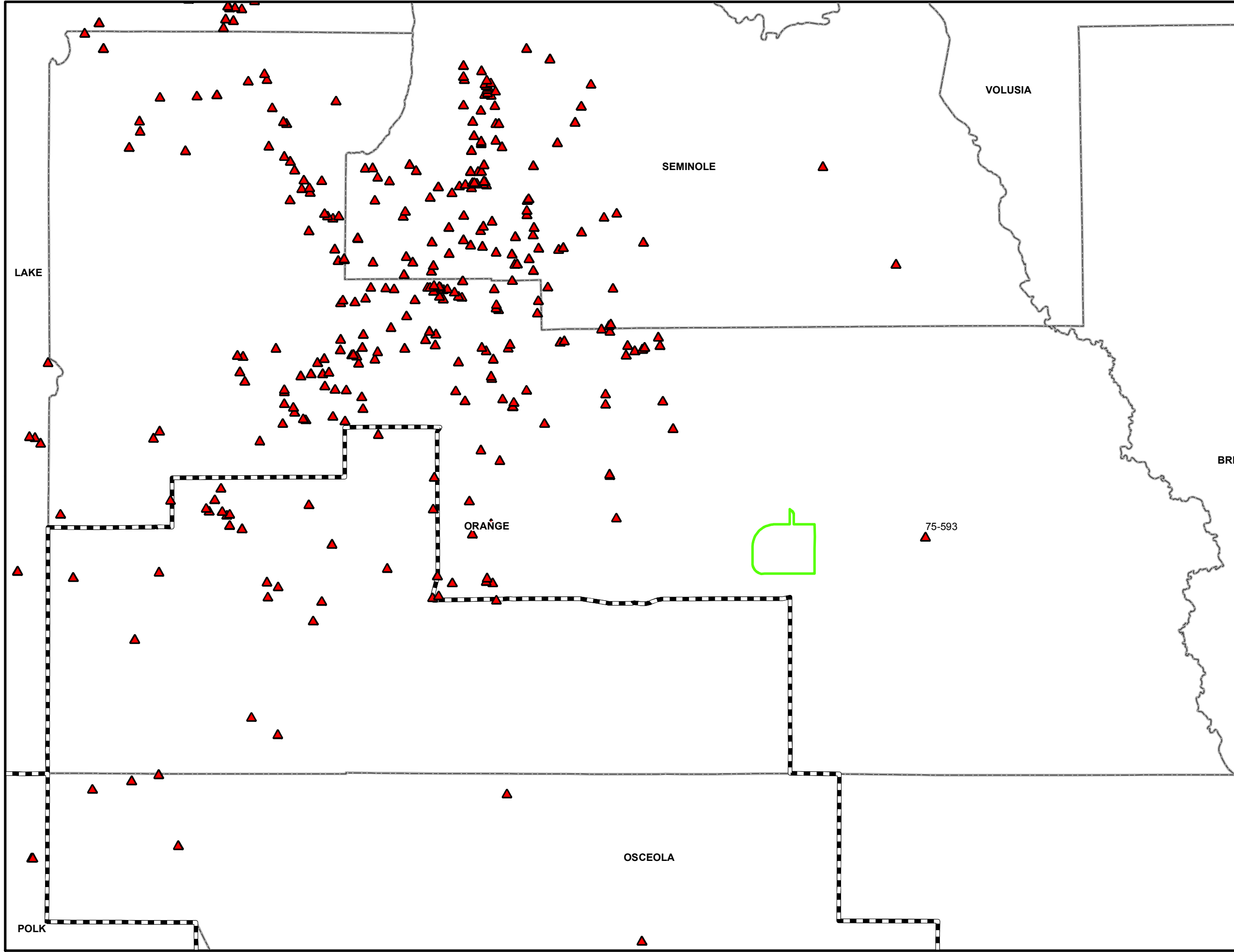
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"UNSTABLE AREAS" DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA

DRAWN BY: RMC	CHECKED BY: MJ	DATE: 1/2/19
FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 9

W:\Projects\2019\19-13-0002 OUC ArcGIS\ArcLayouts\20190104\Subsidence.mxd



Scale: 1" = 20,000'

Source: FGS

Legend

- Reported Subsidence Incident
- SEC Property Boundary
- WMD Boundaries
- County Boundary

**LOCATIONS OF REPORTED
SUBSIDENCE INCIDENTS**



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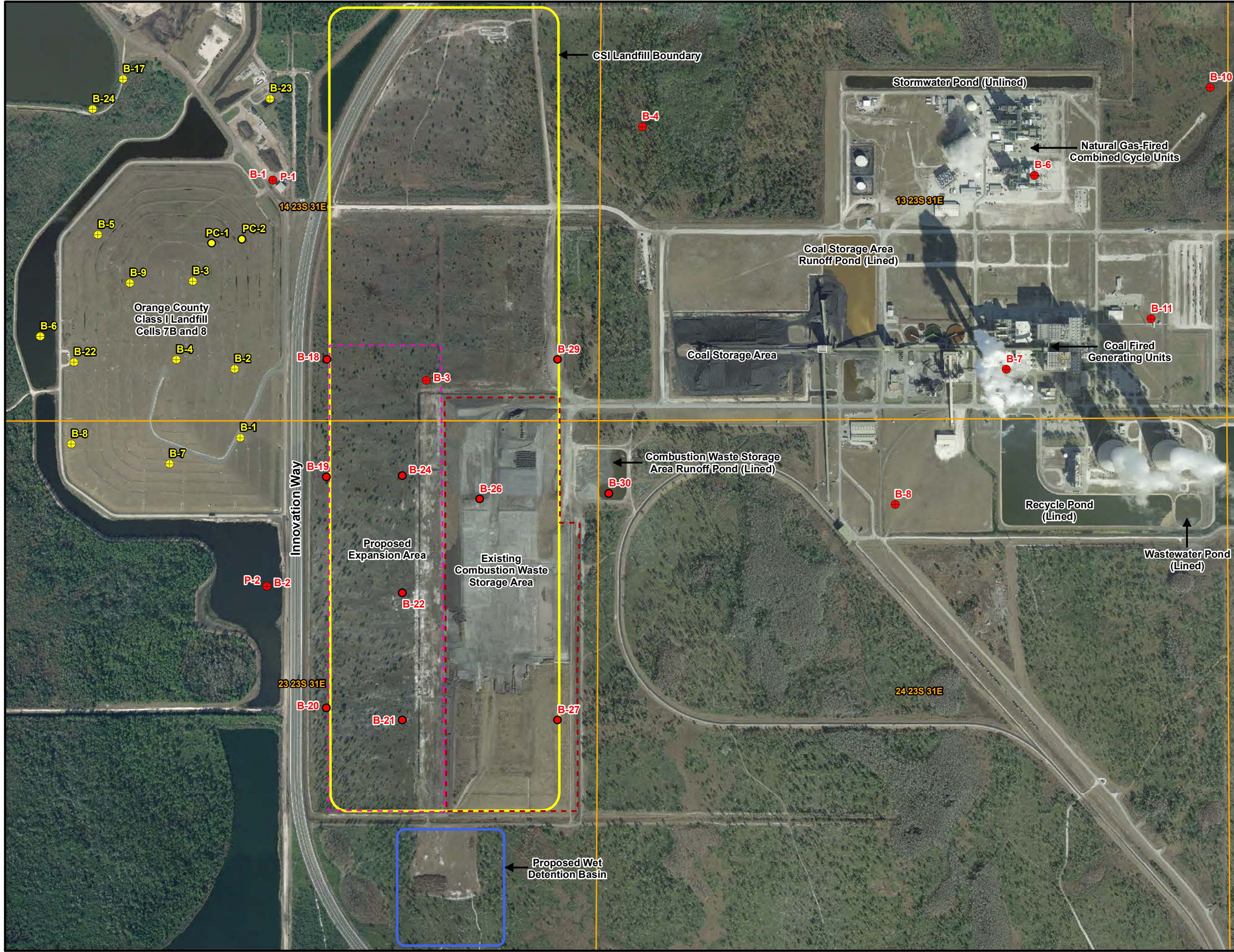
"UNSTABLE AREAS" DEMONSTRATION
CELL 1 OF HORIZONTAL EXPANSION
COMBUSTION WASTE STORAGE AREA

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FILE NO. 19-13-0002	APPROVED BY: FKC	FIGURE: 10

Appendix 1

Soil Boring Logs by Black and Veatch

W:\Projects\2010\10-0249\ArcGIS\ArcLayouts\20110912\BoringLocationMap.mxd



0 400 800
Scale: 1" = 800'

Imagery Source: OCPA
Date: January 2011

Legend

- S&ME Borings (Nov-Dec 1988) (March 1989)
- S&ME Borings (Nov 1989)
- Black & Veatch Borings (May-June 1980)
- Black & Veatch Borings (Nov 1981)
- CSI Landfill Boundary
- Expansion Area
- Existing Landfill Limits
- PLSS
- Wet Detention Basin

LOCATION OF SOIL BORINGS PERFORMED BY BLACK & VEATCH & S&ME



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HORIZONTAL EXPANSION OF COMBUSTION WASTE STORAGE AREA

DRAWN BY: RMC	CHECKED BY: MJ	DATE: 10-24-11
FILE NO. 10-0249	APPROVED BY: FKC	FIGURE: 1-1

EXPLANATION OF BORING LOG TERMINOLOGY

GENERAL

PP	- COMPRESSIVE STRENGTH AS DETERMINED BY PENETROMETER
TV	- COMPRESSIVE STRENGTH AS DETERMINED BY TORVARE
GRAVEL	- JP TO 3 INCHES IN DIAMETER
COBBLE	- 3 INCHES TO 12 INCHES IN DIAMETER
BOULDER	- GREATER THAN 12 INCHES IN DIAMETER
60°	- REPRESENTS 60 DEGREES MEASURED FROM A PLANE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE CORE
TRACE	- REPRESENTS 0 TO 5 PER CENT BY VOLUME
OCCASIONAL OR SOME	- REPRESENTS 5 TO 10 PER CENT BY VOLUME
NUMEROUS	- REPRESENTS 10 TO 50 PER CENT BY VOLUME
N VALUE	- INDICATES THE NUMBER OF BLOWS REQUIRED TO DRIVE A STANDARD SPLIT SPOON SAMPLER 12" WITH A 140-POUND WEIGHT FALLING 30 INCHES
REC	- RECOVERY INDICATES TOTAL AMOUNT OF CORE RECOVERED FOR EACH RUN, EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF THE CORE RUN
RQD	- A MODIFIED CORE RECOVERY IN WHICH ALL PIECES OF SOUND CORE OVER 4 INCHES IN LENGTH ARE COUNTED AS RECOVERY. THE MODIFIED SUM OF CORE RECOVERED IS THEN EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF THE CORE RUN
---	- DASHED LINE IN CLASSIFICATION COLUMN INDICATES APPROXIMATE OR GRADATIONAL CHANGE

WEATHERING

FRESH	- THE ROCK SHOWS NO DISCOLORATION, LOSS OF STRENGTH, OR ANY OTHER EFFECT DUE TO WEATHERING (UNWEATHERED ROCK)
SLIGHTLY WEATHERED	- ROCK IS SLIGHTLY DISCOLORED WITH A SLIGHTLY LOWER STRENGTH THAN UNWEATHERED ROCK
MODERATELY WEATHERED	- ROCK IS CONSIDERABLY DISCOLORED WITH A SIGNIFICANTLY LOWER STRENGTH THAN UNWEATHERED ROCK
HIGHLY WEATHERED	- ROCK IS DISCOLORED AND WEAKENED SO INTENSELY THAT 2-INCH DIAMETER ROCK CORES CAN BE BROKEN READILY BY HAND. WET STRENGTH IS USUALLY MUCH LOWER THAN DRY STRENGTH

BEDDING

LAMINATED	- LESS THAN 0.001 FOOT TO 0.01 FOOT (.1 INCH)
THIN BEDDED	- 0.01 FOOT TO 0.1 FOOT (.1 TO 1.2 INCH)
MEDIUM BEDDED	- 0.1 FOOT TO 1.0 FOOT (1.2 TO 12 INCH)
THICK BEDDED	- GREATER THAN 1.0 FOOT
MASSIVE	- DENOTES NO DISCERNIBLE INTERNAL BEDDING STRUCTURE

ABBREVIATIONS

s	- and	mat	- material
br	- brown	mod	- moderately
calc	- calcareous	occ	- occasional
Cl	- Clay	org	- organics
Cob	- Cobble	PP	- pocket penetrometer
xln	- crystalline	Sa	- Sand
Dol	- Dolomite	Ss	- Sandstone
ft	- feet	sat	- saturated
Gr	- Gravel	Sh	- shale
gr	- gray	Si	- Silt
grn	- green	TV	- torvare
lam	- laminated	w/	- with
Ls	- Limestone	yel	- yellow

SAMPLE SYMBOLS

Bag or Grab Sample	California	Piston
		
Pitcher	Split Barrel	Thin Wall
		



BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-1

CLIENT					PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission					8927		88.9		1 2	
PROJECT					LOCATION		DATE: START FINISH			
Stanton Energy Center					N-1,509,544.5E-439,960.5		6-11-80 6-11-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS		
0					Sand; light brownish-gray; loose; fine grained; moist; w/numerous roots			Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid Water encountered @ 4.5'		
1			6							
2										
3										
4			9		grading brown; wet; w/some roots		SP			
5										
6			9		grading dark brown					
7										
8										
9			8		grading very dark grayish-brown; w/trace roots	78.4				
10										
11			11		Sand; black; medium dense; fine grained; wet; w/trace silt					
12										
13										
14			37		grading dense; w/some silt					
15										
16			39		grading dark reddish-brown; moist		SP			
17										
18										
19			46							
20						67.6				
21										
22			28		Sand; dark yellowish-brown; medium dense; fine grained; wet					
23										
24			25							
25										
26										
27										
28										
29			13		grading yellowish-brown		SP			
30										
31										
32										
33										
34			31		grading dense					
35										
36										
37										
38										
39					Sand; gray; medium dense; fine grained; wet	50.2				
40			12				SP			
Continued on next page										

P-ST-036A



BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-1

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		88.9		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,509.544.5E-439,960.5		6-11-80 6-11-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
4 0 1 2 3 4 5 6 7 8 9 50			2		Clay; dark gray; very soft; moist; with numerous sand	47.9	CH		
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0					Sand; gray; medium dense; fine grained; moist; occasionally clayey	38.9 38.4	SP	PP = 1.0 tsf Bottom of boring @ 50.5' Water level @ 5.3' on 6-13-80	

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LOG OF BORING

BORING NO. B-2

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		87.8	1	2
PROJECT				LOCATION		DATE:	START	FINISH
Stanton Energy Center				N-1,506,051.5E-439,908.0		6-10-80	6-10-80	
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; grayish-brown; loose; fine grained; moist; w/some roots		SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid
1			7					
2						84.3		
3								
4			27		Sand; dark brown; medium dense; fine grained; wet; w/trace roots & silt		SP	
5								
6			19		grading very dark brown; roots grade out	79.8		Water encountered @ 3.6'
7								
8								
9			9		Sand; dark gray; loose; fine grained; wet; w/trace silt			
10								
11								
12			12		grading black; medium dense		SP	
13								
14			13		grading w/more silt			
15								
16								
17			10					
18								
19			18			68.2		
20					Sand; very dark brown; medium dense; fine grained; moist; w/trace silt		SP	
21			13		grading wet; silt grades out			
22						64.3		
23								
24			30		Sand; black; dense; fine grained; moist; w/trace silt		SP	
25								
26					Clayey Sand; yellowish-brown; medium dense; fine grained; wet	61.3	SG	
27								
28						59.0		
29			23		Sand; pale yellow; medium dense; fine grained; wet; w/trace clay		SP	
30								
31								
32						55.3		
33					Sand; light gray; very dense; fine grained; wet		SP	
34			53					
35								
36						52.3		
37					Sand; pale green; loose; fine grained; moist; calcareous; occasionally clayey; occasionally cemented		SP	
38								
39			10					
40								
Continued on next page								

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LOG OF BORING

BORING NO. B-2

CLIENT Orlando Utilities Commission				PROJECT NO. 8927		ELEVATION 87.8		SHEET OF 2 2	
PROJECT Stanton Energy Center				LOCATION N-1,506,051.5E-439,908.0		DATE: START FINISH 6-10-80 6-10-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
4 1 2 3 4 5 6 7 8 9 50			14		grading light gray; medium dense; clay grades out grading w/some shell fragments		SP		
			6		Clay; green; firm; moist; cal- careous; occasionally sandy	39.0	CH		
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0						37.8		Bottom of boring @ 50.0' Water level @ 5.9' on 6-13-80	

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LOG OF BORING

BORING NO. B-3

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		90.8		1 2	
PROJECT				LOCATION		DATE:		START FINISH	
Stanton Energy Center				N-1,507,822.0E-441,280.5		6-9-80		6-9-80	
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
0					Sand; dark gray; loose; fine grained; wet; w/numerous organics & roots	89.3	SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid	
1			6		Sand; pinkish-gray; loose; fine grained; moist; w/some roots	87.8	SP		
2					Sand; dark brown; medium dense; fine grained; moist; w/trace silt & roots		SP		
3			13		grading wet; silt grades out				
4					Sand; very dark gray; loose; fine grained; wet; w/trace silt	82.8		Water encountered @ 4.6'	
5			10		grading black; medium dense				
6			9						
7			14		grading dense		SP		
8			28		grading very dense				
9					grading w/some dark brown; dense				
10			32		Sand; dark yellowish-brown; dense; fine grained; wet	67.8			
11			44		grading brownish-yellow		SP		
12					Clay; gray; stiff; moist; sandy in part; calcareous	58.3			
13			32		grading soft; sand grades out		CH		
14									
15			12						
16									
17			3						
18									
19									
20									

Continued on next page

Continued on next page



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CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-3

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		90.8		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,507,822.0E-441,280.5		6-9-80 6-9-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40									
1							49.8		
2						Sand; gray; loose; fine grained; wet; calcareous; w/some shell fragments			
3									
4									
5									
6									
7			10			grading medium dense		SP	
8									
9									
50			20			grading moist; w/trace shell fragments	39.3		
1									
2									
3									Bottom of boring @ 51.5'
4									Water level not recorded
5									
6									
7									
8									
9									
60									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

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LOG OF BORING

BORING NO. B-4

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		77.7	1 2	
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,510,005.2E-443,136.8		6-12-80 6-12-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; dark gray; loose; fine grained; wet; w/numerous roots	76.0	SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid
1			6					
2					Sand; black; medium dense; fine grained; wet; w/some silt; trace roots			
3			12					
4								
5								
6			13		grading very dark gray mottled			
7								
8								
9			1		grading gray; very loose; roots grade out			
10						57.2	SP-SM	
11			7		grading very dark brown; loose			
12								
13								
14			15		grading black; medium dense			
15								
16								
17			33		grading dense			
18								
19			18		grading dark reddish-brown; medium dense; silt grades out			
20						45.7		
21								
22			18		Sand; dark yellowish-brown; medium dense; fine grained; wet			
23								
24								
25			21		grading yellowish-brown			
26								
27								
28								
29			19				SP	
30						45.7		
31								
32								
33								
34			20		Sand; light gray; medium dense; fine grained; wet			
35								
36								
37								
38								
39								
40			21		grading light brownish-gray	SP		
					Continued on next page			

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LOG OF BORING

BORING NO. B-4

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		77.7		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,510,005.2E-443,136.8		6-12-80 6-12-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40									
1									
2									
3									
4			28			grading dark gray		SP	
5									
6									
7									
8									
9			6			grading dark grayish-brown; loose			
50							27.7		
1									Bottom of boring @ 50.0'
2									Water level not recorded
3									
4									
5									
6									
7									
8									
9									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

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LOG OF BORING

BORING NO. B-5

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		72.1	1	2
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,512,483.5E-445,792.0		6-9-80 6-9-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; gray; loose; fine grained; wet; w/some roots	70.6	SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid Water encountered @ 3.3'
1			4		Sand; black; loose; fine grained; wet; w/trace silt & roots	69.1	SP	
2								
3			3		Sand; dark brown; very loose; fine grained; wet; w/trace silt & roots		SP	
4					grading very dark brown; loose			
5			5		Sand; light brownish-gray; loose; fine grained; moist; w/trace clay	65.3		
6					grading medium dense		SP	
7			15					
8					Sand; white to light gray; medium dense; fine grained; wet	60.8		
9			18		grading light brownish-gray; fine grained; moist			
10					grading pale olive; wet		SP	
11			11					
12					grading light gray			
13			14					
14								
15			16					
16								
17			19					
18								
19			16					
20								
21			20		Sand; gray; medium dense; fine grained; wet; calcareous	45.1		
22								
23								
24			20		grading light gray; moist; partially cemented		SP	
25								
26								
27			20					
28								
29					Shelly Sand; light gray; medium dense; fine to coarse grained; wet; calcareous	35.1		
30			19				SP	
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

Continued on next page



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LOG OF BORING

BORING NO. B-5

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		72.1	2 2	
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,512,483.5E-445,792.0		6-9-80 6-9-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40								
1						31.1		
2					Clay; dark gray; soft; moist;			
3					calcareous			
4			4				CH	
5								
6								
7								
8								
9			5		grading silty			
50						22.1		
1								Bottom of
2								boring @ 50.0'
3								Water level @
4								4.0' on
5								6-13-80
6								
7								
8								
9								
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
0								

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LOG OF BORING

BORING NO. B-6

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		74.4	1 6	
PROJECT				LOCATION		DATE:	START	FINISH
Stanton Energy Center				N-1,509,586.0E-446,508.0		5-20-80	5-28-80	

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0						Sand; light gray; loose; fine grained; moist; slightly calcareous	73.1	SP	Boring drilled w/5-1/8" diameter tricone roller bit using bentonite mud as drilling fluid
1									
2			7			Sand; dark brown; loose; fine grained; moist; w/some silt; trace organics & wood fibers			
3									
4			8					SP-SM	
5									
6						grading dense; wood grades out			
7									
8									
9			16			Sand; dark yellowish-brown; medium dense; fine grained; wet	65.4		
10						grading light yellowish-brown; w/occasional light gray sand pockets; w/some clay			
11			14			grading yellowish-brown			
12						grading light yellowish-brown; loose; wet; light gray sand pockets grade out			
13			10			grading moist; w/light gray sand pockets		SP	
14			9			grading light gray; medium dense; wet			
15			13			grading light brownish-gray			
16			17			grading light gray; loose			
17			5						
18									
19									
20									
21			3			Sand; olive gray; very loose; fine grained; wet; w/trace clay	44.4	SP	
22						grading cemented			
23									
24									
25									
26			4			Clay; olive gray; soft; occasionally sandy	39.2	CH	
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40						Shelly Sand; olive gray; loose; coarse grained; wet; highly calcareous; w/some silt	35.7		

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Continued on next page

FIGURE 12



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LOG OF BORING

BORING NO. B-6

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		74.4	2 6	
PROJECT				LOCATION		DATE:	START	FINISH
Stanton Energy Center				N-1,509,586.0E-446,508.0		5-20-80	5-28-80	

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40									
1									
2									
3			12			grading medium dense		SP-SM	
4									
5									
6									
7							27.9		
8			100			Sand; gray; very dense; fine grained; moist; calcareous; w/numerous shell fragments			
9									
50			67			grading light brownish-gray; medium grained; highly calcareous		SP	
1									
2									
3									
4									
5									
6			90			grading coarse grained	18.4		
7									
8						Sand; gray; very dense; fine grained; moist; calcareous; w/trace shell fragments			
9									
60			26			grading medium dense		SP	
1									
2									
3									
4									
5							9.4		
6			9			Clayey Sand; gray; loose; fine to coarse grained; moist; calcareous; w/numerous shell fragments; trace silt		SC	
7									
8						grading fine grained; w/trace shell fragments			
9									
70			10			Clay; gray; stiff; moist; calcareous	3.2	CH	
1									
2						Sandy Clay; gray; stiff; calcareous; w/numerous shell fragments	1.4	CL	PP = 1.5 tsf
3									
4							-0.6		
5									
6						Sand; gray; medium dense; fine to coarse grained; wet; calcareous; partially cemented; w/numerous shell fragments; trace clay		SP	
7			21						
8									
9									
80							-5.1		

Continued on next page

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CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-6

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		74.4		3 6	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,509,586.0E-446,508.0		5-20-80 5-28-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
80			10		Silty Sand; olive gray; loose; fine to coarse grained; moist; calcareous; w/numerous shell fragments				
1									
2									
3									
4									
5			22		grading gray; medium dense				
6									
7									
8									
9							SM		
90			*		grading loose; fine grained				*sample pushed
1									
2									
3					shell fragments grade out				
4									
5									
6									
7									
8			74		Sand; olive; very dense; fine grained; moist; calcareous;	-23.1			
9					w/some shell fragments				
100			119		grading w/trace shell fragments				
1									
2									
3									
4									
5									
6			61		grading slightly calcareous				
7									
8									
9									
110			64		grading wet		SP		
1									
2									
3									
4									
5									
6			63		grading calcareous; w/some shell fragments				
7									
8									
9									
120									

Continued on next page



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LOG OF BORING

BORING NO. B-6

CLIENT Orlando Utilities Commission	PROJECT NO. 8927	ELEVATION 74.4	SHEET OF 4 6
PROJECT Stanton Energy Center	LOCATION N-1,509,586.0E-446,508.0	DATE: START 5-20-80	FINISH 5-28-80

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
12.0			53		grading w/trace shell fragments			
1								
2								
3								
4								
5								
6			32		grading dense; w/some silt; shell fragments & calcareousness grade out		SP	
7								
8								
9								
13.0			60		grading very dense; w/trace phosphate & silt			
1								
2								
3								
4								
5								
6			83		Sand; pale olive; very dense; medium to coarse grained; wet; calcareous w/numerous shell fragments; some silt	-60.9 -61.4	SP	
7								
8					Sand; white; very dense; medium grained; wet; calcareous; partially cemented; w/trace phosphate			
9								
14.0			314/105'		grading light gray			
1								
2								
3								
4								
5								
6			207/7.5'				SP	
7								
8								
9								
15.0			261					
1								
2								
3								
4								
5								
6			18		Sandy Clay; olive green; very stiff; moist; calcareous	-78.6	CL	
7								
8								
9								
16.0					hard @ 159.0'			

Continued on next page



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LOG OF BORING

BORING NO. B-6

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Orlando Utilities Commission	8927	74.4	5 6
PROJECT	LOCATION	DATE:	START FINISH
Stanton Energy Center	N-1,509,586.0E-446,508.0	5-20-80	5-20-80

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
160					grading w/trace phosphate			PP = 3.75 tsf
1								
2								
3								
4								
5								
6			33		grading hard; w/some phosphate		CL	
7								
8								
9								
170								
1								
2								
3						-97.6		
4					Silty Clay; olive; hard; dry; w/trace phosphate			
5					extremely hard from 172.0'-174.0'			
6			73				CL	
7								
8								
9								
180								
1								
2								
3								
4						-108.6		
5					Sandy Clay; olive; hard; moist; calcareous; interlayered w/Clayey			
6			54		Sand; olive; very dense; medium grained; moist; calcareous		CL & SC	
7								
8								
9								
190								
1			47		Silty Clay; olive; hard; dry; calcareous; w/trace fine grained	-116.0		
2					sand seams & phosphates		CL	
3					extremely hard @ 194.0'			
4								
5					grading sandy; w/numerous phosphates			
6			173/7"			-121.7		
7					Limestone; sandy; light gray; medium to thick bedded; fine			Set 4" diameter steel casing to 198.5'
8					grained; vugs to 0.05'; fresh			
9	42	35						
200								

Continued on next page

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LOG OF BORING

BORING NO. B-6

CLIENT				PROJECT NO.	ELEVATION	SHEET OF		
Orlando Utilities Commission				8927	74.4	6 6		
PROJECT				LOCATION	DATE: START FINISH			
Stanton Energy Center				N-1,509,586.0E-446,508.0	5-20-80 5-28-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
200								
1								
2					Void from 200.5'-203.5'	-126.1		Boring contin-
3								ued w/NX double
4						-128.6		tube core bar-
5					Limestone; argillaceous; fossilif-			rel w/diamond
6	100	70			ferous; white; medium bedded;			bit using water
7					granular; w/vugs to 0.01'; fresh			as drilling
8					30° joints @ 204.9', 205.3',			fluid
9					205.5', & 207.5'			Losing water @
210						-134.1		200.5'
1								Bottom of
2								boring @ 208.5'
3								Water level
4								not recorded
5								
6								
7								
8								
9								
220								
1								
2								
3								
4								
5								
6								
7								
8								
9								
230								
1								
2								
3								
4								
5								
6								
7								
8								
9								
0								

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BLACK & VEATCH
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LOG OF BORING

BORING NO. B-7

CLIENT Orlando Utilities Commission	PROJECT NO. 8927	ELEVATION 78.4	SHEET OF 1 6
PROJECT Stanton Energy Center	LOCATION N-1,507,918.0E-446,265.0	DATE: 5-29-80	START FINISH 6-5-80

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; light gray; medium dense; fine grained; moist; w/trace roots		SP	Boring drilled w/5-1/8" di- ameter tricone roller bit using bentonite mud as drilling fluid
1			11			75.4		
2								
3			12		Sand; dark reddish-brown; medium dense; fine grained; moist; w/trace silt & wood fibers			
4								
5			70		grading very dense			
6								
7			86		grading strong brown; wood & silt grade out		SP	Water encoun- tered @ 3.7'
8								
9			65					
10								
11			62		Sand; dark yellowish-brown; very dense; fine grained; wet; w/trace silt	65.4	SP	
12								
13			20		Sand; light yellowish-brown; med- ium dense; fine grained; wet	62.9	SP	
14								
15			25		Sand; white; medium dense; fine grained; wet	60.4	SP	
16								
17			24		grading w/some light gray			
18								
19			23		light gray grades out		SP	
20								
21			14					
22								
23			9		Sand; dark gray; loose; fine grained; wet; very slightly calcareous; w/trace clay	48.4	SP	
24					0.05' calcite layer @ 32.45'			
25						45.4		
26			9		Clay; gray; stiff; moist; occa- sionally sandy; w/some sand; trace shell fragments		CH	
27								
28						41.7		
29					Shelly Sand; olive gray; medium dense; coarse grained; wet; highly calcareous; w/some clay		SP	
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

Continued on next page



BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-7

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		78.4	2 6	
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,507,918.0E-446,265.0		5-29-80 6-5-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40			28			37.6		
1					Sand; pale olive; medium dense; fine grained; moist; highly calcareous; partially cemented		SP	
2								
3								
4								
5			5		Silty Sand; gray; loose; fine grained; moist; highly calcareous; w/some clay	33.4	SM	
6								
7						31.4		
8					Clay; gray; firm; moist; calcareous			PP = 1.0 tsf
9								
50			8		grading interlayered w/fine silty sand		CH	
1								
2								
3								
4								
5								
6					sand grades out			
7								
8								
9								
60								
1								PP = 1.2 tsf
2					Silty Sand; gray; medium dense; fine grained; moist; calcareous; w/numerous shell fragments; some clay	16.9	SM	
3								
4						14.4		
5								
6			12		Shelly Sand; gray; fine to coarse grained; medium dense; moist; calcareous; w/some silt			
7								
8								
9							SP-	
70			30		grading dense; medium to coarse grained		SM	
1								
2								
3								
4						4.9		
5					Sand; gray; very dense; fine grained; moist; calcareous; w/some shell fragments		SP	
6			31					
7								
8								
9						0.4		
80					Clayey Sand; gray; medium dense; fine to coarse grained; moist; calcareous; w/numerous shell fragments		SC	
					Continued on next page			

Continued on next page



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LOG OF BORING

BORING NO. B-7

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		78.4	3 6	
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,507,918.0E-446,265.0		5-29-80 6-5-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
80 1 2 3 4 5 6 7 8 9 90 1 2 3 4 5 6 7 8 9 100 1 2 3 4 5 6 7 8 9 110 1 2 3 4 5 6 7 8 9 120			29 41 26 20 19 14 61 54		Sand; gray; very dense; fine to coarse grained; moist; calcareous; w/numerous shell fragments; trace clay grading medium dense; wet; clay grades out Sand; gray; medium dense; fine grained; wet; calcareous; w/some shell fragments Clayey Sand; gray; medium dense; fine to coarse grained; wet; calcareous; w/numerous shell fragments grading w/trace phosphate Sand; olive; very dense; fine grained; wet; calcareous; w/some shell fragments; trace phosphate shell fragments grade out	-4.6 -14.6 -19.6 -30.6	SP SC SP	
Continued on next page								

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LOG OF BORING

BORING NO. B-7

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		78.4	4 6	
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,507,918.0E-446,265.0		5-29-80 6-5-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
120			52		grading slightly calcareous; w/trace silt			
1								
2								
3								
4								
5			37		grading w/trace shell fragments			
6								
7								
8								
9								
130			41		calcareousness & shell fragments grade out			
1								
2								
3								
4								
5			14		Clayey Sand; olive; medium dense; fine grained; moist	-56.1		
6								
7								
8								
9					hard from 138.0'-138.5'		SC	
140			22					
1								
2						-63.6		
3					Sandy Clay; olive green; very stiff; dry; w/trace fine sand pockets			
4								
5								
6			25				CL	
7								
8								
9								
150			22		Clayey Sand; olive green; medium dense; fine grained; dry; w/trace phosphate	-71.6		
1								
2								
3								
4								
5								
6			24		grading interlayered w/Sandy Clay; olive green; very stiff;		SC	
7			26		moist; calcareous			
8								
9					grading w/numerous phosphates			
160					0.1' limestone layer @ 160.3'			
Continued on next page								

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LOG OF BORING

BORING NO. B-7

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		78.4		5 6	
PROJECT				LOCATION			DATE: START FINISH		
Stanton Energy Center				N-1,507,918.0E-446,265.0			5-29-80 6-5-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
160			20		Silty <u>Clay</u> ; olive green; very stiff; moist; w/some phosphate	-82.3			
1									
2									
3									
4									
5			35		grading hard; slightly calcareous; w/numerous phosphate				
6									
7									
8									
9									
170			25		grading dark gray; very stiff; dry; sandy w/phosphates				
1									
2									
3									
4									
5			37		grading olive; partially cemented		CL		
6									
7					hard from 178.0'-180.0'				
8									
9									
180			54		grading hard; moist; w/numerous sand pockets; sandiness, calcareousness grade out				
1									
2									
3									
4									
5			40		grading occasionally sandy; very slightly calcareous				
6									
7									
8						-109.6			
9					Clayey <u>Sand</u> ; olive; medium dense; medium grained; moist; very slightly calcareous				
190			25				SC		
1									
2									
3									
4					extremely hard @ 194.0'				
5									
6			33		Sandy <u>Clay</u> ; olive; hard; dry; slightly calcareous; w/trace phosphate	-117.0			
7							CL		
8									
9					0.05' limestone layer @ 196.2'				
200					numerous thin hard layers from 196.5'-199.5'	-121.1			
Continued on next page									

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LOG OF BORING

BORING NO. B-7

CLIENT					PROJECT NO.	ELEVATION	SHEET OF	
Orlando Utilities Commission					8927	78.4	6 6	
PROJECT					LOCATION	DATE: START FINISH		
Stanton Energy Center					N-1,507,918.0E-446,265.0	5-29-80 6-5-80		
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
200					Limestone; sandy; highly fossiliferous; light olive gray to light gray; medium bedded; >10% vugs from pinpoint to 0.1'; slightly weathered			Boring continued w/NX double tube core barrel w/diamond bit using water as drilling fluid
1	55	17						
2								
3								
4					vertical fracture 199.9'-201.4'			
5					grading w/0.2' layers of Limestone;			Losing some water throughout Run 2
6	38	18			light gray; medium bedded; fine grained; w/10% vugs pinpoint to 0.05' @ 199.5' & 201.2'	-129.4		
7								
8					Limestone; sandy; light gray; medium bedded; fine grained; >30% vugs pinpoint to 0.05'; fresh	-130.3		
9						-130.8		
210								Bottom of boring @ 209.2'
1								Water level not recorded
2								
3								
4								
5								
6								
7								
8								
9								
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
0								

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LOG OF BORING

BORING NO. B-8

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		77.4	1	2
PROJECT				LOCATION		DATE: START FINISH		
Stanton Energy Center				N-1,506,756.0E-445,310.0		6-12-80	6-12-80	
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; very dark brown; loose; fine grained; wet; w/numerous roots & organics	75.9	SP	Boring drilled w/3-7/8" di- ameter tricone roller bit using bentonite mud as drilling fluid Water encoun- tered @ 2.8'
1			7				SP	
2					Sand; very dark brown; loose; fine grained; wet; w/some roots; trace silt	74.4		
3			9				SP	
4					Sand; black; loose; fine grained; wet; w/some silt; trace roots	71.9		
5					Sand; dark reddish-brown; dense; fine grained; moist; w/trace silt & roots		SP	
6			45					
7					grading w/some black; medium dense	66.9		
8			29					
9					Sand; light yellowish-brown; dense; fine grained; wet; w/some silt		SP- SM	
10			32					
11			26		grading yellowish-brown; medium dense; w/trace clay	61.3		
12					Sand; light gray; medium dense; fine grained; wet			
13			16					
14			14				SP	
15			13					
16			15					
17					Sand; light olive gray; medium dense; fine grained; wet; w/trace silt	50.4		
18			13				SP	
19					Sand; light gray; medium dense; fine to medium grained; wet; cal- careous; partially cemented; w/phosphate; some silt	45.4		
20								
21			15				SP- SM	
22								
23								
24								
25								
26			25					
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

Continued on next page



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LOG OF BORING

BORING NO. B-8

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		77.4		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,506,756.0E-445.310.0		6-12-80 6-12-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40									
1									
2									
3									
4						Clay; gray; soft; moist; calcareous; w/numerous large (>0.1') shells	34.9	CH	
5									
6									
7									
8									
9			5			grading dry; shells grade out			
50							27.4		
1									Bottom of boring @ 50.0'
2									Water level not recorded
3									
4									
5									
6									
7									
8									
9									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

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LOG OF BORING

BORING NO. B-9

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		81.0	1	2
PROJECT				LOCATION		DATE: START	FINISH	
Stanton Energy Center				N-1,502,640.2E-444,961.7		6-13-80	6-13-80	
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; very dark gray; loose; fine grained; wet; w/numerous roots & organics	79.8	SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid Water encountered @ 2.9'
1			7				SP	
2					Sand; light brownish-gray; loose; fine grained; moist; w/numerous roots	76.9		
3			11				SP	
4					Sand; dark grayish-brown; medium dense; fine grained; wet; w/trace roots	74.2		
5			14		grading very dark grayish-brown		SP	
6					Sand; dark brown; medium dense; fine grained; wet	72.7		
7			28					
8					Sand; black; medium dense; fine grained; moist; w/some silt		SP	
9			77		grading wet; very dense			
10								
11			51					
12						65.5		
13			30		Sand; dark brown; dense; fine grained; wet		SP	
14								
15			41					
16						60.5		
17			16		Sand; yellow to yellowish-brown; medium dense; fine grained; wet		SP	
18								
19			14					
20						54.0		
21			23		Sand; light gray; medium dense; fine grained; wet		SP	
22								
23						49.0		
24			4		Sandy Clay; dark gray; soft; moist		CL	
25						47.2		
26					Sand; dark gray; loose; fine grained; wet; occasionally clayey		SP & SC	
27								
28						43.5		
29			11		Sand; gray; medium dense; fine grained; wet		SP	
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

Continued on next page

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CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-9

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		8.0		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,502,640.2E-444,961.7		6-13-80 6-13-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
40									
1									
2									
3						38.0			
4			66		Shelly Sand; light gray; very dense; fine to coarse grained; wet; calcareous		SP		
5									
6									
7						34.0			
8					Clay; dark gray; firm; moist; calcareous; w/trace shell fragments		CH		
9			5						
50						31.0			
1								Bottom of boring @ 50.0'	
2								Water level not recorded	
3									
4									
5									
6									
7									
8									
9									
60									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

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LOG OF BORING

BORING NO. B-10

CLIENT				PROJECT NO.		ELEVATION	SHEET OF	
Orlando Utilities Commission				8927		69.5	1 2	
PROJECT				LOCATION		DATE:	START	FINISH
Stanton Energy Center				N-1,510,342.0E-448,020.0		6-6-80	6-6-80	
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0					Sand; grayish-brown; loose; fine grained; wet; w/trace roots	68.0	SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid
1			5		Sand; dark brownish-gray to very dark grayish-brown; loose; fine grained; moist; w/trace roots			
2								
3			2		grading dark brown; very loose; wet		SP	
4								
5					grading black	62.9		
6			7		Sand; pinkish-gray; loose; fine grained; moist; w/trace clay			Water encountered @ 3.0'
7								
8			13		grading medium dense; wet; clay grades out			
9								
10			12		grading light gray; moist; w/trace roots		SP	
11								
12					grading wet; roots grade out			
13			10					
14								
15			18					
16								
17			10		grading grayish-brown mottled	49.0		
18								
19			3		Sand; dark gray to light gray; very loose; fine grained; wet	46.5	SP	
20								
21			6		Sand; gray; loose; fine to medium grained; wet; calcareous; w/numerous shell fragments; some silt		SP-SM	
22								
23								
24								
25								
26								
27								
28			12		Gravel; gray; medium dense; wet; calcareous; w/some shell fragments	41.0		losing drilling fluid @ 28.5'
29								
30								
31								
32								
33								
34			19		grading w/light olive gray clayey sand		GP	
35								
36								
37								
38								
39								
40			9		Sand; gray; loose; fine grained; wet; calcareous; w/some shell fragments & silt	32.0	SP	

Continued on next page

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BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-10

CLIENT Orlando Utilities Commission				PROJECT NO. 8927		ELEVATION 69.5		SHEET OF 2 2	
PROJECT Stanton Energy Center				LOCATION N-1,510,342.0E-448,020.0		DATE: START FINISH 6-6-80 6-6-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40 1 2 3 4 5 6 7 8 9 50			9 21			grading medium dense; w/more shell fragments	19.5	SP	
50 1 2 3 4 5 6 7 8 9 60 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0									Bottom of boring @ 50.0' Water level not recorded

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CONSULTING ENGINEERS

LOG OF BORING

BORING NO. B-11

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		69.5		1 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,508,352.5E-447,512.0		6-5-80 6-6-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
0					Sand; very dark grayish-brown; loose; fine grained; wet; w/some silt; trace roots & organics		SP	Boring drilled w/3-7/8" diameter tricone roller bit using bentonite mud as drilling fluid Water encountered @ 2.5'	
1			5						
2						66.5			
3					Sand; grayish-brown; medium dense; fine grained; moist; w/trace roots		SP		
4			26						
5						64.0			
6					Sand; dark grayish-brown & light olive gray; medium dense; fine grained; moist; w/some clay; trace roots		SP		
7			13						
8									
9			18		grading very dark grayish-brown; w/trace silt; clay grades out				
10						59.0			
11			11		Sand; light gray; medium dense; fine grained; moist; w/trace clay		SP		
12						56.5			
13					Sand; very dark grayish-brown; medium dense; fine grained; wet; w/trace silt		SP		
14			11			54.0			
15					Sand; gray; loose; fine grained; moist				
16			4				SP		
17					grading very loose; calcareous				
18			2			49.0			
19					Sand; olive gray; loose; fine grained; wet; calcareous; w/numerous shell fragments; trace silt		SP		
20			7			46.5			
21					Sand; olive gray; loose; fine grained; wet; calcareous; cemented; w/some olive gray clayey sand		SP		
22			7		grading medium dense				
23			14			41.5			
24									
25									
26									
27									
28									
29									
30									
31			6		Sand; olive gray; loose; fine grained; wet; calcareous; w/numerous shell fragments; some clay		SP		
32									
33									
34						35.5			
35					Sand; light olive gray; medium dense; fine grained; wet; calcareous; partially cemented; w/some shell fragments		SP		
36			18						
37						31.5			
38					Silty Sand; gray; loose; fine grained; wet; calcareous		SM		
39									
40									
Continued on next page									

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LOG OF BORING

BORING NO. B-11

CLIENT				PROJECT NO.		ELEVATION		SHEET OF	
Orlando Utilities Commission				8927		69.5		2 2	
PROJECT				LOCATION		DATE: START FINISH			
Stanton Energy Center				N-1,508,352.5E-447.512.0		6-5-80 6-6-80			
DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS	
40			4						
1									
2									
3									
4									
5									
6			10						
7						22.8			
8									
9					Clay; gray; firm; moist; calcareous; w/some shell fragments shell fragments grade out		CH	PP = .75 tsf	
50						19.5			
1								Bottom of boring @ 50.0'	
2								Water level not recorded	
3									
4									
5									
6									
7									
8									
9									
60									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

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EXPLANATION

BORING LOG TERMINOLOGY

GENERAL

- | | |
|---------|--|
| PP | - Compressive strength as determined by penetrometer |
| TV | - Compressive strength as determined by torvane |
| Gravel | - From 1/4 inch to 3 inches in diameter |
| Cobble | - From 3 to 12 inches in diameter |
| Boulder | - Greater than 12 inches in diameter |
| 60° | - Represents 60 degrees measured from a plane perpendicular to the longitudinal axis of the core |
| Trace | - Represents 0 to 10 per cent by volume |
| Some | - Represents 10 to 25 per cent by volume |
| N Value | - Indicates the number of blows required to drive a standard split spoon sampler 12 inches with a 140-pound weight falling 30 inches |
| REC | - Recovery indicates total amount of core recovered for each run. Expressed as a percentage of the total length of the core run |
| RQD | - A modified core recovery in which all pieces of sound core over 4 inches in length are counted as recovery. The modified sum of core recovered is then expressed as a percentage of the total length of the core run |
| --- | - Dashed line in classification column indicates approximate or gradational change |

WEATHERING

- | | |
|----------------------|--|
| Fresh | - The rock shows no discoloration, loss of strength, or any other effect due to weathering (unweathered rock) |
| Slightly Weathered | - Rock is slightly discolored with a slightly lower strength than unweathered rock |
| Moderately Weathered | - Rock is considerably discolored with a significantly lower strength than unweathered rock |
| Highly Weathered | - Rock is discolored and weakened so intensely that 2-inch diameter rock cores can be broken readily by hand. Wet strength is usually much lower than dry strength |

BEDDING

- | | |
|---------------|---|
| Laminated | - Less than 0.001 foot to 0.01 foot (.1 inch) |
| Thin Bedded | - 0.01 foot to 0.1 foot (.1 to 1.2 inches) |
| Medium Bedded | - 0.1 foot to 1.0 foot (1.2 to 12 inches) |
| Thick Bedded | - Greater than 1.0 foot |
| Massive | - Denotes no discernible internal bedding structure |

SAMPLE SYMBOLS

- | | | | | | |
|---|---|---|---|---|---|
| Bag or
Grab Sample | California | Piston | Pitcher | Split
Barrel | Thin Wall |
|  |  |  |  |  |  |



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LOG OF BORING

BORING NO. 18
SHEET 1 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,508,000 E-440,425			ELEVATION (DATUM) 91.8 (MSL)		TOTAL DEPTH 51.0		DATE START 11-3-81	
SURFACE CONDITIONS Flat w/palmettos & scattered scrub oak & pine trees						INSPECTOR M. Petersen				DATE FINISH 11-3-81	
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	1	2	3	5	8	1.0	1.9			Sand; pinkish-gray; loose; fine grained; dry; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	4	8	8	16	0.9				grading medium dense; moist; roots grade out	
SPT	3	2	3	5	8	0.9				grading dark brown; loose; w/trace silt	
SPT	4	2	3	6	9	0.9	10			grading reddish-gray	
SPT	5	4	6	10	16	1.0				Silty Sand; black to very dark brown; medium dense; fine grained; moist [SM]	
SPT	6	4	6	6	12	0.9				grading very dark brown	
SPT	7	5	11	14	25	1.1	20				
SPT	8	5	10	13	23	1.0				Sand; dark yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	9	7	13	18	31	0.6	30			grading yellowish-brown; dense	

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LOG OF BORING

BORING NO. 18
SHEET 2 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,508,000 E-440,425		ELEVATION (DATUM) 91.8 (MSL)		TOTAL DEPTH 51.0		DATE START 11-3-81	
SURFACE CONDITIONS Flat w/palmettos & scattered scrub oak & pine trees								INSPECTOR M. Petersen		DATE FINISH 11-3-81	
SAMPLING						CHECKED BY S. J. Casey			APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	10	3	6	10	16	0.8				grading light yellowish-brown; medium dense	
SPT	11	9	7	8	15	0.7	40			silt grades out	
SPT	12	1	2	5	7	1.5				Sand; very dark gray; loose; fine grained; moist; w/some clay; trace silt [SC]	
										Clayey Sand; olive-gray; fine grained; moist [SC]	
TW	13					2.5	50			Sand; olive-gray; fine grained; moist; w/some clay [SC]	
											Bottom of boring @ 51.0'
											Water accumulated to 5.9' on 11-13-81

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CLIENT										PROJECT				PROJECT NO.	
Orlando Utilities Commission										Stanton Energy Center				8927	
PROJECT LOCATION					COORDINATES			ELEVATION (DATUM)		TOTAL DEPTH		DATE START			
Orlando, Florida					N-,506,990 E-440,420			91.8 (MSL)		75.0		11-11-81			
SURFACE CONDITIONS								INSPECTOR		DATE FINISH					
Flat w/palmettos, scrub oak, & scattered pine trees								M. Petersen		11-11-81					
SAMPLING								CHECKED BY				APPROVED BY			
								S. J. Casey				R. H. Herzog			
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N	VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL			REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD									
SPT	1	1	2	3	5	1.4					Sand; pinkish-gray; loose; fine grained; dry; w/trace roots [SP]			Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid	
SPT	2	3	5	7	12	0.8					Sand; dark yellowish-brown to very pale brown; medium dense; fine grained; moist; w/trace silt & roots [SP]				
SPT	3	3	5	7	12	0.9					grading very dark gray				
SPT	4	13	39	40	79	1.0					Silty Sand; very dark brown; very dense; fine grained; moist; weakly cemented [SM]				
SPT	5	12	17	21	38	1.0					grading dense; non-cemented				
SPT	6	9	10	13	23	0.8					grading medium dense				
SPT	7	6	8	10	18	0.6					Sand; dark yellowish-brown; medium dense; fine grained; moist [SP]				



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LOG OF BORING

BORING NO. 19
SHEET 2 OF 3

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927			
PROJECT LOCATION Orlando, Florida				COORDINATES ~N-1,506,990 E-440,420		ELEVATION (DATUM) 91.8 (MSL)		TOTAL DEPTH 75.0	DATE START 11-11-81		
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees						INSPECTOR M. Petersen		DATE FINISH 11-11-81			
SAMPLING						CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog			
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	8	4	6	7	13	0.9				Sand; very pale brown; medium dense; fine grained; moist; w/trace clay [SP]	
SPT	9	0	0	2	2	1.5	40			Sand; olive-gray mottled w/dark gray; very loose; fine grained; wet; w/trace to some clay [SP]	
										grading w/layers of clayey sand below 39.5' [SP & SC]	
SPT	10	1	0	0	0	1.1				Sand; olive-gray; very loose; fine grained; wet; w/trace clay [SP]	
SPT	11	0	1	0	1	1.4	50			grading olive-gray mottled w/dark gray; clay grades to some [SC]	
SPT	12	2	3	5	8	1.5	53.7			Shelly Sand; light olive-gray; loose; fine to coarse grained; moist; w/trace to some clay [SP]	
										Clay; bluish-gray; firm; moist; w/trace sand [CH]	
SPT	13	26	34	41	75	0.8	60			Sand; light olive-gray; very dense; fine grained; moist; w/trace silt [SP]	

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LOG OF BORING

BORING NO. 19
SHEET 3 OF 3

CLIENT Orlando Utilities Commission					PROJECT Stanton Energy Center			PROJECT NO. 8927						
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,506,990 E-440,420		ELEVATION (DATUM) 91.8 (MSL)		TOTAL DEPTH 75.0		DATE START 11-11-81					
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees					INSPECTOR M. Petersen			DATE FINISH 11-11-81						
SAMPLING					CHECKED BY S. J. Casey			APPROVED BY R. H. Herzog						
SAMPLE SIZE		SAMPLE NUMBER		SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.		DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD								
SPT	14	20	40	40	80	1.1				70		Shelly Sand; light olive-gray; very dense; fine to coarse grained; moist [SP] Sand; light olive-gray; dense; fine grained; moist; w/trace shells & clay [SP] grading medium dense	Bottom of boring @ 75.0' Water accumulated to 6.9' on 11-11-81	
SPT	15	9	12	20	32	0.0								
SPT	16	8	11	15	16	1.2								
										80				
										90				

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LOG OF BORING

BORING NO. 20
SHEET 1 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES ~N-1,505,005 E-440,420		ELEVATION (DATUM) 88.1 (MSL)		TOTAL DEPTH 50.0		DATE START 11-10-81	
SURFACE CONDITIONS Flat w/palmettos, pine trees, & scattered scrub oak						INSPECTOR M. Petersen				DATE FINISH 11-10-81	
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	1	2	5	6	11	0.9	2.4			Sand; pinkish-gray; loose; fine grained; dry; w/trace roots [SP] Silty Sand; very dark brown; medium dense; fine grained; dry; w/trace roots [SM]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	4	5	8	13	0.7				Sand; very dark brown to dark brown; medium dense; fine grained; moist; w/some silt; trace roots [SM]	
SPT	3	2	5	7	12	0.8				grading dark brown; silt grades to trace; roots grade out [SP]	
SPT	4	2	7	8	15	0.9	10			grading brown mottled w/very dark grayish-brown; silt grades to some [SM]	
SPT	5	4	10	25	35	1.1				Sand; very dark grayish-brown; dense; fine grained; moist; weakly cemented; w/some silt; trace clay [SP-SM]	
SPT	6	13	16	22	38	0.9				Sand; very dark brown; dense; fine grained; moist; w/trace silt [SP]	
SPT	7	12	18	22	40	1.0	20			Sand; dark brown; dense; fine grained; moist [SP]	
SPT	8	4	10	11	21	0.7				Sand; brownish-yellow; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	9	4	7	12	19	0.9	30			grading very pale brown; w/trace clay; silt grades out	

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LOG OF BORING

BORING NO. 20
SHEET 2 OF 2

CLIENT Orlando Utilities Commission					PROJECT Stanton Energy Center					PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,505,005 E-440-420			ELEVATION (DATUM) 88.1 (MSL)		TOTAL DEPTH 50.0		DATE START 11-10-81	
SURFACE CONDITIONS Flat w/palmettos, pine trees, & scattered scrub oak					INSPECTOR M. Petersen					DATE FINISH 11-10-81	
CHECKED BY S. J. Casey										APPROVED BY R. H. Herzog	
SAMPLING								DEPTH IN FEET		REMARKS	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	REMARKS	
SPT	10	0	0	0	0	1.3	35.7		Sand; olive-gray mottled w/gray; very loose; fine grained; wet; w/trace to some clay; trace phosphate [SP]	Sampler dropped to 35.7' under weight of rods & hammer. Drove to 36.3' w/4 blows	
TW	11					0.0	40		Clayey Sand; olive-gray; very loose; fine grained; wet; w/trace phosphate [SC]		
SPT	12	0	0	0	0	1.5	46.0		grading moist; w/trace shells	Sampler dropped to 46.0' under weight of rods & hammer. Drove to 46.5' w/2 blows	
SPT	13	3	3	6	9	1.1	50		Sand; light olive-gray; loose; fine grained; moist; w/some clay; trace phosphate & shells [SC]		
										Bottom of boring @ 50.0'	
										Water accumulated to 3.8' on 11-10-81	

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LOG OF BORING

BORING NO. 21
SHEET 1 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927													
PROJECT LOCATION Orlando, Florida		COORDINATES N-1,504,900 E-441,075		ELEVATION (DATUM) 88.9 (MSL)		TOTAL DEPTH 50.0		DATE START 11-9-81													
SURFACE CONDITIONS Flat w/palmettos, scattered pine trees & scrub oak				INSPECTOR M. Petersen				DATE FINISH 11-9-81													
SAMPLING				CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog													
SAMPLE SIZE CORE SIZE		SAMPLE NUMBER RUN NUMBER		SET 6"		2ND 6"		3RD 6"		N VALUE		SAMPLE RECOV.		DEPTH IN FEET		SAMPLE TYPE GRAPHIC LOG		CLASSIFICATION OF MATERIAL		REMARKS	
CORE SIZE		RUN NUMBER		RUN LENGTH		RUN RECOV.		ROD RECOV.		PERCENT RECOV.		ROD		DEPTH IN FEET		SAMPLE TYPE		CLASSIFICATION OF MATERIAL		REMARKS	
SPT	1	1	3	4	7	1.0								9.9			Sand; pinkish-gray; loose; fine grained; moist; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid			
SPT	2	3	6	8	14	0.9											Sand; dark brown; medium dense; fine grained; moist; w/trace silt & roots [SP]				
SPT	3	2	5	6	11	1.0											grading brown; roots & silt grade out				
SPT	4	3	6	11	17	0.9											Sand; very dark brown; medium dense; fine grained; moist; w/some silt [SM]				
SPT	5	6	7	9	16	1.1											Silty Sand; very dark grayish-brown; medium dense; fine grained; moist [SM]				
SPT	6	12	11	15	26	0.9											grading very dark brown; weakly cemented				
SPT	7	8	16	19	35	0.8								20			Sand; dark yellowish-brown; dense; fine grained; moist; w/trace silt & phosphate [SP]				
SPT	8	6	8	12	20	1.0											grading brownish-yellow				
SPT	9	4	9	15	24	0.7								30			grading w/trace clay; silt grades out				

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LOG OF BORING

BORING NO. 21
SHEET 2 OF 2

CLIENT Orlando Utilities Commission					PROJECT Stanton Energy Center					PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,504,900 E-441,075			ELEVATION (DATUM) 88.9 (MSL)		TOTAL DEPTH 50.0		DATE START 11-9-81	
SURFACE CONDITIONS Flat w/palmettos, scattered pine trees & scrub oak					INSPECTOR M. Petersen					DATE FINISH 11-9-81	
SAMPLING					CHECKED BY S. J. Casey					APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	10	0	0	1	1	1.2				Sand; light brownish-gray; to gray; very loose; fine grained; wet; w/trace clay & phosphate [SP]	Last blow drove sampler to 35.5'. Drove to 36.0' w/4 blows
SPT	11	0	0	0	0	1.5	40			Clayey Sand; dark gray; very loose; fine grained; wet; w/trace phosphate [SC]	Sampler dropped to 41.0' under weight of rods & hammer. Drove to 41.5' w/5 blows
										grading w/trace shells	
TW	12					2.5					
SPT	13	0	1	3	4	1.5	50			Sandy Clay; olive-gray; soft; moist; w/small pockets of gray sand [CL]	
											Bottom of boring @ 50.0'
											Water accumulated to 3.4' on 11-9-81

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LOG OF BORING

BORING NO. 22
SHEET 1 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES ~N-1,505,994 E-441,075		ELEVATION (DATUM) 88.8 (MSL)		TOTAL DEPTH 50.0		DATE START 11-10-81	
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-10-81	
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	1	2	4	5	9	1.0				Sand; pinkish-gray; loose; fine grained; moist; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	3	7	9	16	0.7				Sand; dark grayish-brown; medium dense; fine grained; moist; w/some silt; trace roots [SM]	
SPT	3	4	5	8	13	1.0				grading dark brown; roots grade out	
SPT	4	3	6	7	13	1.2	10			Silty Sand; very dark grayish-brown; medium dense; fine grained; moist [SM]	
SPT	5	2	5	7	12	1.0				grading black	
SPT	6	9	10	15	25	1.1				grading weakly cemented	
SPT	7	9	10	11	21	1.1	20			grading very dark grayish-brown	
SPT	8	3	8	8	16	0.7				Sand; dark yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	9	2	3	6	9	0.6	30			grading yellowish-brown; loose	

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CONSULTING ENGINEERS

LOG OF BORING

BORING NO. 22
SHEET 2 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927			
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,505,994 E-441,075		ELEVATION (DATUM) 88.8 (MSL)		TOTAL DEPTH 50.0	DATE START 11-10-81		
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees						INSPECTOR M. Petersen		DATE FINISH 11-10-81			
SAMPLING						CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog			
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	10	3	5	4	9	0.4				grading very pale brown; silt grades out	
SPT	11	0	0	0	0	1.5	40			Sand; light olive-gray; very loose; fine grained; moist; w/trace clay; & shells [SP]	Drove sampler from 40.0' to 40.5' w/4 blows
SPT	12	4	3	4	7	1.3	44.6			Sand; olive-gray; loose; fine grained; moist; w/some clay; [SC]	
SPT	13	4	7	11	18	1.0	50			Sand; olive-gray; loose; fine grained; wet; w/trace clay [SP]	
										grading light olive-gray mottled w/olive gray; medium dense; moist; w/trace shells	
											Bottom of boring @ 50.0' Water accumulated to 2.7' on 11-10-81

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LOG OF BORING

BORING NO. 24
SHEET 1 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,507,000 E-441,075		ELEVATION (DATUM) 89.4 (MSL)		TOTAL DEPTH 50.5	DATE START 11-4-81
SURFACE CONDITIONS Flat w/palmettos & scattered pine trees						INSPECTOR M. Petersen		DATE FINISH 11-4-81	

SAMPLING								CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.		DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD						
SPT	1	3	4	7	11	1.0		2.3			Sand; pinkish-gray; loose; fine grained; dry; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	4	6	8	14	1.1				Silty Sand; very dark brown; medium dense; fine grained; moist [SM]		
SPT	3	4	7	9	16	1.0				Sand; light reddish-brown; medium dense; fine grained; moist; w/trace silt & roots [SP]		
SPT	4	3	6	8	14	1.0				grading grayish-brown; roots grade out		
SPT	5	4	7	10	17	1.3				grading very dark grayish-brown; silt grades to some [SM]		
SPT	6	3	5	6	11	1.1				grading black		
SPT	7	13	18	26	44	1.1				grading very dark gray		
SPT	8	10	15	20	35	1.4				grading very dark brown; dense		
SPT	9	7	8	13	21	1.1				grading dark reddish-brown to strong brown; silt grades to trace [SP]		
SPT	9	7	8	13	21	1.1					Sand; yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	

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LOG OF BORING

BORING NO. 24
SHEET 2 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida		COORDINATES N-1,507,000 E-441,075		ELEVATION (DATUM) 89.4 (MSL)		TOTAL DEPTH 50.5		DATE START 11-4-81	
SURFACE CONDITIONS Flat w/palmettos & scattered pine trees				INSPECTOR M. Petersen				DATE FINISH 11-4-81	
SAMPLE SIZE		SAMPLE NUMBER		SET 6"		2ND 6"		3RD 6"	
CORE SIZE		RUN NUMBER		RUN LENGTH		RUN RECOV.		RQD RECOV.	
N		VALUE		SAMPLE RECOV.		DEPTH IN FEET		SAMPLE TYPE	
CORING		RQD		PERCENT RECOV.		GRAPHIC LOG		CLASSIFICATION OF MATERIAL	
REMARKS									
SPT		10		8		15		18	
33		0.7						grading dense; silt grades out	
SPT		11		1		1		0	
1		1.3						Sand; olive-gray mottled w/dark gray; very loose; fine grained; wet; w/trace clay & silt [SP]	
SPT		12		2		4		4	
8		0.8						grading loose; clay grades out	
SPT		13		0		0		0	
0		1.5						Drove sampler from 50.0' to 50.5' w/1 blow	
								Bottom of boring @ 50.5'	
								Water accumulated to 5.4' on 11-4-81	

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LOG OF BORING

BORING NO. 26
SHEET 1 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927		
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,506,800 E-441,740			ELEVATION (DATUM) 89.2 (MSL)		TOTAL DEPTH 50.0	DATE START 11-6-81	
SURFACE CONDITIONS Flat, grassy area w/palmettos & scattered pine trees						INSPECTOR M. Petersen		DATE FINISH 11-6-81		
SAMPLING						CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD				
SPT	1	2	4	7	11	0.9			Sand; pinkish-gray; medium dense; fine grained; moist; w/trace silt & roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	6	10	15	25	0.8			Sand; dark brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	3	4	5	11	16	1.1			grading very dark grayish-brown	
SPT	4	3	5	7	12	1.1			silt grades to some [SM]	
SPT	5	2	2	3	5	1.3			Silty Sand; black; loose; fine grained; moist [SM]	
SPT	6	9	23	24	47	0.9			grading dense	
SPT	7	24	43	80	123	1.0			Sand; dark reddish-brown; very dense; fine grained; moist; partially cemented; w/trace silt [SP]	
SPT	8	12	29	41	70	0.7			grading dark yellowish-brown; non-cemented	
SPT	9	18	22	23	45	0.4			grading dense; silt grades out	

P-ST-036B



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LOG OF BORING

BORING NO. 26
SHEET 2 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927			
PROJECT LOCATION Orlando, Florida		COORDINATES N-1,506,800 E 441,740		ELEVATION (DATUM) 89.2 (MSL)		TOTAL DEPTH 50.0		DATE START 11-6-81			
SURFACE CONDITIONS Flat, grassy area w/palmettos & scattered pine trees				INSPECTOR M. Petersen				DATE FINISH 11-6-81			
SAMPLING SET 6" 2ND 6" 3RD 6" N VALUE SAMPLE RECOV.				CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog			
CORE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	10	5	7	9	16	0.7				Sand; very pale brown mottled w/gray; medium dense; fine grained; wet; w/trace clay [SP]	
TW	11					2.5	40			Sandy Clay; dark gray; moist; w/trace shells [CL]	
SPT	12	7	6	6	12	1.4				Sand; olive-gray; fine grained; moist; w/trace clay, shells, & phosphate [SP]	
										Sand; light olive-gray; medium dense; fine grained; wet; w/trace shells & phosphate [SP] grading w/some clay below 44.0' [SC]	
SPT	13	3	2	4	6	1.5	50			Clayey Sand; light olive-gray; loose; fine grained; moist; w/trace shells & phosphate; interlayered w/Sandy Clay; light olive-gray; firm; moist [SC & CL]	
										Bottom of boring @ 50.0'. Water accumulated to 3.4' on 11-6-81	

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LOG OF BORING

BORING NO. 27
SHEET 1 OF 3

CLIENT Orlando Utilities Commission										PROJECT Stanton Energy Center										PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida					COORDINATES N-1,504,900 E-442,410					ELEVATION (DATUM) 84.3 (MSL)					TOTAL DEPTH 75.0					DATE START 11-9-81	
SURFACE CONDITIONS Flat, marshy, grassy area w/palmettos & scattered pine trees										INSPECTOR M. Petersen										DATE FINISH 11-9-81	
SAMPLING										CHECKED BY S. J. Casey										APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS										
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD															
SPT	1	1	1	2	3	1.5	0.6			Organic Silt; black; very loose; fine grained; dry; w/trace clay, sand & roots [OL]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid										
SPT	2	7	10	13	23	1.2			Silty Sand; dark yellowish-brown; very loose; fine grained; moist; w/trace clay & roots [SM]												
SPT	3	5	12	22	34	1.2	10		Sand; very dark brown; medium dense; fine grained; moist; w/trace silt [SP-SM]												
									grading very dark grayish-brown; dense												
SPT	4	18	32	51	83	1.0			Sand; dark brown; very dense; fine grained; moist; w/trace silt [SP]												
SPT	5	13	20	28	48	0.9	20		grading dense												
SPT	6	4	7	9	16	0.9			Sand; brownish-yellow; medium dense; fine grained; moist; weakly cemented; w/some silt; trace clay [SM]												
SPT	7	5	6	8	14	1.0	30		Sand; pale olive; medium dense; fine grained; wet; w/trace clay [SP]												

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LOG OF BORING

BORING NO. 27
SHEET 2 OF 3

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida			COORDINATES N-1,504,900 E-442,410			ELEVATION (DATUM) 84.3 (MSL)		TOTAL DEPTH 75.0		DATE START 11-9-81	
SURFACE CONDITIONS Flat, marshy, grassy area w/palmettos & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-9-81	
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	8	0	2	0	2	1.1				Sand; olive mottled w/gray; very loose; fine grained; wet; w/some clay; trace phosphate [SC]	
SPT	9	2	1	1	2	1.5	40			Silty Sand; light olive-gray; very loose; fine grained; moist; partially cemented [SM]	
SPT	10	1	3	3	6	1.2				grading loose; non-cemented; w/trace shells	
TW	11						50			Clayey Sand; olive-gray; moist; w/trace shells [SC]	
SPT	12	4	4	3	7	1.4				Clayey Sand; olive-gray; loose; fine grained; moist; w/some shells; trace phosphate [SC]	
										grading w/pockets of very pale brown sand below 54.5'	
SPT	13	16	35	47	82	1.0	60			Shelly Sand; light gray; very dense; fine to coarse grained; moist; w/trace phosphate [SP]	

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Last blow drove sampler to 36.0'



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LOG OF BORING

BORING NO. 27
SHEET 3 OF 3

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927			
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,504,900 E-442,410			ELEVATION (DATUM) 84.3 (MSL)		TOTAL DEPTH 75.0		DATE START 11-9-81		
SURFACE CONDITIONS Flat, marshy, grassy area w/palmettos & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-9-81			
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog			
SAMPLE SIZE		SAMPLE NUMBER		SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD							
SPT	14	22	29	30	59	0.6							
SPT	15	12	10	12	22	0.8			70			Sand; gray; medium dense; fine grained; moist; w/trace shells & phosphate [SP]	
SPT	16	6	6	11	17	1.3						grading partially cemented; w/trace clay; shells grade out	
									80				Bottom of boring @ 75.0'
													Water accumulated to 1.3' on 11-9-81

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LOG OF BORING

BORING NO. 29
SHEET 1 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,508,000 E-442,410		ELEVATION (DATUM) 87.4 (MSL)		TOTAL DEPTH 50.0		DATE START 11-3-81	
SURFACE CONDITIONS Flat field w/palmettos & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-3-81	
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog	
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD					
SPT	1	2	5	6	11	1.2	1.9			Sand; pinkish-gray; loose; fine grained; moist; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	4	8	10	18	0.8				Silty Sand; dark brown; medium dense; fine grained; moist; w/trace roots [SM]	
SPT	3	3	5	7	12	1.2				Sand; light yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	4	4	13	38	51	1.2	10			Silty Sand; very dark brown; medium dense; fine grained; wet; w/trace roots [SM]	
SPT	5	27	36	34	70	1.0				grading very dense; moist; roots grade out	
SPT	6	18	24	32	56	1.1				Sand; dark reddish-brown; very dense; fine grained; moist; w/some silt [SM]	
SPT	7	5	8	15	23	1.0	20			Sand; dark yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	8	3	6	8	14	1.0				grading very pale brown	
SPT	9	8	13	13	26	0.4	30			grading light yellowish-brown	

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LOG OF BORING

BORING NO. 29
SHEET 2 OF 2

CLIENT Orlando Utilities Commission				PROJECT Stanton Energy Center				PROJECT NO. 8927		
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,508,000 E-442,410		ELEVATION (DATUM) 87.4 (MSL)		TOTAL DEPTH 50.0	DATE START 11-3-81	
SURFACE CONDITIONS Flat field w/palmettos & scattered pine trees						INSPECTOR M. Petersen		DATE FINISH 11-3-81		
SAMPLING						CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD				
SPT	10	0	0	1	1	1.4			Sand; olive; very loose; fine grained; moist; w/some clay; trace silt & phosphate [SC]	
SPT	11	2	4	6	10	1.1	40		grading loose; clay grades to trace [SP]	
SPT	12	4	8	8	16	0.9			grading medium dense	
SPT	13	14	24	12	36	0.6	50		grading light olive-gray; dense; w/trace shells	
										Bottom of boring @ 50.0' Water accumulated to 5.8' on 11-3-81

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LOG OF BORING

BORING NO. 30
SHEET 1 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927	
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,506,850 E-442,850		ELEVATION (DATUM) 87.4 (MSL)		TOTAL DEPTH 50.0		DATE START 11-12-81	
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-12-81	

SAMPLING							CHECKED BY S. J. Casey		APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	1	3	5	5	10	1.1				Sand; pinkish-gray; loose; fine grained; moist; w/trace roots [SP]	Boring advanced w/3-7/8" diameter drag bit using bentonite mud as drilling fluid
SPT	2	5	6	9	15	0.8				Sand; very dark brown to pale brown; medium dense; fine grained; moist; w/trace to some silt; trace roots [SP]	
SPT	3	5	9	12	21	1.0				grading brown; silt grades to trace @ 6.0'	
SPT	4	7	10	12	22	0.9				grading dark brown; silt grades to some from 9.2'-9.5'	
SPT	5	3	4	7	11	1.3				Silty Sand; black; medium dense; fine grained; moist; w/trace clay [SM]	
SPT	6	5	7	13	20	1.2				grading very dark brown	
SPT	7	8	11	12	23	1.4				clay grades out	
SPT	8	6	10	13	23	1.1				Sand; dark yellowish-brown; medium dense; fine grained; moist; w/trace silt [SP]	
SPT	9	10	15	20	35	0.7				Sand; very pale brown; dense; fine grained; moist; w/trace clay [SP]	

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BLACK & VEATCH
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LOG OF BORING

BORING NO. 30
SHEET 2 OF 2

CLIENT Orlando Utilities Commission						PROJECT Stanton Energy Center				PROJECT NO. 8927		
PROJECT LOCATION Orlando, Florida				COORDINATES N-1,506,850 E-442,850			ELEVATION (DATUM) 87.4 (MSL)		TOTAL DEPTH 50.0		DATE START 11-12-81	
SURFACE CONDITIONS Flat w/palmettos, scrub oak, & scattered pine trees						INSPECTOR M. Petersen				DATE FINISH 11-12-81		
SAMPLING						CHECKED BY S. J. Casey				APPROVED BY R. H. Herzog		
SAMPLE SIZE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD						
SPT	10	11	14	25	39	0.6				grading w/pockets of gray clayey sand below 34.9'		
SPT	11	13	7	8	15	1.5	38.8			Sand; light gray; medium dense; fine grained; moist; w/some silt [SM] Clay; olive-gray; stiff; moist; w/trace sand [CH]		
SPT	12	6	20	21	41	0.8	43.8			Sand; light olive-gray; medium dense; fine grained; moist; w/some clay [SC] Shelly Sand; gray; medium dense; fine to coarse grained; moist; w/some clay [SC]		
SPT	13	5	6	14	20	1.5	50			grading medium dense @ 48.5'		
											Bottom of boring @ 50.0' Water accumulated to 3.6' on 11-12-81	

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Appendix 2

**Soil Boring Logs for
Horizontal Expansion Area**

Boring Designation TH-01

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS													
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83													
				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88													
2. HOLE NUMBER TH-01		LOCATION COORDINATES N 1,504,746.0 E 597,087.2		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55															
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 36		DISTURBED 0													
4. NAME OF DRILLER Donnie/Norman				13. TOTAL NUMBER CORE BOXES 0															
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING													
				14. ELEVATION GROUND WATER															
				15. DATE BORING 1/12/10		STARTED 1/12/10													
						COMPLETED 1/12/10													
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.6															
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A															
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR															
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
		3				0' to 12': SAND, with silt, hardpan, very dark brown (SP-SM)	100	1									0.0		
		4						2											2.5
		5	9					3											
		6																	
		10	22																
		11																	
		13	24																
		8																	
		12																	
		13	25										7.0			21	SP-SM		5.0
		6				12' to 23.5': SAND, with silt, reddish brown (SP-SM)		5											
		8						6											
		10	18					7											
		8						8											
		10						9											
		15	25					10											
		10						11											
		12						12											
		19	31					13											
		18						14											
70.6	12.0	20	33																
		13				12' to 23.5': SAND, with silt, reddish brown (SP-SM)		9											
		15						10											
		17	32					11											
		15						12											
		18						13											
		22	40					14											
		13																	
		17																	
		19	36																
		15																	
		17																	
		21	38																
		18																	
		20																	
		24	44																
		13																	
		17																	
		21	38																
59.1	23.5																		
		6																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,504,746.0 E 597,087.2					ELEVATION TOP OF BORING 82.6		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
54.1	28.5	6	17			23.5' to 28.5': SAND, with silt, brown (SP-SM) (continued)		15			6.3			29	SP-SM	
		11														
44.1	38.5	2	1			28.5' to 38.5': SAND, silty, greenish gray (SM)		16								
		1														
		W/H														
		1														
39.1	43.5	W/H	W/H			38.5' to 43.5': SAND, clayey, greenish gray (SC)		18								
		W/H														
		W/H														
34.1	48.5	3	10			43.5' to 48.5': SAND, silty, trace fine to coarse shells, greenish gray (SM)		19								
		4														
		6														
		6	49			48.5' to 53.5': SAND, silty, cemented shells, light gray (SM)		20								
		9														
		40														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

[illegible]

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,504,746.0 E 597,087.2					ELEVATION TOP OF BORING 82.6											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
		18 18 27	45			78.5' to 87': SAND, silty, trace fine to coarse shells, greenish gray (SM) (continued)		27			34.2			30	SM	
-4.4	87.0															
		9 8 11	19			87' to 108.5': SAND, silty, trace fine to coarse shells, with cemented fragments to 1/2-inch size, fine to medium grained, greenish gray (SM)		28								
		11 7 19	26					29			13.1			16	SM	
		9 16 15	31					30								
		6 13 10	23					31								
-25.9	108.5	6 8 14	22			108.5' to 118.5': SAND, with silt, greenish gray (SP-SM)		32			8.3			20	SP-SM	

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,504,746.0 E 597,087.2					ELEVATION TOP OF BORING 82.6											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
						108.5' to 118.5': SAND, with silt, greenish gray (SP-SM) (continued)										
		5														
		7						33								
		8	15													
-35.9	118.5															
		9				118.5' to 125': SAND, with silt, trace fine to coarse shells, dark greenish gray (SP-SM)										
		15						34			6.9			24	SP-SM	
		16	31													
		10														
		22						35								
-42.4	125.0	30	52													

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

TH-02

DRILLING LOG			DIVISION	INSTALLATION			SHEET 1 OF 3 SHEETS
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM		HORIZONTAL	VERTICAL
				State Plane		NAD83	NAVD88
				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit			
2. HOLE NUMBER TH-02		LOCATION COORDINATES N 1,504,338.4 E 597,094.8		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 25	UNDISTURBED 0
4. NAME OF DRILLER Donnie/Norman				13. TOTAL NUMBER CORE BOXES 0			
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING	
				14. ELEVATION GROUND WATER			
				15. DATE BORING		STARTED 1/14/10	COMPLETED 1/14/10
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.7			
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A			
8. TOTAL DEPTH OF BORING (ft) 75.0				18. SIGNATURE AND TITLE OF INSPECTOR			

ELEV	DEPTH	Blows/ 0.5 ft	N _r	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
80.7	2.0	2				0' to 2': SAND, brown (SP)	100	1									
		3															
		4	7														
		6															
75.7	7.0	9				2' to 7': SAND, with silt, hardpan, very dark brown (SP-SM)	100	2									
		10	19														
		7															
		6															
		7	13														
		8															
		10															
		17	27														
66.2	16.5	9				7' to 16.5': SAND, hardpan, very dark brown (SP)	100	5									
		13															
		15	28														
		7															
		11															
		16	27														
		10															
		11															
		14	25														
		12															
		14															
		19	33														
66.2	16.5	11				16.5' to 23.5': SAND, with silt, brown (SP-SM)	100	9									
		14															
		18	32														
		10															
		12															
		16	28														
		9															
		9															
59.2	23.5	10	19			16.5' to 23.5': SAND, with silt, brown (SP-SM)	100	11									
		7															
		8															
		10	18														
		6															
		8															
		9	17														
		6															
59.2	23.5	7				16.5' to 23.5': SAND, with silt, brown (SP-SM)	100	12									
		7															
		7															
		7	14														
59.2	23.5					16.5' to 23.5': SAND, with silt, brown (SP-SM)											
		3															

DRILLING LOG (Cont Sheet)					INSTALLATION					SHEET 2 OF 3 SHEETS						
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane			HORIZONTAL NAD83		VERTICAL NAVD88						
LOCATION COORDINATES N 1,504,338.4 E 597,094.8					ELEVATION TOP OF BORING 82.7											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
		1 1	2			23.5' to 29': SAND, with silt, greenish gray (SP-SM) (continued)	100	15			7.4			28	SP-SM	
53.7	29.0	1														25.0
53.0	29.7	W/H W/H	W/H			29' to 29.7': SAND, clayey, greenish gray (SC)	100	16								27.5
						29.7' to 48.5': SAND, silty, greenish gray (SM)										30.0
																32.5
		3 4 5					100	17								35.0
																37.5
		2 2 3					100	18			40.6			42	SM	40.0
																42.5
		3 4 6					100	19								45.0
																47.5
34.2	48.5															50.0
		4 10 16				48.5' to 58.5': SAND, with silt, light greenish gray (SP-SM)	100	20								52.5

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,504,338.4 E 597,094.8					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
24.2	58.5	30				48.5' to 58.5': SAND, with silt, light greenish gray (SP-SM) (continued)	100	21			7.9			25	SP-SM	
		37	104													
		67														
10.2	72.5	25				58.5' to 72.5': SAND, silty, few fine to coarse shells, greenish gray (SM)	100	22								
		28														
		53	81													
		10														
7.7	75.0	12				72.5' to 75': SAND, clayey, few fine to coarse shells, cemented sand, greenish gray (SC)	100	23								
		16	28													
		9														
		12					100	24								
		14	26													
		5														
		6					100	25								
		7	13													

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

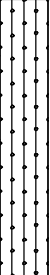
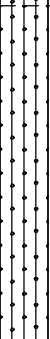
TH-03

DRILLING LOG			DIVISION	INSTALLATION			SHEET 1 OF 3 SHEETS
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM		HORIZONTAL	VERTICAL
				State Plane		NAD83	NAVD88
				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit			
2. HOLE NUMBER TH-03		LOCATION COORDINATES N 1,504,734.9 E 596,627.6		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 26	UNDISTURBED 0
4. NAME OF DRILLER Donnie/Norman				13. TOTAL NUMBER CORE BOXES 0			
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING	
				14. ELEVATION GROUND WATER			
				15. DATE BORING		STARTED 1/13/10	COMPLETED 1/14/10
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 83.2			
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A			
8. TOTAL DEPTH OF BORING (ft) 75.0				18. SIGNATURE AND TITLE OF INSPECTOR			

[illegible]

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,504,734.9 E 596,627.6					ELEVATION TOP OF BORING 83.2											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
54.7	28.5	8				18' to 28.5': SAND, with silt, brown (SP-SM) (continued)		15								
		10	18													
49.7	33.5	1				28.5' to 33.5': SAND, clayey, greenish gray (SC)		16			28.8	42	26	38	SC	
		1	2													
		1														
34.2	49.0	1				33.5' to 49': SAND, silty, trace fine to coarse shells, greenish gray (SM)		17								
		2														
		1	3													
		2														
		3														
		2														
		3														
		2														
		4														
6	10															
34.2	49.0	2				49' to 58.5': CLAY, greenish gray (CH)		20								
		1														
		2	3													

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,504,734.9 E 596,627.6					ELEVATION TOP OF BORING 83.2		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
24.7	58.5	2				49' to 58.5': CLAY, greenish gray (CH) (continued)		21			80.9	90	70	63	CH	
		2														
		2	4													
20.7	62.5	10				58.5' to 62.5': SAND, with silt, some fine to coarse shells, greenish gray (SP-SM)		22								
		8														
		7	15													
15.7	67.5					62.5' to 67.5': SAND, silty, little fine to coarse shells, greenish gray (SM)		23								
9.7	73.5	9				67.5' to 73.5': SAND, silty, trace fine to coarse shells, greenish gray (SM)		24								
		11														
		13	24													
8.2	75.0	7				73.5' to 75': SAND, clayey, trace fine to coarse shells, greenish gray (SC)		25			13.9		31	SM		
		9														
		11	20													

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS													
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83													
				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88													
2. HOLE NUMBER TH-04		LOCATION COORDINATES N 1,505,262.0 E 597,082.1		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55															
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 25		DISTURBED 0													
4. NAME OF DRILLER Donnie/Norman				13. TOTAL NUMBER CORE BOXES 0															
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG FROM VERTICAL ---		BEARING		14. ELEVATION GROUND WATER													
				15. DATE BORING 1/13/10		STARTED 1/13/10													
						COMPLETED 1/13/10													
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.9															
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A															
8. TOTAL DEPTH OF BORING (ft) 75.0				18. SIGNATURE AND TITLE OF INSPECTOR															
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
73.9	9.0	2				0' to 9': SAND, brown (SP)		1											
		4																	
		7	11																
		9																	
		12																	
		13	25																
		7																	
		9																	
		12	21																
		8																	
66.4	16.5	9				9' to 16.5': SAND, with silt, hardpan, very dark brown (SP-SM)		4											
		9																	
		14	23																
		9																	
		12																	
		15	27																
		7																	
		9																	
		9	18																
		7																	
59.4	23.5	7				16.5' to 23.5': SAND, with silt, reddish brown (SP-SM)		5											
		8																	
		11	19																
		7																	
		10																	
		11	21																
		9																	
		10																	
		14	24																
		13																	
		10						6											
		10																	
		15	25																
		8																	
		9																	
		11	20																
		9																	
		11																	
		13	24																
		7						7											

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,505,262.0 E 597,082.1					ELEVATION TOP OF BORING 82.9		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
54.4	28.5	8	18			23.5' to 28.5': SAND, with silt, brown (SP-SM) (continued)		15									
		10															
48.9	34.0	10	30			28.5' to 34': SAND, with silt, greenish gray (SP-SM)		16									
		12															
		18															
38.9	44.0	3	10			34' to 44': SAND, silty, with clay lenses, greenish gray (SM)		17									
		4															
		6															
		2															
35.4	47.5	1	1			44' to 47.5': SAND, clayey, few fine to coarse shells, greenish gray (SC)		18									
		W/H															
		4															
33.3	49.6	7	15			47.5' to 49.6': CLAY, dark greenish gray (CH)		19									
		8															
		2	4			49.6' to 53.5': CLAY, trace fine to coarse shells, light greenish gray (CH)		20									
		2															
		2															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,505,262.0 E 597,082.1					ELEVATION TOP OF BORING 82.9		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
29.4	53.5	4 4 5	9			53.5' to 58.5': SAND, clayey, few fine to coarse shells, greenish gray (SC)		21									
24.4	58.5	19 22 24	46			58.5' to 73': SAND, silty, trace fine to coarse shells, greenish gray (SM)		22									
		15 17 20	37					23			13.4			30	SM		
		14 15 20	35					24									
9.9	73.0					73' to 75': SAND, clayey, cemented sand, greenish gray (SC)		25									
7.9	75.0	8 10 7	17														

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 4 SHEETS	
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	
2. HOLE NUMBER TH-05				LOCATION COORDINATES N 1,504,978.6 E 598,030.4		VERTICAL NAVD88	
3. DRILLING AGENCY Ardaman and Associates, Inc.				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55	
4. NAME OF DRILLER Donnie/Norman				12. TOTAL SAMPLES 19		DISTURBED 19	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING	
6. THICKNESS OF OVERBURDEN				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0	
7. DEPTH DRILLED INTO ROCK				14. ELEVATION GROUND WATER		15. DATE BORING 1/15/10	
8. TOTAL DEPTH OF BORING (ft) 80.0				16. ELEVATION TOP OF BORING (ft) 152.0		STARTED 1/15/10	
				17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 1/16/10	
				18. SIGNATURE AND TITLE OF INSPECTOR			

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
148.0	4.0					0' to 4': Landfill Cover										
143.0	9.0					4' to 9': Core: 80% Recovery		1								
142.0	10.0					9' to 10': Core: No Recovery										
137.0	15.0					10' to 15': Core: 80% Recovery		2								
132.0	20.0					15' to 20': Core: 60% Recovery; Very Soft		3								
						20' to 25': Core: 50% Recovery; Soft		4								

[illegible]

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 4 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,504,978.6 E 598,030.4					ELEVATION TOP OF BORING 152.0											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
97.0	55.0					50' to 55': Core: 85% Recovery (continued)										
						55' to 60': Core: 50% Recovery		11								
92.0	60.0					60' to 65': Core: 50% Recovery		12								
87.0	65.0					65' to 67': Core:		13								
85.0	67.0	4 5 4 4	9			67' to 72': Core: 85% Recovery		14								
80.0	72.0					72' to 74': Core: 25% Recovery		15								
78.0	74.0					74' to 78.5': SAND, silty, very dark brown (SM)										
73.5	78.5	6 7 7	14			78.5' to 80': SAND, silty, very dark brown (SM)		16								
72.0	80.0	8 9 10	19					17								
Boring terminated 80 feet below ground surface.																
1. Soils are field visually classified in accordance with the Unified Soil Classification System																

DRILLING LOG (Cont Sheet)	INSTALLATION		SHEET 4
			OF 4 SHEETS
PROJECT	COORDINATE SYSTEM		HORIZONTAL
OUC 90-Acre Landfill Expansion	State Plane		NAD83
LOCATION COORDINATES	ELEVATION TOP OF BORING		VERTICAL
N 1,504,978.6 E 598,030.4	152.0		NAVD88

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	

2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-06				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88											
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		DISTURBED 85											
4. NAME OF DRILLER M. Brackins				12. TOTAL SAMPLES		UNDISTURBED 0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER											
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/30/11		STARTED COMPLETED											
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.8		17. TOTAL CORE RECOVERY FOR BORING N/A											
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer													
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
82.3	0.5	1			◇	0' to 0.5': ProMat	100	1									0.0
		5			●	0.5' to 6': SAND, dark brown, (SP)	100	2	0	97	3.0			24	SP		2.5
		3	8				100	3									
		5					100	4	0	96	3.6			23	SP		5.0
		7					100	5									
		8	15				100	6	0	92	7.8			21	SP-SM	Organic Content=6.0%	7.5
		6					100	7									
		7					100	8									
		10	17				100	9									
		8					100	10	0	93	7.5			29	SP-SM		15.0
76.8	6.0	21	32				100	11									
		13				6' to 10.5': SAND, with silt, organic silt, very dark brown, (SP-SM)	100	12									
		19					33	13									
		22	41				33	14									
		25					100	15									
		24					100	16									
		25	49				100	17									
		2					100	18									
		7					100	19									
72.3	10.5	14	21				100	20									
		8				10.5' to 16.5': SAND, with silt, reddish brown, (SP-SM)	33	21									
		12					33	22									
		19	31				100	23									
		9					100	24									
		19					100	25									
		24	43				100	26									
		10					100	27									
		18					100	28									
		32	50				100	29									
		15					100	30									
		19					100	31									
66.3	16.5	23	42				100	32									
		3				16.5' to 19.5': SAND, trace silt, brown, (SP)	100	33									
		9					100	34									
		11	20				100	35									
		4					100	36									
		5					100	37									
		6	11				100	38									
		1				19.5' to 25.5': SAND, with silt, brown, (SP-SM)	100	39	0	95	5.1			30	SP-SM		20.0
		3					100	40									
		5	8				100	41									
		2					100	42									
		3					100	43									
		3	6				100	44									
		1					100	45									
		1					100	46									
		2	3				100	47									

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS													
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL		VERTICAL											
						State Plane		NAD83		NAVD88											
LOCATION COORDINATES N 1,504,348.4 E 597,560.6						ELEVATION TOP OF BORING 82.8															
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS					
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class						
57.3	25.5	1				19.5' to 25.5': SAND, with silt, brown, (SP-SM) (continued)	100	17	0	94	6.4			25	SP-SM						
		1																			
		1	2																		
51.3	31.5	1				25.5' to 31.5': SAND, grayish brown, (SP)	100	18													
		W/R																			
		1	1																		
		1																			
		2	3																	24	SP
		1																			
		2																			
		3	5																		
		1																			
		1																			
1	2																				
43.8	39.0	1				31.5' to 39': SAND, silty, trace clay, gray, (SM)	50	22													
		W/R																			
		W/R	W/R																		
		W/R																			
		W/R	W/R																		
		W/R																			
		W/H																			
		W/H	W/H																		
		W/R																			
		W/H																			
W/H	W/H																				
42.8	40.0	W/H				39' to 40': SAND, clayey, greenish gray, (SC)	100	27													
W/H																					
W/H	W/H																				
W/H																					
W/H																					
1	1																				
W/H																					
W/H																					
W/H	W/H																				
W/H																					
36.8	46.0	W/H				40' to 46': CLAY, greenish gray, (CH)	80	28													
W/H																					
W/H																					
W/H																					
W/H																					
W/H	W/H																				
W/H																					
W/H																					
W/H	W/H																				
W/H																					
34.8	48.0	W/H				46' to 48': SAND, clayey, few fine to coarse shells, greenish gray, (SC)	100	32													
		W/R																			
		W/H	W/H																		
		W/H				48' to 51': CLAY, few fine to coarse shells, greenish gray, (CH)	100	33			96.7	103	77	72	CH						
		2	2																		
		1																			
31.8	51.0	3				51' to 53.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)	100	34													
		4	7																		
		2																			
		0				51' to 53.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)	100	35			60.0			42	CH						
		2																			
		3	5																		
		2				51' to 53.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,504,348.4 E 597,560.6					ELEVATION TOP OF BORING 82.8		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
29.3	53.5	2					100	36									
		4	6			53.5' to 55.5': SAND, silty, trace fine to coarse shells, (SM)											
		13					100	37									
27.3	55.5	28															55.0
		34	62														
		8				55.5' to 69': SAND, with silt, few fine to coarse shells, gray (SP-SM)	100	38									
		39															
		50	50														57.5
		13					100	39									
		26	60														
		34															
		17					53	40									60.0
		36	67														
		31					100	41									
		12															
		31	60														
		29					100	42									62.5
		11															
		13	33														
		20					100	43									
		10															
		11	23														
		12					100	44									65.0
		6															
		6	13														
		7					100	45									67.5
		5															
		6	13														
		7					100	46									
13.8	69.0	4															
		7	14			69' to 75': SAND, silty, trace fine to coarse shells, gray, (SM)	100	47									70.0
		6															
		6	15														
		9					100	48			21.1		31	SM			
		4															
		7	14														
		7					67	49									72.5
		4															
		6	12				100	50									
		6															
7.8	75.0	3															75.0
		7	13														
		6				75' to 76.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CL)	100	51			51.7		31	CL			
		2															
6.3	76.5	2	6														
		4				76.5' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	52			39.2	41	25	42	SC		77.5
		5															
4.8	78.0	1	3														
		2				78' to 80': CLAY, few fine to coarse shells, greenish gray, (CH)	100	53									
		0															
		0	3														
2.8	80.0	3					100	54			79.4	NP	NP	32	ML		80.0
		3															
		7	16			80' to 82.5': SILT, sandy, cemented sand, trace fine to coarse shells, greenish gray, (ML)											
		9					100	55									
		7															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

SHEET 4 of 5

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 5 OF 5 SHEETS							
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,504,348.4 E 597,560.6						ELEVATION TOP OF BORING 82.8											
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-31.2	114.0	14	24			108' to 114': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SP-SC) (continued)	85	75									
		8					80	76									
		11															
		13															
-32.7	115.5	7	26			114' to 115.5': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SC)	100	77			12.4		31	SC			
		13															
		13															
		7															
-38.7	121.5	14	27			115.5' to 121.5': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SP-SC)	100	78									
		6															
		11															
		15															
		7															
		15															
		34															
		19															
		9															
		19															
		44															
		25															
-40.2	123.0	13	26			121.5' to 123': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SC)	100	82			21.5		28	SC			
		14															
		12															
		7															
-42.2	125.0	9	21			123' to 125': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SP-SC)	68	83									
		12															
		13															
		30															
		32	62														
Boring terminated 125 feet below ground surface.																	

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-07

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-07				LOCATION COORDINATES N 1,504,358.8 E 596,743.7		10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit										
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 86 UNDISTURBED 0										
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				15. DATE BORING 5/26/11		STARTED 5/26/11 COMPLETED 6/3/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.7		17. TOTAL CORE RECOVERY FOR BORING N/A										
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Rockland B. Burr Geologist												
ELEV	DEPTH	BLOWS/0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LI	PI	MC	ASTM Class	REMARKS
80.7	2.0	1				0' to 2': SAND, brown, (SP)	67	1	0	98	2.5			6	SP	
78.2	4.5	7	17			2' to 4.5': SAND, dark brown, (SP)	100	2								
		8					100	3	0	96	3.6			20	SP	
75.7	7.0	4	15			4.5' to 7': SAND, with silt, dark brown, (SP-SM)	100	4								
		7					100	5			5.1			23	SP-SM	
		8				7' to 10.5': SAND, with silt, dark gray, (SP-SM)	100	6								
		9	17				100	7			9.4			24	SP-SM	
72.2	10.5	7					100	8			12.8			23	SM	
		6				10.5' to 14.5': SAND, silty, dark brown, (SM)	100	9								
		17					100	10								
68.2	14.5	14	31				100	11								
		8				14.5' to 19': SAND, with silt, brown to dark brown, (SP-SM)	100	12			7.2			26	SP-SM	
		10					100	13								
		16					100	14								
63.7	19.0	15	31				100	15	0	92	8.1			31	SP-SM	
		8				19' to 29': SAND, with silt, brown, (SP-SM)	100	16								
		11					100	17								
		14	25				100	18								
		11					100	19								
		15					100	20								
		14	29				100	21								
		8					100	22								
		11					100	23								
		12	23				100	24								

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL								
						State Plane		NAD83	NAVD88								
LOCATION COORDINATES N 1,504,358.8 E 596,743.7						ELEVATION TOP OF BORING 82.7											
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
53.7	29.0	8				19' to 29': SAND, with silt, brown, (SP-SM) (continued)	100	17									25.0
		10															
		17	27														
		3						100	18			8.0		27	SP-SM		
		3															
51.2	31.5	6	9			29' to 31.5': SAND, with silt, gray, (SP-SM)										27.5	
		3															
		4						100	19								
		13	17														
		3						100	20								
45.7	37.0	4				31.5' to 37': SAND, silty, trace clay, gray, (SM)	100	21			11.7			27	SP-SM	30.0	
		3	7					80									
		2															
		2															
		5	7														
45.2	37.5	W/R				37' to 37.5': SAND, clayey, gray, (SC)	100	22								32.5	
		W/H															
		W/H	W/H														
		W/R						67	23			12.2		29	SM		
		W/R	W/R														
42.2	40.5	W/R				37.5' to 40.5': SAND, silty, thin layer of gray clay, gray, (SM)	100	24								35.0	
		W/R															
		W/R	W/R														
		W/R						67	25								
		W/R	W/R														
38.2	44.5	W/R				40.5' to 44.5': SAND, clayey, trace silt, green, (SC)	100	26								37.5	
		W/H															
		W/H	W/H														
		W/H						67	27			21.7		33	SM		
		3	4														
33.7	49.0	W/H				44.5' to 49': SAND, silty, trace fine to coarse shells, trace layers of green clay, green, (SM)	100	28								40.0	
		W/H															
		W/H	W/H														
		W/H						100	29			27.2	31	9	33		SC
		3	3														
32.2	50.5	1				49' to 50.5': CLAY, trace fine grained sand, trace fine to coarse shell, green, (CH)	100	30								42.5	
		2															
		4	6														
		4						100	31								
		8															
		11	19			50.5' to 58': CLAY, green, (CH)	100	32			43.6			44	SM	45.0	
		3															
		4															
		2	6														
		4						100	33								
		7				49' to 50.5': CLAY, trace fine grained sand, trace fine to coarse shell, green, (CH)	100	34			88.1	112	79	78	CH	47.5	
		12	19														
		3															
		1															
		2	3														
		3				50.5' to 58': CLAY, green, (CH)	100	35			96.3	107	76	77	CH	50.0	
		3															
		2															
		6	8														
		3															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,504,358.8 E 596,743.7					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
24.7	58.0	3				50.5' to 58': CLAY, green, (CH) (continued) 54': ... set 3" casing to 54'	100	36			93.0	83	58	67	CH	55.0
		3	6													
		3														
		4														
		6	10													
22.7	60.0	W/R				58' to 60': SAND, clayey, trace fine to coarse grained shells, moist, gray, (SC) 58.5': ... NO RECOVERY 59': ... extend 3" casing to 59'	100	37							57.5	
		W/R														
		1	1													
		1														
		2														
21.7	61.0	3	5			60' to 61': SAND, clayey, few fine to coarse grained shells, 4" layer of coarse shell at 61', gray, (SC)	100	39							60.0	
		2														
		4														
		4	8													
		8														
18.2	64.5	17				61' to 64.5': SAND, trace silt, few fine to coarse grained shells, gray, (SP)	100	41							62.5	
		23	40													
		6														
		9														
		10	19													
15.2	67.5	10				64.5' to 67.5': SAND, silty, few fine to coarse grained shells, gray, (SM)	100	42							65.0	
		14														
		18	32													
		8														
		11														
9.2	73.5	15	26			67.5' to 73.5': SAND, with silt, few fine to coarse grained shells, gray, (SP-SM)	100	44		18.9		28	SM	67.5		
		11														
		15														
		17	32													
		6														
7.2	75.5	5				73.5' to 75.5': SAND, clayey, few fine to coarse grained shells, gray, (SC)	100	46						75.0		
		7	12													
		7														
		10														
		17	27													
5.7	77.0	W/H				75.5' to 77': CLAY, sandy, trace fine to coarse grained shell, gray, (CH)	100	47						77.5		
		W/H														
		2	2													
		7														
		4														
4.2	78.5	9	13			77' to 78.5': SILT, calcareous, brown, (ML)	100	48				30	ML	80.0		
		15														
		20	35													
		5														
		10														
		15	25			78.5' to 88.5': SAND, silty, trace fine to coarse shells, gray, (SM)	100	49								
		12														
		20														
		5														
		10														
		15					53	54		37.9		35	SM			
		12														
		20														
		5														
		10														
		15					67	55								
		12														
		20														
		5														
		10														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 4 OF 5 SHEETS																								
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88																						
LOCATION COORDINATES N 1,504,358.8 E 596,743.7						ELEVATION TOP OF BORING 82.7																										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS																
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class																	
-5.8	88.5	22	42			78.5' to 88.5': SAND, silty, trace fine to coarse shells, gray, (SM) (continued) 82.5': ... occasional thin layers of cemented sand below 82.5'	20	56									82.5															
		12																														
		12																														
		17	29																													
		8																														
		12																														
		12	24																													
		6																														
		9																														
		12	21																													
-7.3	90.0	7				88.5' to 90': SAND, with silt, trace fine to coarse shells, thin layers of cemented sand, gray, (SP-SM)	67	60									87.5															
		8																														
		14	22																													
-10.8	93.5	10				90' to 93.5': CLAY, sandy, few fine to coarse grained shells, gray, (CL)	100	61			57.9	34	19	34	CL		90.0															
		11																														
		6																														
		11	15																													
		3																														
		5																														
		6	11																													
		9																														
		-12.8	95.5	10																	93.5' to 95.5': SAND, silty, little fine to coarse grained shells, gray, (SM)	100	63									92.5
				10														20														
3																																
4																																
6	10																															
8																																
11																																
18	29																															
8																																
10																																
-17.3	100.0	10				95.5' to 100': SAND, few fine to coarse grained shells, trace silt, trace fine grained phosphate, gray, (SP)	100	65									97.5															
		11																														
		18	29																													
		8																														
		10																														
		10	20																													
		11																														
		11																														
		11	22																													
		-24.8	107.5	10																	100' to 107.5': SAND, with silt, little fine to coarse grained shells, trace fine grained phosphate, gray, (SP-SM)	67	68									100.0
11																																
11																																
8	19																															
8																																
17																																
12	29																															
7																																
9																																
7	16																															
-26.8	109.5	8				107.5' to 109.5': SAND, little fine to coarse grained shells, trace fine to medium grained phosphate, gray, (SP)	100	71									102.5															
		8																														
		9	17																													
		8																														
		10																														
		11	21																													
		9																														
		16																														
		17	33																													
				3																	109.5' to 114': SAND, few fine to coarse grained shells, trace fine to coarse grained phosphate, brown, (SP)	67	74								105.0	
7																																
13	20																															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS										
PROJECT					COORDINATE SYSTEM		HORIZONTAL										
OUC 90-Acre Landfill Expansion					State Plane		NAD83										
LOCATION COORDINATES					ELEVATION TOP OF BORING												
N 1,504,358.8 E 596,743.7					82.7												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-31.3	114.0	9				109.5' to 114': SAND, few fine to coarse grained shells, trace fine to coarse grained phosphate, brown, (SP) (continued)	67	75									112.5
		12	34														
		22															
		16															
-33.8	116.5	25	56			114' to 116.5': SAND, silty, few fine grained shells, trace fine to coarse grained phosphate, brown, (SP)	100	76									115.0
		31															
		12	21														
		9															
-42.3	125.0	12				116.5' to 125': SAND, trace fine to coarse grained shells, trace silt, trace fine to coarse grained phosphate, brown, (SP)	100	77									117.5
		12															
		19	48														
		29															
		6															
		22	52														
		30															
		12															
		28	66														
		38															
		9															
		29	70														
-42.3	125.0	41					67	79									120.0
		41															
		48	98														
		50															
-42.3	125.0	13					67	80									122.5
		37															
		49	86														
		48															
-42.3	125.0	48					75	83									125.0

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-08				LOCATION COORDINATES N 1,505,063.3 E 597,558.4		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 83		DISTURBED 0										
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		15. DATE BORING 6/24/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.3		STARTED 6/29/11										
8. TOTAL DEPTH OF BORING (ft) 125.0				17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 6/29/11										
				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis and Ortiz Claudette Geotechnical Engin												
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
80.8	1.5	1 4 4	8			0' to 1.5': SAND, with silt, brown, (SP-SM)		1	0	89	11.5			22	SP-SM	
		9 12 13	25			1.5' to 4.5': SAND, with silt, dark brown, (SP-SM)		2								
77.8	4.5	9 10 14	24					3								
		16 20 31	51			4.5' to 10.5': SAND, silty, dark brown, (SM)		4	0	88	12.2			20	SM	
		6 18 26	44					5								
		19 26 34	60					6								
71.8	10.5	38 63 56	119					7								
		4 10 13	23			10.5' to 19.5': SAND, with silt, brown to light brown, (SP-SM)		8								
		6 15 16	31					9								
		8 23 17	40					10	0	91	9.4			28	SP-SM	
		2 6 8	14					11								
		2 2 3	5					12								
62.8	19.5	1 4 8	12					13								
		3 4 4	8			19.5' to 24': SAND, with silt, (SP-SM)		14								
		3 6 5	11					15	0	94	6.2			24	SP-SM	
		2 2 2						16								
58.3	24.0	2 4														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL								
						State Plane		NAD83	NAVD88								
LOCATION COORDINATES						ELEVATION TOP OF BORING											
N 1,505,063.3 E 597,558.4						82.3											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
53.8	28.5	1				24' to 28.5': SAND, with silt, greenish gray, (SP-SM)		17									25.0
		W/H	W/H														
		W/H															
		W/H	W/H														
		W/H	W/H														
49.3	33.0	W/R				28.5' to 33': SAND, silty, trace clay, trace fine to coarse shells, greenish gray, (SM)		18			7.3			26	SP-SM	27.5	
		W/R	W/R														
		W/H															
		W/H	W/H														
		W/H	W/H														
47.8	34.5	W/H				33' to 34.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)		19								30.0	
		W/H	W/H														
		W/H	W/H														
44.8	37.5	1				34.5' to 37.5': SAND, silty, trace clay, trace fine to coarse shells, gray, (SM)		20								32.5	
		2	4														
		1															
		W/H	1														
41.8	40.5	1				37.5' to 40.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)		21								35.0	
		1	2														
		W/H															
		1	3														
35.8	46.5	2				40.5' to 46.5': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)		22								37.5	
		6	10														
		4															
		2															
		2	6														
		4															
		3															
		2	4														
34.3	48.0	3				46.5' to 48': SAND, clayey, fine to coarse shells, greenish gray, (SC)		23								40.0	
		2															
		3	5														
		3				48' to 56.5': CLAY, trace fine to coarse shells, greenish gray, (CH)		24								42.5	
		3	5														
		1															
		1															
		2	3														
		1															
		1	2														
		1															
		1						25								45.0	
		1						26								47.5	
		1						27								50.0	
		1						28								52.5	
		1						29									
		1						30									
		1						31									
		1						32									
		1						33									
		1						34									
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		1						62									
		1						63									
		1						64									
		1						65									
		1						66									

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,505,063.3 E 597,558.4					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
25.8	56.5	1				48' to 56.5': CLAY, trace fine to coarse shells, greenish gray, (CH) (continued)		36									
		2	3														
		2															
		3	6														
23.8	58.5	3				56.5' to 58.5': SAND, with silt, mostly fine to coarse shells, gray, (SP-SM)		37		88.3	81	58	47	CH			55.0
		2															
		3															
		15	18														
17.8	64.5	17				58.5' to 64.5': SAND, trace silt, fine to coarse shells, gray, (SP)		38		63.2			42	CH			
		21															
		29	50														
		26															
		37															
		43	80														
		12															
		32															
11.8	70.5	40	72			64.5' to 70.5': SAND, with silt, trace fine to coarse shells, gray, (SP-SM)		39									57.5
		17															
		26															
		21	47														
		10															
		15															
		14	29														
		8															
7.3	75.0	11				70.5' to 75': SAND, silty, trace fine to coarse shells, gray, (SM)		40									
		14	25														
		10															
		11															
		15	26														
		4															
		9															
		13	22														
4.3	78.0	4				75' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)		41									
		8															
		11	19														
		4															
		5															
		7	12														
		9															
		8	16														
2.8	79.5	5				78' to 79.5': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)		42									
		3															
		8															
		5	8														
1.3	81.0	W/H				79.5' to 81': SILT, sandy, trace fine to coarse shells, greenish gray, (ML)		43		36.3			38	SC			
		1															
		2	3														
		W/H															
		1				81' to 84': SAND, silty, trace fine to coarse shells, gray, (SM)		44		43.0			45	SC			
		3	4														
		2															
		7	10														
		2				79.5' to 81': SILT, sandy, trace fine to coarse shells, greenish gray, (ML)		45		56.1	50	35	51	CH			
		3															
		6				81' to 84': SAND, silty, trace fine to coarse shells, gray, (SM)		46		61.7	NP	NP	43	ML			
		7															
		2				79.5' to 81': SILT, sandy, trace fine to coarse shells, greenish gray, (ML)		47									
		3															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,505,063.3 E 597,558.4					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-1.7	84.0	8	15			81' to 84': SAND, silty, trace fine to coarse shells, gray, (SM) (continued)		56										82.5
		4						57										85.0
		9						58										87.5
		6	15					59										90.0
		15						60										92.5
		12						61										95.0
		10	22					62										97.5
		4						63										100.0
		6						64										102.5
		8	14					65										105.0
		3						66										107.5
		3						67										110.0
		4	7					68										
		4						69										
		4						70										
		9	13					71										
		7						72										
		11						73										
		10	21					74										
		10																
		10																
		4																
		2																
		4																
		7	11															
		4																
		2																
		4	6															
		10																
		10																
		5																
		5																
		14	19															
		7																
		7																
		8	15															
		6																
		10																
		6																
		6	16															
		8																
		8																
		7																
		6	13															
		7																
		6																
		8	14															
		5																
		2																
		4	6															
		5																
		10																
		11	21															
		5																
		2																
		4	6															
		5																
		10																
		11	21															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,063.3 E 597,558.4					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
-36.2	118.5	14				108' to 118.5': SAND, with clay, trace fine to coarse shells, trace fine phosphate, gray, (SP-SC) (continued)		75								
		22	46													
		24														
		5														
		15	42													
-39.2	121.5	27				118.5' to 121.5': SAND, clayey, trace fine to coarse shells, trace fine phosphate, gray, (SC)		76								
		21														
		28	63													
		35														
		4														
-41.2	123.5	18	41			121.5' to 123.5': SAND, with clay, trace fine to coarse shells, trace fine phosphate, gray, (SP-SC)		77								
		23														
		13														
		12	22													
		10														
-42.7	125.0	5				123.5' to 125': SAND, clayey, cemented sand, trace fine to coarse shells, greenish gray, (SC)		78								
		11	34													
		23														
		14														
		17	35													
		18						79								
		19														
		17	35													
		18														
		16														
		19						80			27.9		34	SC		
		21	40													

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-09

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-09				LOCATION COORDINATES N 1,505,298.5 E 596,702.2		10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit										
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 84 UNDISTURBED 0										
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.3		15. DATE BORING STARTED 6/7/11 COMPLETED 6/10/11										
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Rockland B. Burr Geologist										
8. TOTAL DEPTH OF BORING (ft) 125.0																
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
		1				0' to 7': SAND, trace silt, brown, (SP)	33	1								
		1					67	2	0	96	4.0			18	SP	
		4	5				100	3								
		8					67	4								
		8					67	5								
		10	18				67	6	0	96	4.3			23	SP	
		9					67	7								
		9					67	8			10.8			21	SP-SM	
		8					67	9								
		3					100	10								
		5					100	11								
		8	17				67	12			6.7			26	SP-SM	
		3					100	13								
		7					100	14								
		7					100	15	0	94	5.6			31	SP-SM	
		4					67	16								
		4				22.5' to 26': SAND, trace silt, brown, (SP)										
		6														
		9														
		11	20													
		12	21													

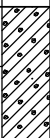
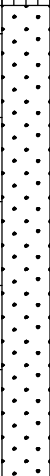
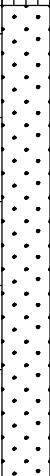
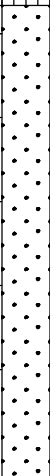
DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 2 OF 5 SHEETS							
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,505,298.5 E 596,702.2						ELEVATION TOP OF BORING 82.3											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
56.3	26.0	5				22.5' to 26': SAND, trace silt, brown, (SP) (continued)	67	17									
		9															
		10	19														
		3				26' to 28.5': SAND, with silt, light brown, (SP-SM)	33	18									
		6															
		12	18														
53.8	28.5	7					67	19									
		7															
		3	10														
52.3	30.0	2				28.5' to 30': SAND, trace silt, brown, (SP)	100	20	0	96	4.3			26	SP		
		1															
		2	3														
50.8	31.5	2				30' to 31.5': SAND, silty, gray, (SM)	100	21									
		1															
		1	2														
44.8	37.5	W/R				31.5' to 37.5': SAND, clayey, thin layers of gray clay, gray, (SC)	67	22			37.3			36	SC		
		W/R															
		W/R	W/R														
		W/R															
		W/R															
		W/R	W/R														
		1															
42.8	39.5	2				37.5' to 39.5': SAND, trace silt, gray, (SP)	100	26									
		1															
		1	2														
33.8	48.5	W/R				39': ... extend 3" casing to 39'	100	27									
		2															
		4	6			39.5' to 48.5': SAND, silty, trace fine to coarse grained shells, green, (SM)	100	28			31.7			39	SM		
		2															
		3				44': ... extend 3" casing to 44'	100	29									
		4	6														
		4				100	30										
		4															
		5	9			100	31										
		3															
		4				100	32										
		8	12														
		3				100	33										
		7															
		9	16			100	34										
		3															
2			100	35													
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2			100	36													
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3			100	37													
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4	6																
2			100	92													
2																	
4	6		100	93													
2																	
2			100	94													
4	6																
2			100	95													
2																	
4	6		100	96													
2																	
2			100	97													
4	6																
2			100	98													
2																	
4	6		100	99													
2																	
2			100	100													

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,505,298.5 E 596,702.2					VERTICAL NAVD88												
ELEVATION TOP OF BORING 82.3																	
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
27.8	54.5	4				48.5' to 54.5': CLAY, trace fine to coarse grained shells, green, (CH) (continued)	100	36									
		5	9														
		7															
25.8	56.5	9	16			54.5' to 56.5': SAND, clayey, mostly fine to coarse grained shells, gray, (SC)	100	37									55.0
		7															
		8															
20.3	62.0	8	16			56.5' to 62': SAND, with silt, mostly fine to coarse grained shells, gray, (SP-SM)	100	38									
		3															
		10															
		7	17														
		9															
		8	15														
		3															
15.8	66.5	7				61.5': ... 100% circulation loss, water table measured at 13.6' below ground surface	67	41			10.3		29	SP-SM			
		7															
		7	14														
		6															
		8															
		13	21														
		11															
13.8	68.5	15				62' to 66.5': SAND, trace silt, trace fine to coarse grained shells, gray, (SP)	67	42									62.5
		22	37														
		6															
		10															
		14	24														
		7															
		11															
10.3	72.0	12	23			66.5' to 68.5': SAND, trace silt, thin layers of cementation, gray, (SP)	27	45									65.0
		8															
		8															
		8	16														
		3															
		3															
		4	7														
7.3	75.0	3				68.5' to 72': SAND, silty, gray, (SM)	67	46									67.5
		3															
		3															
		4															
		3															
		4															
		5	9														
3.8	78.5	4				72' to 75': SAND, clayey, few silt, gray, (SC)	67	47			37.1		37	SM		70.0	
		5															
		6															
		3															
		3															
		4															
		4	7														
3.8	78.5	5				75' to 78.5': SAND, silty, trace clay, brown (SM)	67	48			40.1	NP	NP	30	SM		72.5
		4															
		4															
		5															
		6															
		3															
		4	9														
3.8	78.5	4				78.5' to 86.5': SAND, with silt, trace fine to coarse grained shells, gray, (SP-SM)	67	49									75.0
		5															
		6															
		3															
		3															
		4															
		4	7														
3.8	78.5	3				75' to 78.5': SAND, silty, trace clay, brown (SM)	13	50									77.5
		6															
		3															
		3															
		4															
		4															
		4	7														
3.8	78.5	3				75' to 78.5': SAND, silty, trace clay, brown (SM)	67	51									80.0
		4															
		8	12														
		7															
		12															
		16	28														
		5															
3.8	78.5	8				78.5' to 86.5': SAND, with silt, trace fine to coarse grained shells, gray, (SP-SM)	100	52									80.0
		12	20														
		10															
		14															
		15	29														
		7															
		10															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

SPK FORM 1836-A
SEP 05

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 5 OF 5 SHEETS							
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,505,298.5 E 596,702.2						ELEVATION TOP OF BORING 82.3											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-31.7	114.0	3				111' to 114': SAND, clayey, trace fine grained shells, trace fine grained phosphate, gray, (SC) (continued)	100	75									112.5
		4	8														
		4					100	76									
		4	12														
-34.2	116.5	8				114' to 116.5': SILT, sandy, trace fine to coarse shells, gary, (ML)	100	77			56.1			37	ML		115.0
		4	12														
		6					100	78									
		6															
-42.7	125.0	3				116.5' to 125': SAND, trace fine to coarse grained phosphate, trace silt, trace fine to coarse shell, thin layers of gray clay, gray, (SP)	100	78									117.5
		5	12														
		7						100	79								
		6	21														
		11						100	80								
		10															
		6	18					100	81								
		7															
		11						100	82								
		15	34														
-42.7	125.0	19				116.5' to 125': SAND, trace fine to coarse grained phosphate, trace silt, trace fine to coarse shell, thin layers of gray clay, gray, (SP)	100	82									120.0
		6															
		11	25														
		14															
		10															
		15	33					75	83								
-42.7	125.0	18				116.5' to 125': SAND, trace fine to coarse grained phosphate, trace silt, trace fine to coarse shell, thin layers of gray clay, gray, (SP)										122.5	
		21															

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

Boring Designation TH-10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-10				LOCATION COORDINATES N 1,505,699.8 E 596,740.0		10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit											
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES 24											
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.5		15. DATE BORING 6/28/11											
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Stevens Gregory Geotechnical Engineer											
8. TOTAL DEPTH OF BORING (ft) 75.0																	
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
Gravel	Sand	Fines	LL	PI	MC	ASTM Class											
81.0	1.5	1 1 4	5			0' to 1.5': SAND, grayish brown, (SP)		1									
79.5	3.0	6 5 6	11			1.5' to 3': SAND, silty, brown, (SM)		2	0	78	22.2			13	SM		
75.0	7.5	5 8 7 10 12 10 12 15	15 22 27			3' to 7.5': SAND, trace silt, dark brown, (SP)		3 4 5		96	4.3			21	SP		
70.5	12.0	1 7 8 7 12 13	15 25			7.5' to 12': SAND, with silt, grayish brown, (SP-SM)		6 7	0	92	7.6			22	SP-SM		
		4 10 13	23			12' to 22': SAND, with silt, dark brown, (SP-SM)		8									
60.5	22.0	4 7 9	16			22' to 33.5': SAND, with silt, reddish brown, (SP-SM)		9	0	94	6.3			28	SP-SM		
		8															

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,699.8 E 596,740.0					ELEVATION TOP OF BORING 82.5		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
49.0	33.5	10	22			22' to 33.5': SAND, with silt, reddish brown, (SP-SM) (continued)		10								
		12														
		3														
		5						11	0	91	9.5		28	SP-SM		
		7	12													
47.5	35.0	1	2			33.5' to 35': SAND, silty, dark brown, (SM)		12								
		1														
		1														
42.5	40.0	2	5			35' to 40': SAND, gray, (SP)		13								
		2														
		3														
		1						14								
		1														
		W/R	1					15								
		5	6			40' to 52': SAND, silty, greenish gray, (SM)										
		1														
30.5	52.0	2	5					16			21.9		34	SM		
		2														
		3														
		2						17								
		3														
		2	5													
						52' to 57.5': CLAY, sandy, greenish gray, (CH)										

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,699.8 E 596,740.0					ELEVATION TOP OF BORING 82.5		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
25.0	57.5	2				52' to 57.5': CLAY, sandy, greenish gray, (CH) (continued)		18			85.4	67	49	49	CH	
		3														
		2	5													
		4														
		4														
20.5	62.0	6	10			57.5' to 62': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)		19			83.0	66	47	53	CH	
		3														
		7														
		10	17													
		8														
9.0	73.5	7				62' to 73.5': SAND, silty, with trace to fine shells, greenish gray, (SM)		20								
		4														
		4														
		5	9													
		4														
7.5	75.0	4				73.5' to 75': SILT, sandy, with trace to fine shells, greenish gray, (ML)		21								
		5														
		4														
		5														
		4	9													
7.5	75.0	5				73.5' to 75': SILT, sandy, with trace to fine shells, greenish gray, (ML)		22			13.9			36	SM	
		4														
		6	10													
7.5	75.0	5				73.5' to 75': SILT, sandy, with trace to fine shells, greenish gray, (ML)		23								
		4														
		6	10													
7.5	75.0	5				73.5' to 75': SILT, sandy, with trace to fine shells, greenish gray, (ML)		24			58.0			34	ML	
		4														
		6	10													

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-11				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88										
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		DISTURBED 84										
4. NAME OF DRILLER M. Brackins				12. TOTAL SAMPLES		UNDISTURBED 0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER										
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/20/11		STARTED 6/20/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.7		COMPLETED 6/22/11										
8. TOTAL DEPTH OF BORING (ft) 125.0				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Rockland B. Burr Geologist										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LI	PI	MC	ASTM Class	REMARKS
81.2	1.5	5				0' to 1.5': SAND, with silt, dark brown, (SP-SM)	100	1			7.4			21	SP-SM	
		7				1.5' to 6': SAND, gray, (SP)	100	2								
		8	17				100	3	0	98	1.7			27	SP	
		8	16				100	4								
76.7	6.0	6					100	5								
		7	16				100	6								
		9				6' to 14': SAND, trace silt, dark brown, (SP)	100	7	0	97	3.3			26	SP	
		1					67	8								
		4	9				67	9								
		3					67	10								
		4	8				100	11	0	92	8.3			24	SP-SM	
		2				14' to 18': SAND, with silt, dark brown, (SP-SM)	100	12								
		2	4				100	13								
		2					100	14								
		1					100	15			12.3			26	SM	
		3	4				100	16								
		3				18' to 27': SAND, silty, dark brown, (SM)	100	17								
		4					100	18								
		13	17				100	19								
		5					100	20								
		12	25				100	21								
		3					100	22								
		11					100	23								
		18	29				100	24								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION			SHEET 2 OF 5 SHEETS								
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,505,721.6 E 597,171.0						ELEVATION TOP OF BORING 82.7											
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
55.7	27.0	6				18' to 27': SAND, silty, dark brown, (SM) (continued)	100	17									25.0
		11	22														
		6					100	18									
49.2	33.5	8		16		27' to 33.5': SAND, with silt, brown, (SP-SM)											27.5
		8															
		8															
		6					67	19									
		7	16														
		4					67	20									
		7															
		10	17				67	21									
		5					100	22									
		9	18														
47.7	35.0	9		16		33.5' to 35': SAND, silty, brown, (SM)											30.0
		5															
		7															
		9	16														
		3					100	23									
		6															
		6	12														
		3					100	24									
		1															
		2	3														
44.2	38.5	W/R				35' to 38.5': SAND, clayey, gray, (SC)											35.0
		1					100	25			23.3			31	SC		
		1	2														
		W/H															
		W/H					100	26									
		2	2														
		W/H															
		W/H															
		W/H															
		2															
42.2	40.5	2				38.5' to 39': SAND, silty, gray, (SM)											37.5
		3															
		3	6														
		3					100	27			42.4	38	24	24	SC		
		W/H															
		W/H															
		W/H	W/H														
		W/H															
		W/H															
		2															
36.2	46.5	2				40.5' to 46.5': SAND, clayey, thin layers of green clay at 45', green, (SC)											40.0
		2															
		2															
		2	4				100	28			25.8	34	16	36	SC		
		W/H															
		W/H					33	29									
		W/H															
		2					67	30									
		2															
		2	4				100	31			35.4	37	14	43	SC		
34.2	48.5	2				46.5' to 48.5': SAND, silty, trace clay, green, (SM)											42.5
		3															
		3	6				100	32									
		3															
		2					100	33									
		2	4														
		2															
		3															
		2					100	34			34.4	39	22	35	SC		
		2	5														
31.2	51.5	1				48.5' to 51.5': SAND, clayey, thin layers of green clay, thin layers of cementation, green, (SC)											45.0
		2															
		2															
		3															
		3	5				100	35									
		1															
		2															
		3															
		W/H															
		W/H															
31.2	57.5	2				51.5' to 57.5': CLAY, trace fine to coarse shells, green, (CH)											50.0
		3															
		3	5														
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 3 OF 5 SHEETS								
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL							
						State Plane		NAD83	NAVD88							
LOCATION COORDINATES N 1,505,721.6 E 597,171.0						ELEVATION TOP OF BORING 82.7										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
25.2	57.5	1				51.5' to 57.5': CLAY, trace fine to coarse shells, green, (CH) (continued)	100	36			94.3	97	71	67	CH	
		3	4													
		1					67	37								
		2	4													
		W/H					100	38			73.8	104	76	56	CH	
	2															
	4	6														
15.2	67.5	1				57.5' to 67.5': SAND, with silt, trace fine to coarse shells, trace clay, gray, (SP-SM)	100	39								57.5
		5														
		9	14				67	40								
		6														
		6	14												60.0	
		8														
		6	12				100	41								
		6														
		6	9				100	42							62.5	
		3														
10.7	72.0	3				67.5' to 72': SAND, trace silt, trace fine to coarse shells, gray, (SP)	100	43								
		5														
		10	15				100	44							65.0	
		7														
7.7	75.0	6	12			72' to 75': SAND, silty, trace fine to coarse shells, gray, (SM)	100	45								
		7														
		8	15													
6.2	76.5	7				75' to 76.5': CLAY, sandy, gray, (CL)	67	46								67.5
		12														
		15	27				67	47							70.0	
		8														
4.7	78.0	14	30			76.5' to 78': SAND, clayey, trace phosphate, gray, (SC)	67	48								
		7														
		12														
		11	23													
3.2	79.5	5				78' to 79.5': CLAY, sandy, trace phosphate, gray, (CL)	100	49								72.5
		6														
		5	11				67	50			27.4			38	SM	
		3														
1.2	81.5	2	4			79.5' to 81.5': SILT, sandy, calcarious, brown, (ML)	100	51			50.7	40	26	36	CL	75.0
		3														
		4	7													
		1				78' to 79.5': CLAY, sandy, trace phosphate, gray, (CL)	100	52			36.5			47	SC	77.5
		1														
		1	2													
		1				78' to 79.5': CLAY, sandy, trace phosphate, gray, (CL)	100	53			88.2	30	10	34	CL	
		3														
		7	10													
		3				79.5' to 81.5': SILT, sandy, calcarious, brown, (ML)	100	54			80.8	NP	NP	34	ML	80.0
		4														
		9	13													
		6														
		10					100	55								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,505,721.6 E 597,171.0					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-2.8	85.5	17 11 22 14 5 17 15	27 36 32			81.5' to 85.5': SAND, silty, trace fine to coarse shells, gray, (SM) (continued)	100 67	56 57										82.5 85.0
-4.3	87.0	10 11 9	20			85.5' to 87': SILT, sandy, cemented sand, gray, (ML)	67	58			51.4			20	ML			87.5
-8.8	91.5	9 5 6 6 2 3 7 7 10	11 5 17			87' to 91.5': SAND, silty, trace fine to coarse shells, gray, (SM)	100 67 67	59 60 61										90.0
-11.9	94.5	6 4 6 4 6 9	10 10 15			91.5' to 94.5': SAND, clayey, trace fine to coarse shells, gray (SC)	100 100	62 63			31.1			24	SC			92.5
-17.9	100.5	11 8 11 7 12 14 8 14 17 9 11 11	19 26 31 22			94.5' to 100.5': SAND, trace silt, trace fine to coarse shells, trace phosphate, gray, (SP)	100 100 100 100 100	64 65 66 67										95.0 97.5 100.0
-20.9	103.5	5 6 6 4 5 6	12 11			100.5' to 103.5': SAND, with silt, trace fine to coarse shells, gray, (SP-SM)	100 100	68 69										102.5
-24.9	107.5	4 3 7 6 10 7 5 5	10 17			103.5' to 107.5': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, cemented sand, gray, (SC)	100 100 100	70 71 72			32.0			25	SC			105.0 107.5
-28.4	111.0	8 3 4 3 3 2 3	13 7 5			107.5' to 111': SILT, sandy, calcareous, gray (ML)	100 100 100	73 74			61.9			31	ML			110.0

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,721.6 E 597,171.0					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
-32.9	115.5	2				111' to 115.5': CLAY, sandy, greenish gray, (CH) (continued)	100	75			71.2			37	CH	112.5
		3	5													
		4	10													
-35.9	118.5	6				115.5' to 118.5': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	100	78							117.5	
		9	19													
		6	9													
-39.9	122.5	4				118.5' to 122.5': SAND, with clay, trace fine to coarse phosphate, grayish brown, (SP-SC)	100	80							120.0	
		13	19													
		8	36													
-42.4	125.0	11				122.5' to 125': SAND, with silt, dark brown, (SP-SM)	100	82							122.5	
		14	28													
		6	38													
		32					75	83							125.0	

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-12

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS											
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-12				LOCATION COORDINATES N 1,505,913.1 E 597,569.2		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55											
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 85											
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES		0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL		BEARING											
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		80.3 6/22/11											
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 6/22/11											
8. TOTAL DEPTH OF BORING 125.0				16. ELEVATION TOP OF BORING		82.2											
				17. TOTAL CORE RECOVERY FOR BORING		N/A											
				18. SIGNATURE AND TITLE OF INSPECTOR		Ortiz Claudette Geotechnical Engineer											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
		3				0' to 12': SAND, trace silt, dark brown, (SP)		1									0.0
		3															
		6															
		6	9					2	0	97	3			26	SP		2.5
		7															
		8															
		6	15					3									
		7															
		8															
		5	15					4									5.0
		5															
		7															
		6	12					5	0	97	3			24	SP		7.5
		6															
		6															
		3	12					6									
		6															
		7						7									10.0
		8															
		6	13														
		7															
		8															
		3	15					8									
		5															
70.2	12.0	6															
		5	11			12' to 13.5': SAND, silty, organic silt, very dark brown, (SM)		9			13			21	SM	Organic Content=10.8%	12.5
68.7	13.5	7															
		10															
		5	17			13.5' to 18.5': SAND, with silt, dark brown, (SP-SM)		10									
		6															
		8															
		8	14					11									15.0
		9															
		9															
		4	18					12									17.5
		4															
		5															
63.7	18.5	3	9					13									
		4				18.5' to 32': SAND, brown, (SP)											
		5															
		2	9					14									20.0
		2															
		2															
		2	5					15									
		2															
		4															
		2	6					16									22.5
		3															
		5															

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,913.1 E 597,569.2					ELEVATION TOP OF BORING 82.2		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
50.2	32.0	2				18.5' to 32': SAND, brown, (SP) (continued)		17								
		4														
		5	9													
		2														
		4														
		6	10													
		5														
49.2	33.0	8						18								
		11	19													
		4														
		9														
		12	21													
		9														
		17														
48.2	34.0	23	40					21								
		4														
		13														
		14	27													
		4														
		9														
		14	23													
43.7	38.5	4				33' to 34': SAND, with silt, grayish brown, (SP-SM)		23								
		9														
		16	25													
		6														
		15														
		24	39													
		10														
42.2	40.0	24				34' to 38.5': SAND, brown, (SP)		24								
		16	40													
		3														
		3														
		4	7													
		3														
		4														
38.7	43.5	5	9			40' to 43.5': SAND, clayey, cemented sand, carbonated, gray, (SC)		28		18.9		23	SC			
		4														
		5														
		3	8													
		4														
		3														
		3	6													
35.7	46.5	2				43.5' to 46.5': SAND, silty, cemented sand, carbonated, greenish gray, (SM)		30								
		3														
		2														
		4	6													
		3														
		2														
		2														
34.2	48.0	2	4			46.5' to 48': SAND, clayey, greenish gray, carbonated, greenish gray, (SC)		32		33.9		36	SC			
		2														
		1														
		2														
		3	5													
		1														
		1														
31.2	51.0	2	3			49.5' to 51': SAND, clayey, greenish gray, carbonated, greenish gray, (SC)		34		46.6		38	SC			
		1														
		2														
		2														
		2														
		2														
		3	5													
29.7	52.5	2				51' to 52.5': SAND, silty, cemented sand, carbonated, greenish gray, (SM)		35								
		2														
		2														
		3														
		W/H														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,505,913.1 E 597,569.2					ELEVATION TOP OF BORING 82.2		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
24.2	58.0	1				52.5' to 58': CLAY, trace fine to coarse shells, greenish gray, (CH) (continued)		36									
		1	2														
		W/H															
		1	2														
23.2	59.0	1				58' to 59': SAND, clayey, fine to coarse shells, greenish gray, (SC)		37			78.5	88	66	56	CH		
		1	2														
21.7	60.5	1				59' to 60.5': CLAY, trace fine to coarse shells, greenish gray, (CH)		38									
		1	2														
		2	3														
		2	4														
14.2	68.0	3				60.5' to 68': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)		39									
		4															
		3	7														
		5															
		5	10														
		4															
		3															
		3	6														
		4															
		4	8														
		5															
		10.2	72.0	4			9			68' to 72': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)		40			86.6	90	66
3																	
1																	
1	2																
8.7	73.5	W/H				72' to 73.5': SAND, clayey, mostly fine to coarse shells, gray, (SC)		41									
		W/H															
		W/H	W/H														
		W/H															
6.2	76.0	1				73.5' to 76': SAND, silty, trace fine to coarse shells, (SM)		42									
		4	5														
		2															
		2	3														
3.7	78.5	4				76' to 78.5': CLAY, trace fine to coarse shells, greenish gray, (CL)		43									
		6															
		10	16														
		5															
		6				78.5' to 92.5': SAND, silty, cemented sand, trace fine to coarse shells, gray, (SM)		44									
		5															
		6	11														
		17															
		15						45									

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)				INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT				COORDINATE SYSTEM		HORIZONTAL											
OUC 90-Acre Landfill Expansion				State Plane		NAD83											
LOCATION COORDINATES				ELEVATION TOP OF BORING		VERTICAL											
N 1,505,913.1 E 597,569.2				82.2		NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-10.3	92.5	13	28			78.5' to 92.5': SAND, silty, cemented sand, trace fine to coarse shells, gray, (SM) (continued)											
		16															
		19															
		12	31														
		5															
		7															
		11	18														
		6															
		11	18														
		7															
		1															
		5															
-13.8	96.0	2	7			92.5' to 96': SAND, clayey, cemented sand, trace fine to coarse shells, gray, (SC)											
		3	4														
		2															
		4															
		4	8														
		2															
		4															
		5	9														
		4															
		9															
		8															
		17															
-25.3	107.5	4				96' to 107.5': SAND, silty, cemented sand, trace fine to coarse shells, gray to light gray, (SM)											
		9															
		8	17														
		6															
		11															
		8	19														
		6															
		5	11														
		8															
		9															
		9	18														
		8															
7																	
-26.3	108.5	5	12			107.5' to 108.5': CLAY, greenish gray, (CH)											
		8															
		3															
		8															
		5															
		3	8														
		3															
		5															
		8															
		2	3														
		3															
		5															
8																	
-28.8	111.0	3				108.5' to 111': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, greenish gray, (SC)											
		5	8														
		2															
		2															
		7	9														
		7															
		7															
		7															
		7															
		7															
		7															
		7															
7																	
7																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,505,913.1 E 597,569.2					ELEVATION TOP OF BORING 82.2		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
-34.8	117.0	5				111' to 117': SAND, with clay, trace fine to coarse phosphate, grayish brown, (SP-SC) (continued)		75								
		10	29													
		19														
		14														
		29	56													
-39.3	121.5	27				117' to 121.5': SAND, clayey, trace fine to coarse phosphate, grayish brown, (SC)		76								
		3														
		13	37													
		24														
		13														
-42.8	125.0	17				121.5' to 125': SAND, with clay, trace fine to coarse phosphate, grayish brown, (SP-SC)		77								
		19	36													
		8														
		26	66													
		40														
		18						78								
		27	57													
		30														
		15														
		18	36													
		18						79								
		9														
		12	30													
		18														
		9														
		14						80								
		21	35													
		26														
		9														
		14														
		21						81								
		26														
		9														
		14														
		21														
		26						82								
		9														
		14														
		21														
		26														
		26						83								
		9														
		14														
		21														
		26														

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
				10. SIZE AND TYPE OF BIT		VERTICAL NAVD88											
2. HOLE NUMBER TH-13		LOCATION COORDINATES N 1,506,115.0 E 597,168.7		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45													
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 20											
				13. TOTAL NUMBER CORE BOXES		0											
4. NAME OF DRILLER Graham Bowden				14. ELEVATION GROUND WATER													
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG FROM VERTICAL ---		BEARING		15. DATE BORING STARTED 6/21/11 COMPLETED 6/21/11											
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.4													
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A													
8. TOTAL DEPTH OF BORING (ft) 75.0				18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist													
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
77.9	4.5	1			[Symbol]	0' to 4.5': SAND, trace silt, brown, (SP)		1									0.0
		4															
		6	10														
		9			[Symbol]			2	0	97	2.7			23	SP	2.5	
		15															
		13	28														
74.9	7.5	7			[Symbol]	4.5' to 7.5': SAND, trace silt, dark brown, (SP)		3									
		9															
		9	18														
		7			[Symbol]			4									
		6															
		5	11														
74.9	7.5	4			[Symbol]			5	0	97	3.3			23	SP	7.5	
		6															
		7	13														
		5			[Symbol]	7.5' to 17': SAND, silty, very dark brown, (SM)		6									
		5															
		13	18														
		25			[Symbol]			7	0	79	21.0			33	SM	10.0	
		53															
		51	104														
65.4	17.0				[Symbol]			8									
		16															
		23			[Symbol]			9									
		17	40														
					[Symbol]	17' to 32': SAND, with silt, reddish brown, (SP-SM)											
		8															
		12			[Symbol]												
		16	28														
					[Symbol]												
		9															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,506,115.0 E 597,168.7					ELEVATION TOP OF BORING 82.4		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
50.4	32.0	13	27			17' to 32': SAND, with silt, reddish brown, (SP-SM) <i>(continued)</i>		10	0	94	6.4			29	SP-SM	
		14														
		7														
45.4	37.0	11	14			32' to 37': SAND, trace silt, dark brown, (SP)		11								
		16														
		7														
40.4	42.0	9	16			37' to 42': SAND, silty, calcareous, greenish gray, (SM)		13			18.5		27	SM		
		7														
		7														
33.9	48.5	5	10			42' to 48.5': SAND, clayey, greenish gray, (SC)		14			34.2	35	14	38	SC	
		5														
		5														
30.4	52.0	4	20			48.5' to 52': SAND, silty, calcareous, greenish gray, (SM)		15			37.0	NP	NP	39	SM	
		7														
		13														
						52' to 57': CLAY, sandy, calcareous, greenish gray, (CL)										

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)

INSTALLATION

SHEET 3
OF 3 SHEETS

PROJECT

OUC 90-Acre Landfill Expansion

COORDINATE SYSTEM

State Plane

HORIZONTAL

NAD83

VERTICAL

NAVD88

LOCATION COORDINATES

N 1,506,115.0 E 597,168.7

ELEVATION TOP OF BORING

82.4

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
25.4	57.0	4				52' to 57': CLAY, sandy, calcareous, greenish gray, (CL) <i>(continued)</i>										
		3						16			71.3	48	31	47	CL	
		4	7													
10.4	72.0					57' to 72': SAND, with silt, calcareous, trace fine to coarse shells, gray, (SP-SM)										
		36						17								
		44														
		37	81													
		13						18								
		21														
		21	42													
		15						19			11.9			30	SP-SM	
		19														
		28	47													
7.4	75.0					72' to 75': SAND, silty, calcareous, trace shell, gray, (SM)										
		4						20			40.4			34	SM	
		7														
		11	18													

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-14

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-14				LOCATION COORDINATES N 1,506,102.5 E 596,728.0		10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit										
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 84 UNDISTURBED 0										
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/23/11		STARTED 6/23/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.7		COMPLETED 6/27/11										
8. TOTAL DEPTH OF BORING (ft) 125.0				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer										
ELEV	DEPTH	BLOWS/0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
81.2	1.5	1				0' to 1.5': SAND, trace silt, brown, (SP)	67	1	0	97	3.3			15	SP	
		2														
		4	6													
		5				1.5' to 11': SAND, with silt, dark brown, (SP-SM)	100	2								
		7														
		6	13													
		5					100	3								
		7														
		7														
		19					100	4	0	94	6.5			22	SP-SM	
		28	47													
		12					100	5								
		20														
		21	41													
		11					67	6								
		18														
		22	40													
		13					100	7								
		18														
		20	38													
71.7	11.0	5				11' to 22.5': SAND, trace silt, brown, (SP)	100	8								
		9														
		12	21				100	9								
		4														
		9					100	10								
		13	22													
		4					100	11	0	96	4.1			30	SP	
		9														
		13	22				67	12								
		6														
		10					67	13								
		13	23													
		4					67	14								
		8														
		9	17													
		4					67	15								
		5														
		4	9													
		2					67	16	0	95	4.9			30	SP	
		3														
60.2	22.5	7	10			22.5' to 30': SAND, trace silt, light brown, (SP)	67	16	0	95	4.9			30	SP	
		1														
		1														
		2	3													

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,102.5 E 596,728.0					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
52.7	30.0	1				22.5' to 30': SAND, trace silt, light brown, (SP) (continued)	33	17									25.0
		1															
		3	4														
		2															
		2															
49.2	33.5	1				30' to 33.5': CLAY, lamination of fine grained quartz and phosphate, green, (CH)	100	21			77.2			55	CH	30.0	
		1	2														
		1															
		W/R															
		1	2														
45.2	37.5	2				33.5' to 37.5': SAND, with silt, trace fine to coarse shells, gray, (SP-SM)	100	23								35.0	
		4															
		6	10														
		2															
		4															
35.2	47.5	5				37.5' to 47.5': SAND, silty, trace fine to coarse shell, green, (SM)	100	26								40.0	
		5	9														
		4															
		5															
		5	10														
		2															
		2															
		3	5														
		6															
		6	12														
		4															
		5															
		6	11														
34.2	48.5	3				47.5' to 48.5': CLAY, lamination of fine grained quartz and phosphate, green, (CH)	100	32			80.7	91	67	62	CH	47.5	
		3															
		3															
		3	7														
		4															
33.2	49.5	W/H				48.5' to 49.5': SAND, silty, trace clay, trace fine to coarse shells, green, (SM)	100	33								50.0	
		2															
		2	4														
		W/R															
		W/R															
		W/R				49': loss circulation while driving the split spoon to 49', water table at 4.5' BGS, pump is able to overcome formation losses	33	35			77.6	100	71	86	CH	52.5	
		W/R															
		W/R															
		W/R															
		2															
		2				49.5' to 54': CLAY, green, (CH)											

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,506,102.5 E 596,728.0					ELEVATION TOP OF BORING 82.7											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	U	PI	MC	ASTM Class	
28.7	54.0	3 4	7			49.5' to 54': CLAY, green, (CH) (continued)	100	36			97.8	107	74	75	CH	
		3 3 3	6			54' to 60': SAND, clayey, few fine to coarse shells, green, (SC)	100	37								55.0
		2 2 6	8				100	38								
		2 2 4	6				100	39								57.5
22.7	60.0	1 2 4	6				100	40			47.7			46	SC	
		1 3 6	9			60' to 62': CLAY, sandy, trace fine to coarse shells, green, (CH)	100	41			56.1	54	36	54	CH	60.0
20.7	62.0	4 15 21	36			62' to 67.5': SAND, few fine to coarse shells, trace silt, gray, (SP)	100	42								62.5
		6 9 11	20					43								
		6 8 12	20					44								65.0
15.2	67.5	1 1 5	6					45								
		11 8 10	18			67.5' to 75': SAND, silty, trace to coarse shells, gray, (SM)	46			24.0			36	SM		67.5
		5 8 7	15				47									70.0
		5 5 15	20				48									
		5 7 6	13				49									72.5
7.7	75.0	4 11 10	21				50									75.0
		W/H W/H				75' to 76.5': SAND, clayey, few fine to coarse shells, greenish gray, (SC)	51			36.4			36	SC		
6.2	76.5	2 6 9	2			76.5' to 79.5': CLAY, sandy, few fine to coarse shells, greenish gray, (CL)	100	52			77.6	31	9	31	CL	77.5
		4 4 8	12				100	53			76.8			31	CL	
3.2	79.5	8 17 14	31			79.5' to 82.5': SAND, silty, few fine to coarse shells, greenish gray, (SM)	100	54								80.0
		7 10					80	55								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,506,102.5 E 596,728.0					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
0.2	82.5	10	20			82.5' to 91.5': SAND, silty, cemented sand, few fine to coarse shells, greenish gray, (SM)	100	56										82.5
		4						80	57			38.5		27	SM			85.0
		11	25															
		14																
		1																
		6																
		12	18															
		12																
		15						100	58									
		15	30															
		4					100	59										
		2																
		3	5															
		2					100	60										
		8																
		15	23															
		7					100	61										
-8.8	91.5	7																
		7	14															
		4				91.5' to 94.5': SAND, clayey, few fine to coarse shells, greenish gray, (SC)	100	62										
		9																
		11	20															
		5					67	63										
-11.8	94.5	6																
		7	13															
		8				94.5' to 99': SAND, with silt, few fine to coarse shells, greenish gray, (SP-SM)	100	64										
		17																
		31	48															
		6						100	65									
		11																
		18	29															
		10					100	66										
-16.3	99.0	15																
		22	37															
		7				99' to 109.5': SAND, silty, trace fine to coarse shells, trace fine phosphate, greenish gray, (SM)	100	67										
		10																
		7	17															
		11						100	68									
		13																
		14	27					100	69									
		6																
		6						100	70									
		20	26															
		8						100	71									
		5																
		13	18				100	72										
		7																
		7					100	73										
		4	11															
		4																
		7																
		14	21															
		7					100	74										
		6																
-26.8	109.5	7	13															
		10				109.5' to 115.5': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SC)	100	74										
		11																
		16	27															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)				INSTALLATION		SHEET 5 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,506,102.5 E 596,728.0				ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-32.8	115.5	8				109.5' to 115.5': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SC) (continued)	100	75			12.9				20	SC	
		10	20														
		18															
		29	50				100	76									
		50	/6"	/6"			100	77									
		8	51														
-42.3	125.0	22				115.5' to 125': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate, grayish brown, (SP-SC)	100	78									
		29															
		9	56														
		19															
		37															
		5	19														
		6															
		13															
		4	34														
		15															
19																	
14	56																
23																	
33							113	82			7.8		21	SP-SC			
17	50																
36	/4"	/4"															
50																	
10	41						100	83									
		17															
		24															

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-15				LOCATION COORDINATES N 1,506,520.2 E 596,734.1		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 22		DISTURBED 0										
4. NAME OF DRILLER Graham Bowden				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		15. DATE BORING 6/21/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.8		STARTED 6/21/11										
8. TOTAL DEPTH OF BORING (ft) 75.0				17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 6/22/11										
				18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
		1				0' to 3': SAND, grayish brown, (SP)		1								
		1														
		4	5													
		4						2								
79.8	3.0	5														
		4	9													
		5				3' to 4.5': SAND, dark brown, (SP)										
		4						3								
78.3	4.5	5														
		4														
		4				4.5' to 7.5': SAND, with silt, dark brown, (SP-SM)		4								
		6	10													
		7						5								
75.3	7.5	10														
		23	33													
		13				7.5' to 9': SAND, silty, organic silt, dark brown, (SM)		6			12.2			21	SM	
		22														
73.8	9.0	45	67													
		50				9' to 12': SAND, with silt, dark brown, (SP-SM)		7								
		83														
		63	146													
70.8	12.0															
						12' to 22': SAND, brown, (SP)										
		20						8								
		30														
		33	63													
		9						9								
		12														
		14	26													
60.8	22.0															
						22' to 32': SAND, trace silt, very light brown, (SP)										
		5														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,520.2 E 596,734.1					ELEVATION TOP OF BORING 82.8		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
50.8	32.0	8	14			22' to 32': SAND, trace silt, very light brown, (SP) (continued)		10									
		6															
		16															
47.8	35.0	20	36			32' to 35': SAND, with silt, greenish gray, (SP-SM)		11									
		1															
		1															
40.8	42.0	1	2			35' to 42': SAND, silty, greenish gray, (SM)		12									
		1															
		1															
30.8	52.0	W/H				42' to 52': CLAY, greenish gray, (CH)		13									
		3															
		3															
		8				52' to 57': SAND, clayey, shells, greenish gray, (SC)		14		14.9			22	SM			
		9															
		12							21								
		3						15									
		4															
		6							10								
		3						16		66.6	58	41	42	CH			
		4															
		7							11								
		3						17		92.6	91	67	64	CH			
		4															
		4							8								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,520.2 E 596,734.1					ELEVATION TOP OF BORING 82.8		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
25.8	57.0	4				52' to 57': SAND, clayey, shells, greenish gray, (SC) (continued)		18									55.0
		7															
		18	25														
15.8	67.0	24				57' to 67': SAND, with silt, fine to coarse shells, greenish gray, (SP-SM)		19									57.5
		38															
		38	76														
		17															
		24															
		25	49														
10.8	72.0	10				67' to 72': SAND, silty, fine to coarse shells, greenish gray, (SM)		21									62.5
		20															
		25	45														
7.8	75.0	16				72' to 75': SAND, clayey, fine to coarse shells, greenish gray, (SC)		22			32.8			39	SC		65.0
		11															
		6	17														

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-16

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-16				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88										
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME-45		DISTURBED 83										
4. NAME OF DRILLER Graham Bowden				12. TOTAL SAMPLES		UNDISTURBED 0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER										
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/22/11		STARTED 6/22/11										
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.3		COMPLETED 6/24/11										
8. TOTAL DEPTH OF BORING (ft) 125.0				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
76.3	6.0	1				0' to 6': SAND, grayish brown, (SP)		1								
		1														
		4	5													
		4														
		7														
		6	13													
		5														
		5														
		8	13													
73.3	9.0	3				6' to 9': SAND, trace silt, dark brown, (SP)		2	0	98	2.1					
		5														
		5	10													
		3														
		5														
		6	11													
		8														
		12														
		18	30													
71.8	10.5	8				9' to 10.5': SAND, silty, trace organic, very dark brown, (SM)		3								
		11														
		18														
		19	37													
		8														
		14														
		17	31													
		7														
		16														
68.8	13.5	20	36			10.5' to 13.5': SAND, with silt, dark brown, (SP-SM)		5								
		8														
		12														
		14	26													
		7														
		8														
		9	17													
		3														
		7														
		9	16			13.5' to 25.5': SAND, brown, (SP)		6	0	93	7.2					
		5														
		6														
		9	15													
		5														
		5														
		6	11													
		3														
		5														
		6														
		10														
		11														
		12														
		13	0	96				3.7								
		14														
		15														
16																

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,506,520.1 E 597,173.2					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
56.8	25.5	2 3 4	7			13.5' to 25.5': SAND, brown, (SP) (continued)		17										25.0
		3 3 4	7			25.5' to 30': SAND, grayish brown, (SP)		18										
		3 3 7	10					19	0	95	4.7			29	SP			27.5
52.3	30.0	4 4 5	9					20										30.0
50.8	31.5	1 2 4	6			30' to 31.5': SAND, trace silt, dark brown, (SP)		21										
		2 1 1	2			31.5' to 34.5': SAND, silty, greenish gray, (SM)		22	0	87	13.1			30	SM			32.5
47.8	34.5	W/H 1 W/H	1					23										
46.3	36.0	3 5 9	14			34.5' to 36': SAND, clayey, grayish brown, (SC)		24										35.0
		3 2 4	6			36' to 46.5': SAND, silty, trace clay, fine to coarse shells, greenish gray, (SM)		25										37.5
		2 3 5	8					26		30.4	NP	NP		27	SM			40.0
		3 5 6	11					27										
		1 1 3	4					28		29.8				34	SM			42.5
		3 5 7	12					29										
		3 3 4	7					30										45.0
35.8	46.5	2 3 5	8					31		36.6	NP	NP		42	SM			
34.3	48.0	3 4 4	8			46.5' to 48': SAND, clayey, fine to coarse shells, greenish gray, (SC)		32										47.5
		2 2 4	6			48' to 51': CLAY, sandy, fine to coarse shells, greenish gray, (CH)		33		86.8				59	CH			50.0
31.3	51.0	1 1 2	3					34		97.2	103	79	79	CH				52.5
29.8	52.5	1 2 3	5			51' to 52.5': CLAY, trace fine to coarse shells, greenish gray, (CH)		35										
		2																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,506,520.1 E 597,173.2					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
28.3	54.0	2 3	5			52.5' to 54': SAND, clayey, fine to coarse shells, greenish gray, (SC) (continued)		36			31.3			40	SC	55.0
26.8	55.5	1 3 3	6			54' to 55.5': CLAY, fine to coarse shells, greenish gray, (CH)		37			76.9			43	CH	
		2 5 4				55.5' to 58.5': SAND, clayey, fine to coarse shells, greenish gray, (SC)		38								
23.8	58.5	2 2 3	5					39			40.3	46	32	43	SC	57.5
		3 13 16	29			58.5' to 63': SAND, with silt, mostly, fine to coarse shells, light brown, (SP-SM)		40								60.0
		16 18 18						41								
19.3	63.0	11 11 9	20					42								62.5
		8 10 11	21					43								
		11 7 10	17					44								65.0
		5 8 11	19					45								67.5
		5 8 12	20					46								
		7 10 10	20					47								70.0
10.3	72.0	3 8 7	15					48								
		3 4 5	9			72' to 76.5': SAND, silty, trace fine to coarse shells, gray, (SM)		49			39.0	NP	NP	35	SM	72.5
		2 5 11	16					50								
5.8	76.5	6 3 4	7					51			38.6			40	SM	75.0
		3 4 8	12			76.5' to 78': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)		52			77.7			38	CH	77.5
4.3	78.0	6 7 11	18					53								
		8 10 13	23			78' to 84': SAND, silty, gray, (SM)		54								80.0
		2 4						55								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,506,520.1 E 597,173.2					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-1.7	84.0	7 3 4 9	11 13			78' to 84': SAND, silty, gray, (SM) (continued)		56										82.5
-3.2	85.5	9 12 6	 18			84' to 85.5': SAND, silty, cemented sand, gray, (SM)		57										85.0
-7.7	90.0	7 5 6 5 10 9 5 12 13	 11 19 25			85.5' to 90': SAND, clayey, cemented sand, trace fine to coarse phosphate, greenish gray, (SC)		58 59 60										87.5 90.0
-18.2	100.5	5 7 10 4 5 6 4 7 11 11 12 6 3 6 9 7 4 13 6 7 13	 17 11 18 18 15 17 20			90' to 100.5': SAND, silty, cemented sand, trace fine to coarse phosphate, greenish gray, (SM)		61 62 63 64 65 66 67										92.5 95.0 97.5 100.0
-22.7	105.0	6 6 10 23 16 8 10 10 6	 16 24 16			100.5' to 105': SAND, silty, fine to coarse shells, cemented sand, trace fine to coarse phosphate, greenish gray, (SM)		68 69 70										102.5 105.0
-27.2	109.5	5 3 4 3 5 8 9 20 22	 7 13 42			105' to 109.5': SAND, with silt, fine to coarse phosphate, grayish brown, (SP-SM)		71 72 73										107.5
		9 8 17	 25			109.5' to 114': SAND, clayey, fine to coarse phosphate, grayish brown, (SC)		74										110.0

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,520.1 E 597,173.2					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-31.7	114.0	10				109.5' to 114': SAND, clayey, fine to coarse phosphate, grayish brown, (SC) (continued)		75									112.5
		15	36														
		21															
		13															
-39.2	121.5	19	36			114' to 121.5': SAND, with clay, fine to coarse phosphate, grayish brown, (SP-SC)		76									115.0
		17															
		10															
		16	39														
		23															
		6															
		11	29														
		18															
		6															
		8	23														
		15															
		-42.7	125.0	9						121.5' to 125': SAND, clayey, trace fine to coarse phosphate, grayish brown, (SC)		77					
13	30																
17																	
8																	
12	28																
16																	
6																	
5	11																
		7						78								120.0	
		11	18														
		24															

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS										
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER TH-17				LOCATION COORDINATES N 1,506,719.3 E 597,547.5		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 83		DISTURBED 0										
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 81.2		15. DATE BORING 7/26/11										
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 7/28/11										
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Stevens Gregory Geotechnical Engineer												
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
79.7	1.5	5 6 8	14			0' to 1.5': SAND, silty, brown (SM)	60	1	0	88	12.2			15	SM	0.0
76.7	4.5	9 15 14	29			1.5' to 4.5': SAND, with silt, brown (SP-SM)	50	2								2.5
		5 6 7	13				50	3	0	95	5.5			23	SP-SM	
		5 7 9	16			4.5' to 10.5': SAND, dark brown, (SP)	100	4								5.0
		9 11 15	26				100	5	0	96	4.1			24	SP	7.5
		19 16 22	38				100	6								7.5
70.7	10.5	19 22 25	47				100	7								10.0
		1 5 6	11			10.5' to 13.5': SAND, with silt, dark brown, (SP-SM)	70	8	0	93	7.0			28	SP-SM	
67.7	13.5	3 5 7	12				60	9								12.5
		7 8 6	14			13.5' to 16.5': SAND, with silt, organic silt, dark brown, (SP-SM)	60	10	0	89	11.3			24	SP-SM	
		1 4 5	9				60	11								15.0
64.7	16.5	6 9 6	15			16.5' to 24': SAND, with silt, reddish brown, (SP-SM)	60	12								17.5
		1 3 6	9				50	13								17.5
		4 8 8	16				40	14	0	91	9.3			29	SP-SM	20.0
		5 11 13	24				50	15								22.5
57.2	24.0	5 12 15	27				60	16								22.5

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 2 OF 5 SHEETS						
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL		VERTICAL						
						State Plane		NAD83		NAVD88						
LOCATION COORDINATES						ELEVATION TOP OF BORING										
N 1,506,719.3 E 597,547.5						81.2										
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
52.7	28.5	6				24' to 28.5': SAND, brown, (SP)	40	17	0	95	4.6			32	SP	25.0
		7														
		11	18													
		4					50	18								27.5
		8														
		11	19													
		4					50	19								
		7														
		11	18													
		4				28.5' to 34.5': SAND, with silt, brown, (SP-SM)	40	20	0	93	7.2			33	SP-SM	30.0
		9														
		11	20													
		3					50	21								32.5
		5														
		5	10													
		2					60	22								
		4														
		6	10													
		2					60	23								
		2														
		2														
46.7	34.5	4	6													
45.2	36.0	2				34.5' to 36': SAND, grayish brown, (SP)	50	24	0	95	4.6			30	SP	35.0
		5														
		5	10													
43.7	37.5	1				36' to 37.5': SAND, clayey, greenish gray, (SC)	50	25			19.9			27	SC	37.5
		7														
		4	11													
		1				37.5' to 40.5': SAND, grayish brown, (SP)	40	26								40.0
		4														
		8	12													
40.7	40.5	3					30	27								
		7														
		11	18													
39.2	42.0	1				40.5' to 42': SAND, clayey, greenish gray, (SC)	80	28			24.5			30	SC	42.5
		2														
		1	3													
37.7	43.5	W/H				42' to 43.5': SAND, silty, greenish gray, (SM)	80	29								45.0
		1														
		1	2													
		W/H				43.5' to 52.5': SAND, clayey, greenish gray, (SC)	100	30			22.5			36	SC	
		1														
		1	2													
		1					60	31								47.5
		1														
		1	2													
		W/H					100	32			34.1			34	SC	
		1														
		1	2													
		1					80	33								50.0
		1														
		1	2													
		W/H					100	34			28.0			34	SC	
		1														
		1	2													
		W/H					80	35			25.6			35	SC	52.5
		1														
		1	2													
28.7	52.5	W/H														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,506,719.3 E 597,547.5					ELEVATION TOP OF BORING 81.2											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
24.2	57.0	1				52.5' to 57': CLAY, few fine to coarse shells, greenish gray, (CH) (continued)	80	36			98.2	109	83	65	CH	55.0
		3	4													
		2														
		3														
		4	7				80	37								
		1					80	38		62.6	99	75	46	CH		
22.7	58.5	1				57' to 58.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	70	39		40.9			25	SC	57.5	
		3														
		2	5													
16.7	64.5	3				58.5' to 64.5': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	60	40							60.0	
		5														
		6	11													
		4														
		4														
		4	8													
		5														
		7														
		8	15			80	42							62.5		
		5				80	43									
13.7	67.5	6				64.5' to 67.5': SAND, silty, trace fine to coarse shells, greenish gray, (SM)		44							65.0	
		7														
		6	13													
		2														
		1					45		14.8			27	SM			
		1	2											67.5		
9.2	72.0	W/H				67.5' to 72': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	80	46								
		1	2													
		2														
		2														
		4	6				100	47		24.9		37	SM	70.0		
		3														
		3												72.5		
6.2	75.0	5				72' to 75': SAND, silty, mostly fine to coarse shells, greenish gray, (SM)	100	49								
		5	10													
		6														
		10														
		4	14				33	50						75.0		
3.2	78.0	1				75' to 78': CLAY, sandy, greenish gray, (CL)	100	51		51.1	41	25	34		CL	
		2														
		2	4													
		3														
		4					100	52						77.5		
		7	11			78' to 82.5': SILT, sandy, trace fine to coarse shells, gray, (ML)	100	53		54.6			32		ML	
		5														
		7														
		10	17													
		6												80.0		
		7					100	54								
		11	18													
		5					100	55								
		11														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 4 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL									
						State Plane		NAD83	NAVD88									
LOCATION COORDINATES N 1,506,719.3 E 597,547.5						ELEVATION TOP OF BORING 81.2												
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-1.3	82.5	7	18			82.5' to 88.5': SAND, silty, trace fine to coarse shells, cemented sand, (SM)											82.5	
		9					100	56										
		10																
		11	21															
		4					100	57										85.0
		7																
		5	12														85.0	
		3																
		7				100	58											
		8	15															
		6				100	59										87.5	
-7.3	88.5	2				88.5' to 93': SAND, with silt, mostly fine to coarse shells, cemented sand, gray, (SP-SM)												
		11	13				100	60			11.4			29	SP-SM			
		6																
		7					100	61										90.0
		6	13															
		5																
		7																
		7	14															
		14				70	62										92.5	
-11.8	93.0	13	27			93' to 102': SAND, silty, few fine to coarse shells, cemented sand, gray, (SM)												
		7					50	63										
		13	24															
		7					70	64										95.0
		9																
		10	19															
		7																
		8				80	65										97.5	
		8	16															
		9				100	66											
		12																
		17	29															
		11				100	67										100.0	
		18	26															
		8																
		10				70	68											
-20.8	102.0	9				102' to 103.5': SAND, clayey, trace fineto coarse phosphate, trace fine shells, greenish gray, (SC)												
		11	20				70	69			12.3			27	SC			102.5
-22.3	103.5	3																
		4	8															
		4																
		3				103.5' to 114': SAND, with clay, trace fine to coarse phosphate, greenish gray, (SP-SC)	70	70										
		5																
		9	14				100	71			11.7			30	SP-SC			105.0
		6																
		6	14															
		8																
		6				100	72										107.5	
		7																
		11	18															
		7				100	73											
		11																
		14	25															
		4																
		8				85	74										110.0	
		16	24															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 5 OF 5 SHEETS						
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88						
LOCATION COORDINATES N 1,506,719.3 E 597,547.5						ELEVATION TOP OF BORING 81.2										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
-32.8	114.0	8				103.5' to 114': SAND, with clay, trace fine to coarse phosphate, greenish gray, (SP-SC) (continued)	100	75								112.5
		14	34													
		20														
		11														
-35.8	117.0	19	39			114' to 117': SAND, clayey, trace fine to coarse phosphate, greenish gray, (SC)	70	76								115.0
		20														
		12														
		18	33													
-35.8	117.0	15				117' to 125': SAND, with clay, trace fine to coarse phosphate, greenish gray, (SP-SC)	60	78								117.5
		8														
		15	38													
		23														
		8														
		6	15													
		9														
		6														
		13	28													
		15														
		13														
		19	41													
-43.8	125.0	22					70	81								120.0
		5														
		6	16													
		10														
		8														
		11	29													
		18														
		27														

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

TH-18

[illegible]

DRILLING LOG (Cont Sheet)					INSTALLATION			SHEET 2 OF 3 SHEETS								
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88							
LOCATION COORDINATES N 1,506,929.0 E 597,121.7					ELEVATION TOP OF BORING 82.3											
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
55.3	27.0	9	20			17' to 27': SAND, with silt, brown, (SP-SM) (continued)		10	0	94	5.8			30	SP-SM	
50.3	32.0	4	16			27' to 32': SAND, brown, (SP)		11								
		7														
		9														
45.3	37.0	5	10			32' to 37': SAND, gray, (SP)		12								
		6														
		4														
40.3	42.0	W/H	W/H			37' to 42': SAND, silty, trace clay, greenish gray, (SM)		13		20.4			32	SM		
		W/H														
		W/H														
38.8	43.5	W/H	W/H			42' to 43.5': SAND, clayey, greenish gray, (SC)		14		41.3	42	26	40	SC		
		W/H														
32.3	50.0	1	3			43.5' to 50': SAND, silty, greenish gray, (SM)		15								
		2														
		3														
		2	7			50' to 55': CLAY, greenish gray, (CH)		16		22.3			25	SM		
		3														
		4														
		1	3					17		93.0	96	76	69	CH		
		2														
		3														
		3	7					18								
		3														
		4														

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,506,929.0 E 597,121.7					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
27.3	55.0	1 2 2 3	4			50' to 55': CLAY, greenish gray, (CH) (continued)		19			93.3	108	76	75	CH	
		2 22 33	55			55' to 62': SAND, with silt, fine to coarse shells, grayish brown, (SP-SM)		20								55.0
																57.5
		16 25 33	58					21								60.0
20.3	62.0					62' to 72': SAND, silty, trace fine to coarse shells, greenish gray, (SM)										62.5
		4 8 9	17					22								65.0
																67.5
		5 11 22	33					23			17.2			33	SM	70.0
10.3	72.0					72' to 75': CLAY, sandy, fine to coarse shells, greenish gray, (CL)										72.5
		4 5 13	18					24			62.1	44	26	37	CL	75.0

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88											
2. HOLE NUMBER TH-19		LOCATION COORDINATES N 1,506,922.0 E 596,728.2		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55													
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 83		DISTURBED 0											
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0													
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
				14. ELEVATION GROUND WATER													
				15. DATE BORING 5/31/11		STARTED COMPLETED 6/3/11											
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.8													
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A													
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer													
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
Gravel	Sand	Fines	LL	PI	MC	ASTM Class											
		1				0' to 5': SAND, brown, (SP)	100	1									0.0
		1															
		4	5														
		6															
		7															
		9	16														2.5
		9															
		9															
		12	21														
77.8	5.0	9															
		8				5' to 13.5': SAND, with silt, dark brown, (SP-SM)	100	4									5.0
		12	20														
		12															
		16	28														7.5
		20															
		23															
		28	51														
		21															
		30															
		41	71														10.0
		3															
		8															
		13	21														
		4															
		5															
69.3	13.5	5	10														12.5
		5															
		5				13.5' to 24': SAND, dark brown to brown, (SP)	100	10									
		6	15														15.0
		5															
		7															
		5	12														
		1															
		3															
		4	7														17.5
		6															
		5															
		8	13														
		5															
		5															
		10	15														20.0
		8															
		9															
		8	17														
		2															
		4															
58.8	24.0	3	7														22.5

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,922.0 E 596,728.2					ELEVATION TOP OF BORING 82.8		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
55.8	27.0	1				24' to 27': SAND, with silt, gray, (SP-SM)	100	17									25.0
		1															
		2	3														
		3															
46.8	36.0	2	4			27' to 36': SAND, clayey, cemented sand, interbedded clay layers, greenish gray, (SC)	100	18									27.5
		2															
		1	3														
		W/H															
		W/H															
		W/H	W/H														
		W/H															
		W/H	W/H														
		W/H	W/H														
		1															
		1															
		2	3														
		1															
		2															
		2	4														
		37.8	45.0	5								36' to 45': SAND, silty, cemented sand, interbedded clay layers, greenish gray, (SM)	100	24			
2																	
4	6																
4																	
3																	
3																	
5																	
3																	
3																	
3	6																
1																	
2																	
3	5																
1																	
3																	
37.8	45.0			2	5			45' to 54': CLAY, with shells, greenish gray, (CH)	100	25							
		3															
		5	8														
		3															
		5															
		7	12														
		3															
		6															
		4	10														
		3															
		3															
		3	6														
		1															
		2															
		3	5														
		37.8	45.0	1								36' to 45': SAND, silty, cemented sand, interbedded clay layers, greenish gray, (SM)	100	26			
3																	
5																	
7	12																
3																	
6																	
4	10																
3																	
3																	
3	6																
1																	
2																	
3	5																
1																	
3																	
2	5																
37.8	45.0	1				45' to 54': CLAY, with shells, greenish gray, (CH)	100	27								37.5	
		2															
		2	4														
		W/H															
		W/H															
		2	2														
		W/H															
		1															
		3	4														
		1															
		2															
		5	7														
		W/H															
		4															
		2	6														
		2															

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,506,922.0 E 596,728.2					ELEVATION TOP OF BORING 82.8												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
28.8	54.0	4 13	17				100	36									
		5 15				54' to 58.5': SAND, with silt, grayish brown, (SP-SM)	100	37									55.0
		20 35															
		5 29					100	38									
		25 54															
		5 8					100	39									57.5
24.3	58.5	20 28															
		6 16				58.5' to 66': SAND, trace fine to coarse shells, gray, (SP)	100	40									60.0
		21 37															
		13 13					100	41									62.5
		11 24															
		10 11					100	42									65.0
		12 23															
		8 7					100	43									
		10 17															
		6 9					100	44									67.5
16.8	66.0	10 19															
		4 5				66' to 72': SAND, with silt, trace fine to coarse shells, gray (SP-SM)	100	45									70.0
		7 12															
		7 9					100	46									
		10 19															
		6 7					100	47									72.5
		9 16															
		6 7					100	48									75.0
10.8	72.0	9 16															
		6 6				72' to 76.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	49			27.4		39	SC			77.5
		7 13															
		6 8					100	50									80.0
		9 17															
		7 2					100	51			33.4		38	SC			
6.3	76.5	2 4															
		2 1				76.5' to 81': CLAY, sandy, with trace fine to coarse shells, greenish gray, (CL)	100	52									
		2 3															
		2 2					100	53			84.4	49	31	48	CL		
		2 4															
		2 3					100	54									
1.8	81.0	7 10															
		5 4				81' to 85.5': CLAY, sandy, cemented sand, trace fine to coarse shells, greenish gray, (CH)	100	55			53.2		38	CH			

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS												
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
LOCATION COORDINATES N 1,506,922.0 E 596,728.2					ELEVATION TOP OF BORING 82.8		VERTICAL NAVD88												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
-2.8	85.5	5	9			81' to 85.5': CLAY, sandy, cemented sand, trace fine to coarse shells, greenish gray, (CH) (continued)													
		8																	
		9	16																
		7																	
		8					100	56											
		8					100	57											
		10	18																
-14.8	97.5	5				85.5' to 97.5': SAND, silty, cemented sand, trace fine to coarse shells, greenish gray, (SM)	100	58			49.2	NP	NP	25	SM				
		2	5																
		3																	
		2																	
		5																	
		9	14																
		1																	
		5																	
		8	13																
		3																	
		4																	
		6	10																
		7																	
		5	12																
		5																	
		4																	
8	12																		
4																			
4																			
5	9																		
5																			
6																			
6	12																		
-17.8	100.5	5				97.5' to 100.5': SAND, with silt, cemented sand, greenish gray, (SP-SM)	100	66											
		9																	
		7	16																
		3																	
		7																	
		6	13																
-22.3	105.0	8				100.5' to 105': SAND, silty, trace fine to coarse phosphate, cemented sand, light greenish gray, (SM)	100	68			30.9	NP	NP	42	SM				
		3																	
		4	7																
		2																	
		6																	
		10	16																
		1																	
2																			
3	5																		
-23.8	106.5	2				105' to 106.5': SAND, clayey, trace fine to coarse phosphate, cemented sand, light greenish gray, (SC)	100	71			16.5			30	SC				
		3																	
		6	9																
		7				106.5' to 114': SAND, with silt, few fine to coarse shells, grayish brown, (SP-SM)	100	72											
		18																	
		29	47																
		4																	
		6																	
		9	15																
		4																	
		7																	
13	20																		

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 5 OF 5 SHEETS						
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane			HORIZONTAL NAD83		VERTICAL NAVD88					
LOCATION COORDINATES N 1,506,922.0 E 596,728.2						ELEVATION TOP OF BORING 82.8										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
-31.3	114.0	7				106.5' to 114': SAND, with silt, few fine to coarse shells, grayish brown, (SP-SM) (continued)	100	75								112.5
		15	35													
		20														
		6														
-35.8	118.5	9	25			114' to 118.5': SAND, clayey, trace fine to coarse shells, grayish brown, (SC)	100	76			11.0		25	SP-SM	115.0	
		16														
		7														
		17	41													
-35.8	118.5	24				114' to 118.5': SAND, clayey, trace fine to coarse shells, grayish brown, (SC)	100	77			17.2		27	SC	117.5	
		18														
		29	56													
		27														
-35.8	118.5	11				114' to 118.5': SAND, clayey, trace fine to coarse shells, grayish brown, (SC)	100	78							120.0	
		16	30													
		14														
		7														
-42.3	125.0	16				118.5' to 125': SAND, greenish gray, (SP)	100	80							122.5	
		38	75													
		37														
		4														
-42.3	125.0	13	25			118.5' to 125': SAND, greenish gray, (SP)	100	81							125.0	
		12														
		4														
		8	26													
-42.3	125.0	18				118.5' to 125': SAND, greenish gray, (SP)	100	82							125.0	
		6														
		9	17													
		8														

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-20

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-20				10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit		VERTICAL NAVD88											
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		DISTURBED 26											
4. NAME OF DRILLER R. Cabral				12. TOTAL SAMPLES		UNDISTURBED 0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER											
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/29/11		STARTED 6/29/11											
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.7		COMPLETED 6/29/11											
8. TOTAL DEPTH OF BORING (ft) 75.0				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Stevens Gregory Geotechnical Engineer											
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
Gravel	Sand	Fines	LL	PI	MC	ASTM Class											
81.2	1.5	W/H 2 3	5			0' to 1.5': SAND, brown, (SP)		1									0.0
		4 5 7	12			1.5' to 13.5': SAND, with silt, dark brown, (SP-SM)		2									2.5
		6 6 9	12					3									
		4 6 9	15					4	0	94	5.8			23	SP-SM		5.0
		9 14 15	29					5									7.5
		1 6 11	17					6									
		10 12 12	24					7									10.0
69.2	13.5																12.5
		9 12 18	30			13.5' to 17': SAND, with silt, trace fine to coarse shells, dark brown, (SP-SM)		8	0	94	6.2			28	SP-SM		15.0
65.7	17.0																
						17' to 22': SAND, with silt, trace fine to coarse shells, reddish brown, (SP-SM)											17.5
		7 10 10	20					9									20.0
60.7	22.0																22.5
						22' to 27': SAND, trace fine to coarse shells, reddish brown, (SP)											
		4															

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,507,275.9 E 596,746.4					ELEVATION TOP OF BORING 82.7		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
55.7	27.0	7	15			22' to 27': SAND, trace fine to coarse shells, reddish brown, (SP) (continued)		10	0	97	2.8			32	SP	
		8														
47.7	35.0	3	5			27' to 35': SAND, with silt, grayish brown, (SP-SM)		11	0	89	10.9			27	SP-SM	
		2														
		1														
		1														
43.2	39.5	W/H	W/H			35' to 39.5': SAND, silty, grayish brown, (SM)		13								
		W/H														
		W/H														
		W/H														
		W/H														
		W/H														
41.7	41.0	W/H	W/H			39.5' to 41': SAND, silty, greenish gray, (SM)		16		24.4	NP	NP	37	SM		
		W/H														
		W/H														
39.2	43.5	1	11			41' to 43.5': SAND, silty, trace clay, greenish gray, (SM)		17								
		4														
		7														
35.2	47.5	2	4			43.5' to 47.5': CLAY, trace fine to coarse shells, greenish gray, (CH)		18		90.6	87	64	52	CH		
		3														
		1														
		2														
30.7	52.0	2	7			47.5' to 52': SAND, silty, cemented sand, trace fine to coarse shells, greenish gray, (SM)		19		94.7	115	86	79	CH		
		3														
		4														
		17														
30.7	52.0	50/5"	50/5"			52' to 57': SAND, with silt, fine to coarse shells, greenish gray, (SP-SM)		20								
		15														
		12														
30.7	52.0	12	24				21		19.9			25	SM			

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,507,275.9 E 596,746.4					VERTICAL NAVD88											
ELEVATION TOP OF BORING 82.7																
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
25.7	57.0	14				52' to 57': SAND, with silt, fine to coarse shells, greenish gray, (SP-SM) (continued)		22								
		25														
		40	65													
20.7	62.0	7				57' to 62': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)		23								
		21														
		21	42													
15.7	67.0	6				62' to 67': SAND, with silt, trace fine to coarse shells, greenish gray, (SP-SM)		24			11.2		32	SP-SM		
		12														
		13	25													
10.7	72.0	5				67' to 72': SAND, silty, trace fine to coarse shells, greenish gray, (SM)		25								
		12														
		11	23													
7.7	75.0	8				72' to 75': CLAY, sandy, trace fine to coarse shells, greenish gray, (CL)		26			77.9	45	27	36	CL	
		6														
		5	11													

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-21

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-21				LOCATION COORDINATES N 1,507,295.8 E 597,140.6		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55											
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 83		DISTURBED 0											
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.3		14. ELEVATION GROUND WATER											
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		15. DATE BORING 6/3/11											
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer													
ELEV	DEPTH	BLOWS/0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
80.3	2.0	1				0' to 2': SAND, light brown, (SP)	67	1									
		2															
		5	7														
		4															
76.3	6.0	9				2' to 6': SAND, with silt, dark brown, (SP-SM)	100	2									
		8	17														
		7															
		7															
		8	15														
		6															
		10															
		13	23														
73.3	9.0	13				6' to 9': SAND, trace silt, dark brown, (SP)	100	5									
		26															
		34	60														
		41															
70.3	12.0	47				9' to 12': SAND, with silt, dark brown, (SP-SM)	100	6			4.2			20	SP		
		46	93														
		40															
		41															
59.8	22.5	42	83			12' to 22.5': SAND, brown to light brown, (SP)	100	7									
		7															
		15															
		13	28														
		4															
		10															
		12	22														
		3															
		7															
		8	15														
		W/H															
		3															
		7	10														
		1															
		3															
		5	8														
3																	
4																	
5	9																
1																	
3																	
3	6																
1																	
1																	
3	4																
		6				22.5' to 25.5': SAND, with silt, light gray, (SP-SM)	100	16									
		5															
		9	14														

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL		VERTICAL							
						State Plane		NAD83		NAVD88							
LOCATION COORDINATES N 1,507,295.8 E 597,140.6						ELEVATION TOP OF BORING 82.3											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
56.8	25.5	4 6 5	11			22.5' to 25.5': SAND, with silt, light gray, (SP-SM) (continued)	100	17			10.0			26	SP-SM	25.0	
55.3	27.0	4 3 3	6			25.5' to 27': SAND, clayey, interbedded clay layers, greenish gray, (SC)	100	18			33.1			34	SC		
53.8	28.5	1 W/H W/H	W/H			27' to 28.5': CLAY, sandy, greenish gray, (CH)	100	19			60.8			56	CL	27.5	
52.3	30.0	W/H W/H W/H	W/H			28.5' to 30': SAND, clayey, greenish gray, (SC)	100	20			37.9	37	21	40	SC	30.0	
44.8	37.5	W/H W/H W/H	W/H			30' to 37.5': SAND, silty, greenish gray, (SM)	100	21									
		W/H 1 W/H					100	22			26.9			35	SM	32.5	
		W/H W/H W/H	W/H		100		23			26.6	NP	NP	34	SM			
		W/H W/H 1	1		35': ... with shells	100	24			21.9			36	SM	35.0		
		2 3 3	6			100	25										
		1 3 4	7			37.5' to 43.5': SAND, silty, trace clay, trace fine to coarse shells, greenish gray, (SM)	100	26								37.5	
		2 2 4	6		100		27			32.9			41	SC	40.0		
2 4 7	11		100	28													
38.8	43.5	2 4 7	11			100	29									42.5	
35.8	46.5	2 1 3	4			43.5' to 46.5': CLAY, with shells, greenish gray, (CH)	100	30			96.4	106	82	74	CH	45.0	
		W/H 1 2					100	31			66.2	60	45	56	CH		
		W/H 1 2	3				46.5' to 49': SAND, clayey, with shells, greenish gray, (SC)	100	32			26.9			36	SC	47.5
2 4 8	12		100	33													
33.3	49.0	4 6 10	16				49' to 55.5': SAND, light greenish gray to brown, (SP)	100	34								50.0
		7 16 18	34			100		35								52.5	
		8															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,507,295.8 E 597,140.6					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
26.8	55.5	16			[Symbol]	49' to 55.5': SAND, light greenish gray to brown, (SP) <i>(continued)</i>	100	36										
		22	38															
		11																
		18																
		23	41				100	37										
11.8	70.5	13			[Symbol]	55.5' to 70.5': SAND, with silt and shells, greenish gray, (SP-SM)	100	38										
		20																
		15	35															
		8																
		13																
		16	29															
		8																
		12																
		14	26												31	SP-SM		
		8																
		10																
		12	22															
		4																
		8																
		10	18															
		5.8	76.5	5					[Symbol]	70.5' to 76.5': SAND, clayey, with shells, greenish gray, (SC)	100	42						
6																		
9	15																	
5																		
8																		
11	19																	
6																		
10																		
12	22																	
6																		
9																		
14	23																	
2.8	79.5	6			[Symbol]	76.5' to 79.5': CLAY, sandy, with shells, greenish gray, (CL)	100	43										
		11																
		6	17															
		3																
5.8	76.5	3			[Symbol]	70.5' to 76.5': SAND, clayey, with shells, greenish gray, (SC)	100	44										
		2																
		2																
		3	5															
5.8	76.5	8			[Symbol]	70.5' to 76.5': SAND, clayey, with shells, greenish gray, (SC)	100	45										
		4																
		3	7															
		1																
2.8	79.5	2			[Symbol]	76.5' to 79.5': CLAY, sandy, with shells, greenish gray, (CL)	100	46										
		4																
		5	9															
		2																
2.8	79.5	4			[Symbol]	76.5' to 79.5': CLAY, sandy, with shells, greenish gray, (CL)	100	47										
		5																
		2																
		4																
2.8	79.5	5	9		[Symbol]	76.5' to 79.5': CLAY, sandy, with shells, greenish gray, (CL)	100	48										
		2																
		4																
		5																
2.8	79.5	1			[Symbol]	79.5' to 82.5': SAND, clayey, with shells, greenish gray, (SC)	100	49										
		4																
		6	10															
		2																
2.8	79.5	5			[Symbol]	79.5' to 82.5': SAND, clayey, with shells, greenish gray, (SC)	100	50										
		5																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,507,295.8 E 597,140.6					ELEVATION TOP OF BORING 82.3		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-0.2	82.5	9	14			82.5' to 88.5': SAND, clayey, light gray, (SC)	100	56										82.5
		5																
		6	12															
		6																
		4	8				100	57										85.0
		4																
		4																
		3	5				100	58			44.0	20	7	25	SC			
		2																
		1																
		1					100	59										87.5
-6.2	88.5	3	4			88.5' to 105': SAND, silty, cemented sand, light gray, (SM)	100	60										
		3																
		5					100	61										90.0
		6	11															
		3					100	62										
		4	10															
		6					100	63										92.5
		5																
		4	10				100	64										95.0
		6																
		2					100	65										
		5	8															
		3					100	66										97.5
		2																
		5	11				100	67										100.0
		3																
		6					100	68										
		7																
		6	10				100	69										102.5
		4																
		6	12				100	70										105.0
		4																
		5																
		8	13				100	71										107.5
		7																
		5					100	72			17.0			36	SC			
		30	35															
		48					100	73										110.0
		8																
		8	16															
		6					100	74										
		3	5															
-22.7	105.0	2				105' to 109.5': SAND, clayey, trace fine to coarse shells, trace fine to coarse phosphate, greenish gray, (SC)	100	71										
		0																
		1	3				100	72										
		2																
		1					100	73										
		4	5															
		1																
		2					100	74										
-27.2	109.5	2	4			109.5' to 125': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate fragments, greenish gray, (SP-SC)	100	74										
		3																
		6																
		6	12															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION					SHEET 5 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane					HORIZONTAL NAD83					VERTICAL NAVD88				
LOCATION COORDINATES N 1,507,295.8 E 597,140.6					ELEVATION TOP OF BORING 82.3														
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
		4				109.5' to 125': SAND, with clay, trace fine to coarse shells, trace fine to coarse phosphate fragments, greenish gray, (SP-SC) (continued)	100	75											
		6	15				100	76											
		9																	
		5																	
		10	23																
		13																	
		7																	
		10	27											26	SP-SC				
		17																	
		6																	
		13	27																
		14																	
		9																	
		24	46																
		22																	
		7																	
		12	27																
		15																	
		9																	
		18	43																
		25																	
		10																	
		16	37																
		21																	
		7																	
		13	33																
		20																	
-42.7	125.0	96																	

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS													
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83													
2. HOLE NUMBER TH-22				LOCATION COORDINATES N 1,507,499.0 E 597,544.3		10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit													
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 83 UNDISTURBED 0													
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER													
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING													
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/7/11		STARTED COMPLETED													
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 81.4		17. TOTAL CORE RECOVERY FOR BORING N/A													
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer															
ELEV	DEPTH	BLOWs/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
Gravel	Sand	Fines	LL	PI	MC	ASTM Class													
		1			[Symbol]	0' to 4.5': SAND, trace silt, dark brown, (SP)	100	1										0.0	
		2					100	2											2.5
		5	7				100	3											2.5
		8			[Symbol]	4.5' to 19.5': SAND, with silt, dark brown, (SP-SM)	100	4										5.0	
		10	21				100	5											7.5
		9					100	6											7.5
		13	22		[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	7										10.0	
		8					100	8											12.5
		9					100	9											12.5
		13	22		[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	10										15.0	
		20					100	11											17.5
		25	48				100	12											17.5
		9			[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	13										20.0	
		11					100	14											22.5
		11	22				100	15											22.5
		6			[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	9			5.8		27	SP-SM				12.5	
		14	25				100	10											15.0
		2					100	11											17.5
		13	34		[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	12										20.0	
		14					100	13											22.5
		22	41				100	14											22.5
		9			[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	15										22.5	
		13	36				100	16											22.5
		15					100	17											22.5
		23	46		[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	18										22.5	
		4					100	19											22.5
		11	20				100	20											22.5
		4			[Symbol]	19.5' to 25.5': SAND, reddish brown to brown, (SP)	100	21										22.5	
		7					100	22											22.5
		11	18				100	23											22.5

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,507,499.0 E 597,544.3					ELEVATION TOP OF BORING 81.4		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
55.9	25.5	6 8 11	19			19.5' to 25.5': SAND, reddish brown to brown, (SP) (continued)	100	17										25.0
		4 6 11	17			25.5' to 33': SAND, trace silt, light gray, (SP)	100	18										27.5
		1 3 6	9				100	19										30.0
		2 5 10	15				100	20										32.5
		4 9 15	24				100	21										
		2 4 3	7				100	22										
48.4	33.0																	
46.9	34.5	W/H 1	1			33' to 34.5': CLAY, greenish gray, (CH)	100	23			84.5	105	79	66	CH			
		W/H W/H				34.5' to 36': SAND, clayey, greenish gray, (SC)	100	24			15.6			32	SC			35.0
45.4	36.0	1	1															
		W/H W/H 2	2			36' to 42': SAND, with silt, greenish gray, (SP-SM)	100	25										37.5
		W/H W/H 1	1				100	26			6.9			25	SP-SM			
		W/H W/H 1	1				100	27										40.0
		W/H W/H W/H					100	28										
39.4	42.0	W/H W/H W/H	W/H															
		W/H W/H 1	1			42' to 43.5': SAND, clayey, greenish gray, (SC)	100	29			22.8	32	12	35	SC			42.5
37.9	43.5																	
		W/H W/H 1	1			43.5' to 45': SAND, silty, trace clay, trace fine to coarse shells, greenish gray, (SM)	100	30			19.5			29	SM			45.0
36.4	45.0																	
		W/H W/H W/H	W/H			45' to 46.5': CLAY, trace fine to coarse shells, greenish gray (CH)	100	31			99.3	133	105	84	CH			
34.9	46.5																	
		W/H 2 4	6			46.5' to 51': SAND, silty, trace clay, trace fine to coarse shells, greenish gray, (SM)	100	32										47.5
		2 2 3	5				100	33										
		1 2 2	4				100	34										50.0
30.4	51.0																	
		1 3 8	11			51' to 52.5': SAND, with silt, trace fine to coarse shells, greenish gray, (SP-SM)	100	35										52.5
28.9	52.5																	
		2																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,507,499.0 E 597,544.3					ELEVATION TOP OF BORING 81.4		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
19.9	61.5	9				52.5' to 61.5': SAND, trace silt, trace fine to coarse shells, greenish gray, (SP) (continued)	100	36										
		47	56															
		19																
		37																
		41	78															
		13																
		29																
		25	54															
10.9	70.5	8				61.5' to 70.5': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	100	42			14.1			36	SM			
		14																
		10	20															
		7																
		9																
		12	21															
		7																
		12																
7.9	73.5	12				70.5' to 73.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	43										
		13																
		10																
		13	25															
		10																
		13																
		14	27															
		8																
6.4	75.0	10				73.5' to 75': SILT, sandy, calcarious, few shells, greenish gray, (ML)	100	44										
		10																
		10	20															
		6																
4.9	76.5	10				75' to 76.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	45										
		12																
		12	22															
		5																
0.4	81.0	5				76.5' to 81': SAND, silty, trace clay, greenish gray, (SM)	100	46										
		2																
		2	4															
		2																
		8				81' to 82.5': SAND, clayey, greenish gray, (SC)	100	47										
		4																
		8																
		4																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 4 OF 5 SHEETS								
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL							
						State Plane		NAD83	NAVD88							
LOCATION COORDINATES						ELEVATION TOP OF BORING										
N 1,507,499.0 E 597,544.3						81.4										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
-1.1	82.5	5	9			82.5' to 85.5': CLAY, trace fine to coarse shells, greenish gray, (CH)	100	56			78.5	72	22	57	CH	
		4														
		3														
		2	5													
		W/H					100	57			83.4			65	CH	
		W/H														
-4.1	85.5	2	2													
		1														
		7				85.5' to 93': SAND, silty, trace clay, thin layers of cemented sand, greenish gray, (SM)	100	58								
		6	13													
		1														
		1														
		3	4											25	SM	
		3														
		3														
		11	14													
		7														
		8														
		9	17													
		6					100	62								
		4														
		3	7													
-11.6	93.0	7														
		7														
		5														
		6	11													
		3														
		3														
		3	6													
		3														
		4														
		7	11													
		4														
		5														
		10	15													
		9														
		11														
		47	58													
-19.1	100.5	4				100.5' to 103.5': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	100	68								
		11														
		6	17													
		13														
		11					100	69								
		8	19													
-22.1	103.5	4														
		3														
		2	5													
		3				103.5' to 109.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	70			19.0			39	SC	
		2														
		3														
		2	4													
		2														
		2														
		2														
		3	5													
		1					100	73								
		2														
		3														
		1														
		2					100	74								
		3														
		8														
		8	16													
-28.1	109.5	3				109.5' to 115.5': SAND, silty, greenish gray, greenish gray, (SM)	100	74								
		8														
		8														
		8	16													

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 5 OF 5 SHEETS							
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM State Plane			HORIZONTAL NAD83		VERTICAL NAVD88						
LOCATION COORDINATES N 1,507,499.0 E 597,544.3						ELEVATION TOP OF BORING 81.4											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-34.1	115.5	4				109.5' to 115.5': SAND, silty, greenish gray, greenish gray, (SM) (continued)	100	75									112.5
		5	12														
		7															
		2					100	76									
		7	15														
		8					100	77									
-38.6	120.0	4				115.5' to 120': SAND, with clay, trace fine to coarse shells, greenish gray, (SP-SC)											115.0
		7															
		10	17														
		6					100	78			10.1		26	SP-SC			
		10	23														
		13					100	79									
-43.6	125.0	7				120' to 125': SAND, trace clay, light grayish brown, (SP)											117.5
		11	25														
		14					100	80									
		7															
		13	29														
		16					100	81									
		3															120.0
		10															
		18	28														
		14					100	82									
		18	46														
		28					100	83									
		12															122.5
		22															
		27	49														
		30															

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-23

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS												
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
2. HOLE NUMBER TH-23				10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit		VERTICAL NAVD88												
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 25 UNDISTURBED 0												
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER												
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING												
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/30/11		STARTED 6/30/11												
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.2		COMPLETED 6/30/11												
8. TOTAL DEPTH OF BORING (ft) 76.5				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Gravel	Sand	Fines	LI	PI	MC	ASTM Class	REMARKS		
76.2	6.0	1				0' to 6': SAND, trace silt, dark brown, (SP)		1								SP		
		1																
		2	3															
		6																
		6																
		10	16															
		5																
74.7	7.5	7				6' to 7.5': SAND, with silt, trace organic, dark brown, (SP-SM)		2	0	96	3.7					25	SP	
		10	16															
		5																
		7																
		10	17															
		7																
		21																
70.2	12.0	31	52			7.5' to 12': SAND, with silt, brown, (SP-SM)		4										
		9																
		20																
		27	47															
		5																
		23																
		23	46															
61.2	21.0	11				12' to 21': SAND, brown, (SP)		6										
		25																
		31	56															
		10																
		15																
		12	27															
		3																
		4				21' to 33': SAND, with silt, gray, (SP-SM)		8										
		6																
		10																
		3																
		4																
		6	10															
		5																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)

INSTALLATION

SHEET 2
OF 3 SHEETS

PROJECT

OUC 90-Acre Landfill Expansion

COORDINATE SYSTEM

State Plane

HORIZONTAL

NAD83

VERTICAL

NAVD88

LOCATION COORDINATES

N 1,507,722.5 E 597,149.5

ELEVATION TOP OF BORING

82.2

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
49.2	33.0	5				21' to 33': SAND, with silt, gray, (SP-SM) (continued)		10	0	95	5.1			22	SP-SM	
		6	11													
		W/H														
		W/H														
45.2	37.0	2	2			33' to 37': SAND, trace silt, grayish brown, (SP)		11								
		W/H														
		W/H														
		1	1					12			11.1	NP	NP	26	SP-SM	
		W/H														
40.2	42.0	4	4			37' to 42': SAND, clayey, greenish gray, (SC)		13								
		1														
		2														
		5	7					14								
		1														
35.2	47.0	2				42' to 47': CLAY, sandy, trace fine to coarse shells, greenish gray, (CH)		15								
		2														
		4	6													
		4														
		5	9					16			36.2	38	15	40	SC	
30.2	52.0					47' to 52': SAND, silty, brown, (SM)										
		2														
		3														
		3				47' to 52': SAND, silty, brown, (SM)		17			55.7	65	47	51	CH	
		3														
		6	9													
						52' to 57': SAND, trace fine to coarse shells, light brown, (SP)		18								

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)		INSTALLATION		SHEET 3 OF 3 SHEETS	
PROJECT OUC 90-Acre Landfill Expansion		COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	
LOCATION COORDINATES N 1,507,722.5 E 597,149.5		ELEVATION TOP OF BORING 82.2		VERTICAL NAVD88	

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
25.2	57.0	8 15 20	35			52' to 57': SAND, trace fine to coarse shells, light brown, (SP) (continued)		19								
10.2	72.0	11 16 22	38			57' to 72': SAND, with silt, few fine to coarse shells, gray, (SP-SM)		20								
8.2	74.0	9 13 16	29					21								
5.7	76.5	9 16 14	30					22								
		5 10 5	15			72' to 74': SAND, with silt, mostly fine to coarse shells, gray, (SP-SM)			23			34.2	44	29	32	SC
		4 5 5	10			74' to 76.5': SAND, clayey, few fine to coarse shells, greenish gray, (SC)		24								

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS												
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
2. HOLE NUMBER TH-24				LOCATION COORDINATES N 1,507,751.0 E 596,728.7		10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit												
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 83 UNDISTURBED 0												
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER												
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING												
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 83.0		15. DATE BORING STARTED 6/13/11 COMPLETED												
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer												
8. TOTAL DEPTH OF BORING (ft) 125.0																		
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
Gravel	Sand	Fines	LL	PI	MC	ASTM Class												
80.0	3.0	1			[Symbol]	0' to 3': SAND, light grayish brown, (SP)	100	1									0.0	
		2																
		3	5															
		6																
		7																
		9	16															2.5
		7			[Symbol]	3' to 9': SAND, with silt, organic silt, dark brown, (SP-SM)	100	3			8.0		20	SP-SM				
		8																
		9	17															
		5																
		6																
		8	14															
		7																
		10																
		9	19															
		7																
		12																
		10	22															
74.0	9.0	17			[Symbol]	9' to 12': SAND, with silt, dark brown, (SP-SM)	100	7										
		16																
		20	36															
		5																
		8																
		10	18															
71.0	12.0	8			[Symbol]	12' to 16.5': SAND, silty, brown, (SM)	33	9										
		7																
		8	15															
		7																
		9																
		12	21															
		9			[Symbol]	16.5' to 22.5': SAND, silty, reddish brown, (SM)	100	12										
		14																
		18	32															
		5																
		8																
		12	20															
		10			[Symbol]	22.5' to 25.5': SAND, with silt, brown, (SP-SM)	100	13										
		12																
		11	23															
		2																
		10																
		14	24															
		6			[Symbol]		100	14										
		16																
		23	39															
		4																
		13																
		12	25															
60.5	22.5																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS																																			
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL		VERTICAL																																	
						State Plane		NAD83		NAVD88																																	
LOCATION COORDINATES N 1,507,751.0 E 596,728.7						ELEVATION TOP OF BORING 83.0																																					
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS																											
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class																												
57.5	25.5	4				22.5' to 25.5': SAND, with silt, brown, (SP-SM) (continued)	100	17																																			
		9																																									
		11	20																																								
50.0	33.0	3				25.5' to 33': SAND, light brown, (SP)	100	18																																			
		5																																									
		6	11																																								
		2					80	19																																			
		3																																									
		4	7																																								
		2					100	20																																			
		5																																									
		3	8																																								
		4					80	21																																			
4																																											
4	8																																										
2			50	22																																							
4																																											
4	8																																										
48.5	34.5	1				33' to 34.5': SAND, clayey, light gray, (SC)	100	23																																			
W/H																																											
W/H	W/H																																										
47.0	36.0	W/H				34.5' to 36': SAND, with silt, light gray, (SP-SM)	73	24			10.8			28	SP-SM																												
		W/H																																									
		W/H	W/H																																								
37.0	46.0	0				36' to 46': SAND, clayey, greenish gray, (SC)	80	25			28.2	39	24	32	SC																												
		3																																									
		3	6																																								
		4					73	26																																			
		4																																									
		3	7																																								
		W/H					100	27																																			
		W/H																																									
		W/H	W/H																																								
		W/H					80	28																																			
		W/H																																									
		W/H	W/H																																								
		W/H					50	29																																			
W/H																																											
1	1																																										
W/H			50	30																																							
W/H																																											
W/H	W/H																																										
W/R			67	31																																							
W/R																																											
W/R	W/R																																										
33.5	49.5	W/H																						46' to 49.5': CLAY, greenish gray, (CH)	100	32			97.9	146	114	94											
		W/H																																									
		W/H	W/H																																								
		W/H																																									
32.0	51.0	3																						49.5' to 51': SAND, clayey, cemented sand, light gray, (SC)	100	34																	
		11																																									
		5	16																																								
30.5	52.5	2				51' to 52.5': SAND, silty, light greenish gray, (SM)	100	35																																			
		5																																									
		17	22																																								
		11																																									

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,507,751.0 E 596,728.7					ELEVATION TOP OF BORING 83.0		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
24.5	58.5	16				52.5' to 58.5': SAND, with silt, light greenish gray, (SP-SM) (continued)	100	36									55.0
		22	38														
		10															
		18															
		17	35														
		5															
20.0	63.0	13				55': ... with trace fine to coarse shells	100	37								57.5	
		22	35														
		9															
		10															
		12	22														
		6															
15.5	67.5	7				58.5' to 63': SAND, silty, cemented sand, shells, light gray, (SM)	53	40								60.0	
		7	14														
		6															
		8															
		7	15														
		6															
11.0	72.0	7				63' to 67.5': SAND, with silt, trace fine to coarse shells, light greenish gray, (SP-SM)	100	41								62.5	
		4															
		3															
		6	9														
		4															
		7															
5.0	78.0	8				67.5' to 72': SAND, silty, trace fine to coarse shells, greenish gray, (SM)	100	42								65.0	
		3															
		3	6														
		4															
		6															
		7	15														
3.5	79.5	3				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	43								67.5	
		3															
		5															
		6	11														
		3															
		5	10														
3.5	79.5	5				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	44								70.0	
		3															
		5															
		5															
		5	10														
		5															
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	45								72.5	
		2															
		4	6														
		3															
		5															
		7	12														
3.5	79.5	3				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	46								75.0	
		2															
		3															
		2															
		3	5														
		2															
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	47								77.5	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	48								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	49								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	50								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	51								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	52								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	53								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	54								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	55								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	56								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	57								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	58								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	59								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	60								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	61								80.0	
		2															
		3															
		3															
		2															
		3	5														
3.5	79.5	2				72' to 78': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	62								80.0	

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,507,751.0 E 596,728.7					ELEVATION TOP OF BORING 83.0		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
-4.0	87.0	14	22			79.5' to 87': SAND, silty, trace fine to coarse shells, greenish gray, (SM) (continued)	100	56										
		6																
		11	21															
		10																
		9																
		8					100	57										
		19	27															
		6																
		8																
		10	18															
-5.5	88.5	4				87' to 88.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	59										
		2																
		4	6															
		4				88.5' to 97.5': SAND, silty, trace fine to coarse shells, cemented sand, greenish gray, (SM)	100	60										
		1																
		2	3															
		8																
		9																
		6	15															
		4																
		6																
		9	15															
		7																
		6																
		5	11															
		3																
		3																
		-14.5	97.5	4														
3																		
3																		
2	5																	
4																		
-17.5	100.5	4				97.5' to 100.5': SAND, with silt, trace fine to coarse shells, gray, (SP-SM)	100	66										
		4																
		10	14															
		8																
		8																
		7	15			100.5' to 105': SAND, with silt, cemented sand, trace fine to coarse shells, gray, (SP-SM)	100	68										
		5																
		15																
		21	36															
		42																
		11																
		7	18															
		7																
		9																
		6	15															
		3				105' to 117': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	71										
		3																
		5	8															
		4																
		5																
		4	9															
		4																
		5																
		5																
		4	9															
		1					53	74										
		3																
		5	8															
		5																
		5																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,507,751.0 E 596,728.7					ELEVATION TOP OF BORING 83.0		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-34.0	117.0	2				105' to 117': SAND, clayey, trace fine to coarse shells, greenish gray, (SC) (continued)	100	75									
		1	4														
		3															
		1															
		2	6														
		4															
		0															
		2	5														
-42.0	125.0	3				117' to 125': SAND, with silt, trace fine to coarse shells, trace phosphate, gray, (SP-SM)	100	77									
		2															
		4	8														
		4															
		2															
		4															
		4															
		2															
-42.0	125.0	2				117' to 125': SAND, with silt, trace fine to coarse shells, trace phosphate, gray, (SP-SM)	100	78			16.2		37	SC			
		8	17														
		9															
		5															
		10	20														
		10															
		4															
		10	24														
		14															
		7															
-42.0	125.0	12	28			117' to 125': SAND, with silt, trace fine to coarse shells, trace phosphate, gray, (SP-SM)	100	82									
		16															
		13															
		25	52														
		27															
23																	

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-25

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 3 SHEETS											
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER TH-25				LOCATION COORDINATES N 1,508,199.9 E 596,737.6		10. SIZE AND TYPE OF BIT 3 7/8" or 2 7/8" Drag Bit											
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 27 UNDISTURBED 0											
4. NAME OF DRILLER R. Cabral				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				16. ELEVATION TOP OF BORING (ft) 82.4		15. DATE BORING STARTED 7/1/11 COMPLETED 7/5/11											
7. DEPTH DRILLED INTO ROCK				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist											
8. TOTAL DEPTH OF BORING (ft) 75.0																	
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
		W/H				0' to 7.5': SAND, dark brown, (SP)	50	1									0.0
		2	4				66	2	0	97	3.5			24	SP		2.5
		2					50	3									
		3	7				66	4									5.0
		3					66	5									
74.9	7.5	5	8														
		5				7.5' to 9': SAND, with silt, dark brown, (SP-SM)	66	6	0	92	8.2			28	SP-SM		7.5
73.4	9.0	12	29														
		1				9' to 17': SAND, dark brown, (SP)	100	7									10.0
		3	14														
		11															12.5
		9					66	8									15.0
		14	32														
		18															17.5
65.4	17.0					17' to 27': SAND, with silt, brown, (SP-SM)											
		8					66	9	0	90	10.4			28	SP-SM		20.0
		15	32														
		17															22.5
		2															

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 3 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,508,199.9 E 596,737.6					ELEVATION TOP OF BORING 82.4		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
55.4	27.0	3	7			17' to 27': SAND, with silt, brown, (SP-SM) (continued)	66	10									25.0
		4															
50.4	32.0		16			27' to 32': SAND, light gray, (SP)											27.5
		5															
		7															
47.4	35.0	9				32' to 35': SAND, silty, trace clay, greenish gray, (SM)	50	11	0	95	4.9			23	SP	30.0	
45.9	36.5	W/H	2			35' to 36.5': SAND, clayey, greenish gray, (SC)	100	12								32.5	
		1															
39.4	43.0	W/H	1			36.5' to 43': SAND, silty, trace clay, grayish brown, (SM)	66	13		33.8			38	SC	35.0		
		1															
33.9	48.5	2	30			43' to 48.5': CLAY, greenish gray, (CH)	100	14								37.5	
		3															
		4					7										
		3															
		1															
		1					2										
		W/H															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	100	15		26.9			31	SM	40.0		
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	100	16							42.5		
		3															
		2					5										
		2															
		2															
		3					5										
		3															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	100	17		25.1			36	SM	45.0		
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
		W/H															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	0	18							47.5		
		3															
		2															
		2															
		2															
		3					5										
		3															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	100	19		97.1	110	80	69	CH	50.0		
		3															
		2															
		2															
		2															
		3					5										
		3															
33.9	48.5	W/H	62			48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM)	100	20		96.6	101	71	66	CH	52.5		
		3															
		2															
		2															
		2															
		3					5										
		3															

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 3 SHEETS											
PROJECT					COORDINATE SYSTEM		HORIZONTAL											
OUC 90-Acre Landfill Expansion					State Plane		NAD83											
LOCATION COORDINATES					ELEVATION TOP OF BORING		VERTICAL											
N 1,508,199.9 E 596,737.6					82.4		NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
		13				48.5' to 62': SAND, silty, cemented sand, light grayish brown, (SM) (continued)		23									55.0	
		23																57.5
		23	46															
		5						24									60.0	
		4																
		6	10															
20.4	62.0					62' to 69': SAND, with silt, trace to coarse shells, greenish gray, (SP-SM)		25									62.5	
		3																
		3																
		7	10														65.0	
13.4	69.0	8				69' to 72': SAND, with silt, mostly fine to coarse shells, brown, (SP-SM)		26									67.5	
		14																
		16	30															
10.4	72.0					72' to 75': SAND, silty, few fine to coarse shells, greenish gray, (SM)											70.0	
7.4	75.0	9						27			29.1	NP	NP	32	SM		72.5	
		9																
		9	18															

Boring terminated 75 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS												
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
2. HOLE NUMBER TH-26				LOCATION COORDINATES N 1,508,218.8 E 597,122.9		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45												
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES 83		DISTURBED 0												
4. NAME OF DRILLER Graham Bowden				13. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0												
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING												
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		15. DATE BORING 6/15/11												
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 82.0		STARTED 6/15/11												
8. TOTAL DEPTH OF BORING (ft) 125.0				17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 6/17/11												
				18. SIGNATURE AND TITLE OF INSPECTOR Zachariou Panagiotis Geotechnical Engineer														
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
Gravel	Sand	Fines	LL	PI	MC	ASTM Class												
		1			●	0' to 4.5': SAND, trace silt, brown, (SP)	53	1									0.0	
		1					100	2										2.5
		3	4				100	3										2.5
77.5	4.5	4	10															
		5			●	4.5' to 9': SAND, with silt, organic silt, dark brown, (SP-SM)	100	4									5.0	
		8					100	5			9.8		21	SP-SM				7.5
		12	20				100	6										7.5
73.0	9.0	16	27															
		10			●	9' to 12': SAND, with silt, brown, (SP-SM)	100	7									10.0	
		17					100	8										10.0
		23	40				100	9										12.5
70.0	12.0	28	55															
		11			●	12' to 18': SAND, with silt, reddish brown, (SP-SM)	100	10									15.0	
		20					100	11										15.0
		25	45				100	12										17.5
64.0	18.0	11	33															
		8			●	18' to 22.5': SAND, brown to light brown, (SP)	100	13									20.0	
		13	21				100	14										20.0
		4					100	15										22.5
59.5	22.5	6																
		8	14		●	22.5' to 27': SAND, silty, grayish brown, (SM)	100	16									22.5	
		3					100	16										22.5
		3	6				100	16										22.5

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,508,218.8 E 597,122.9					ELEVATION TOP OF BORING 82.0		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
55.0	27.0	2				22.5' to 27': SAND, silty, grayish brown, (SM) (continued)	100	17			14.1			27	SM	25.0
		4	8													
		4														
52.0	30.0	3				27' to 30': SAND, gray, (SP)	100	18							27.5	
		7	10													
		4														
47.5	34.5	2				30' to 34.5': CLAY, greenish gray, (CH)	100	19							30.0	
		6	23													
		4														
46.0	36.0	2				34.5' to 36': SAND, silty, greenish gray, (SM)	100	20							32.5	
		6	6													
		2	2													
43.0	39.0	2				36' to 39': SAND, silty, shells, gray, (SM)	100	21		92.4	126	93	90	CH	35.0	
		1	1													
		2	2													
41.5	40.5	2				39' to 40.5': CLAY, sandy, greenish gray, (CH)	100	22							37.5	
		1	3													
		2	2													
38.5	43.5	2				40.5' to 43.5': SAND, silty, shells, greenish gray, (SM)	100	23		88.6	113	81	81	CH	40.0	
		1	1													
		2	2													
33.0	49.0	2				43.5' to 49': CLAY, trace fine to coarse shells, greenish gray, (CH)	100	24		24.6	NP	NP	35	SM	42.5	
		1	3													
		2	2													
29.5	52.5	2				49' to 52.5': SAND, clayey, trace fine to coarse shells, greenish gray, (SC)	100	25							45.0	
		1	5													
		2	2													
		2					100	26							47.5	
		1	3													
		2	2													
		2					100	27		62.0	66	50	51	CH	50.0	
		1	3													
		2	2													
		2					100	28		28.2	NP	NP	40	SM	52.5	
		1	6													
		2	2													
		2					100	29		35.8			38	SM		
		1	3													
		2	2													
		2					100	30		96.7	99	75	73	CH		
		1	5													
		2	2													
		2					100	31								
		1	5													
		2	2													
		2					100	32		91.7	105	79	85	CH		
		1	3													
		2	2													
		2					100	33		81.3	88	68	66	CH		
		1	4													
		2	2													
		2					100	34		49.7			48	SC		
		1	3													
		2	2													
		2					100	35		46.9			44	SC		
		1	5													
		2	2													

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS									
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,508,218.8 E 597,122.9					ELEVATION TOP OF BORING 82.0		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
25.0	57.0	5	19			52.5' to 57': SAND, with silt, shells, greenish gray, (SP-SM) (continued)	100	36								55.0
		14														
		10														
		14														
		22	36													
20.5	61.5	7				57' to 61.5': SAND, silty, shells, greenish gray, (SM)	100	37							57.5	
		15	30													
		10														
		12	22													
		7														
19.0	63.0	9	18			61.5' to 63': SAND, with silt, greenish gray, (SP-SM)	100	38					27	SP-SM	60.0	
		9														
		6														
		7														
		10	17													
11.5	70.5	3				63' to 70.5': SAND, silty, shells, greenish gray, (SM)	100	39							62.5	
		7														
		8	15													
		6														
		7														
		10	17													
		4														
		6														
		9	15													
		5														
10.0	72.0	6				70.5' to 72': SAND, clayey, shells, greenish gray, (SC)	100	40							65.0	
		5	11													
		1														
		2														
		4	6													
7.0	75.0	2				72' to 75': CLAY, sandy, shells, greenish gray, (CH)	100	41							60.0	
		3														
		5	8													
		2														
		3														
		4				75' to 90': SAND, silty, trace fine to coarse shells, light gray, (SM)	100	42							62.5	
		8														
		15	23													
		3														
		7														
		10	17													
		7														
		6	13													
		7														
		5														
		8	13			81': ... cemented sand	100	43							65.0	
		4														
		1														

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION				SHEET 4 OF 5 SHEETS												
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL		VERTICAL												
						State Plane		NAD83		NAVD88												
LOCATION COORDINATES						ELEVATION TOP OF BORING																
N 1,508,218.8 E 597,122.9						82.0																
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory					REMARKS								
									Gravel	Sand	Fines	LL	PI		MC	ASTM Class						
-8.0	90.0	4	5			75' to 90': SAND, silty, trace fine to coarse shells, light gray, (SM) (continued)	100	56						22	SM							
		3																				
		5	12																			
		7																				
		3																				
		6																				
		5	11																			
		9																				
		6																				
		4	10																			
-11.0	93.0	9				90' to 93': SAND, with silt, trace fine to coarse shells, cemented sand, gray, (SP-SM)	100	61														
		3																				
		3	6																			
		3																				
		4																				
		6	10																			
		-17.0	99.0	4								93' to 99': SAND, silty, cemented sand, shells, trace fine phosphate, gray, (SM)	100	63								
				5																		
				9					14													
				32																		
16																						
18	34																					
7																						
10																						
20	30																					
11																						
-27.5	109.5	5				99' to 109.5': SAND, clayey, cemented sand, shells, trace fine phosphate, gray, (SC)	100	67														
		3																				
		4	7																			
		2																				
		3																				
		2	5																			
		3																				
		4																				
		6	10																			
		2																				
-27.5	109.5	2				109.5' to 125': SAND, with clay, trace fine phosphate, greenish gray, (SP-SC)	100	74														
		2																				
		3	5																			
		2																				
		2																				
		3	5																			
		1																				
		2																				
		3	5																			
		4																				

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83		VERTICAL NAVD88								
LOCATION COORDINATES N 1,508,218.8 E 597,122.9					ELEVATION TOP OF BORING 82.0												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-43.0	125.0	10				109.5' to 125': SAND, with clay, trace fine phosphate, greenish gray, (SP-SC) (continued)	100	75									+12.5
		15	34														
		19															
		3															
		8	20														
		12															
		3															
		17	49														
		32															
		16															
		18	38														
		20															
		13															
		28	56														
		28															
16																	
26	54																
28																	
5																	
8	20																
12																	
6																	
9	20																
11																	
6																	
11	36																
25																	
28																	

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Boring Designation TH-27

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 5 SHEETS												
1. PROJECT OUC 90-Acre Landfill Expansion				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
2. HOLE NUMBER TH-27				10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit		VERTICAL NAVD88												
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME-45		DISTURBED 83												
4. NAME OF DRILLER Graham Bowden				12. TOTAL SAMPLES		UNDISTURBED 0												
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER												
6. THICKNESS OF OVERBURDEN				15. DATE BORING 6/27/11		STARTED COMPLETED												
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING (ft) 81.6		17. TOTAL CORE RECOVERY FOR BORING N/A												
8. TOTAL DEPTH OF BORING (ft) 125.0				18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist														
ELEV	DEPTH	BLOWS/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
77.1	4.5	1				0' to 4.5': SAND, trace silt, dark brown, (SP)	100	1										
		2																
		3	5															
		6																
		11																
69.6	12.0	4				4.5' to 12': SAND, with silt, dark brown, (SP-SM)	100	4										
		6																
		13																
		26																
		7																
66.6	15.0	8				12' to 15': SAND, trace silt, reddish brown, (SP)	33	9										
		14																
		22																
		29																
		4																
63.6	18.0	9				15' to 18': SAND, silty, light reddish brown, (SM)	100	11										
		13																
		17																
		22																
		5																
59.1	22.5	8				18' to 22.5': SAND, with silt, very light brown, (SP-SM)	100	13										
		12																
		12																
		12																
		15																
		4				22.5' to 24.5': SAND, with silt, gray, (SP-SM)	100	16										
		8																
		12																
		12																
		12																

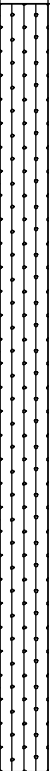
ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)						INSTALLATION		SHEET 2 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion						COORDINATE SYSTEM		HORIZONTAL	VERTICAL									
						State Plane		NAD83	NAVD88									
LOCATION COORDINATES N 1,508,212.6 E 597,539.0						ELEVATION TOP OF BORING 81.6												
ELEV	DEPTH	Blows/ 0.5 ft	N _f	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
57.1	24.5	W/H				24.5' to 28.5': CLAY, gray, (CH)	100	17										
		4	8															
		1																
		W/H	1															
		1	1			24.5' to 28.5': CLAY, gray, (CH)	100	18			81.5	108	80	75	CH			
		W/H																
		W/H																
		W/H																
53.1	28.5	2	2			24.5' to 28.5': CLAY, gray, (CH)	80	19			87.3	123	87	84	CH			
		W/H				28.5' to 31.5': SAND, silty, few shells, gray, (SM)	100	20			26.2			37	SM			
		W/H																
		W/H	W/H															
		W/H																
50.1	31.5	1	2			28.5' to 31.5': SAND, silty, few shells, gray, (SM)	80	21										
		2				31.5' to 36': SAND, with silt, trace fine to coarse shells, light greenish gray, (SP-SM)	50	22										
		3																
		5	8															
		4																
		8				31.5' to 36': SAND, with silt, trace fine to coarse shells, light greenish gray, (SP-SM)	100	23			5.2			28	SP-SM			
		12	20															
		5																
		7																
45.6	36.0	9	16			36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	73	24										
		4				36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	80	25										
		4																
		8	12															
		2																
		8				36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	73	26										
		13	21															
		6																
		7																
		13	20			36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	100	27										
		9				36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	80	28										
		21	34															
		13																
		5																
38.1	43.5	5				36' to 43.5': SAND, trace fine to coarse shells, light and very light greenish gray, (SP)	50	29										
		5																
		4	9															
		2				43.5' to 45': CLAY, greenish gray, (CH)	50	30	0	4	96.5	112	82	79	CH			
		2																
36.6	45.0	3	5															
		1				45' to 48': SAND, clayey, greenish gray, (SC)	67	31			34.1	91	68	42	SC			
		3																
		3	6															
		2																
33.6	48.0	4	6			45' to 48': SAND, clayey, greenish gray, (SC)	100	32			34.0			35	SC			
		2				48' to 52.5': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)	100	33										
		3																
		6	9															
		5																
		7				48' to 52.5': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)	100	34										
		6	13															
		14																
		28																
29.1	52.5	24	52			48' to 52.5': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)	100	35										
		11				48' to 52.5': SAND, with silt, mostly fine to coarse shells, greenish gray, (SP-SM)												

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 3 OF 5 SHEETS											
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
LOCATION COORDINATES N 1,508,212.6 E 597,539.0					ELEVATION TOP OF BORING 81.6		VERTICAL NAVD88											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
24.6	57.0	15				52.5' to 57': SAND, with silt, trace fine to coarse shells, greenish gray, (SP-SM) (continued)	100	36										
		15	30															
		9																
		12																
		16	28															
		7					100	37										
		10					100	38										
		10	20															
15.6	66.0	5				57' to 66': SAND, silty, few fine to coarse shells, greenish gray, (SM)	100	39										
		7																
		10	17															
		5																
		9																
		11	20															
		5																
		6																
		11	17											30	SM			
				6														
		7					100	42										
		7	14															
		4					100	43										
		6																
		9	15															
		5					100	44										
		7																
		10	17															
8.1	73.5	4				66' to 73.5': SAND, silty, trace fine to coarse shells, grayish green, (SM)	100	45			27.1				29	SM		
		6																
		5	11															
		6																
		7																
		8	15															
		6																
		7																
		8	15				100	47										
		4																
		6					100	48										
		6																
		6	12															
		4																
		5					67	49		34.7			34	SM				
		9	14															
6.6	75.0	11				73.5' to 75': SAND, with silt, few fine to coarse shells, greenish gray, (SP-SM)	100	50										
		3																
		3	6															
3.6	78.0	1				75' to 78': SILT, sandy, brownish gray, (ML)	100	51			82.8	NP	NP	35	ML			
		2																
		6	8															
		4																
		5																
		8	13				100	52		77.5			35	ML				
		5				78' to 96': SAND, silty, with cemented sand, trace fine to coarse shells, light gray, (SM)	100	53										
		5																
		8	13															
		7																
		5																
		8	13				100	54										
		11																
		5					100	55										

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 4 OF 5 SHEETS												
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83												
LOCATION COORDINATES N 1,508,212.6 E 597,539.0					ELEVATION TOP OF BORING 81.6		VERTICAL NAVD88												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
-14.5	96.0	8	13			78' to 96': SAND, silty, with cemented sand, trace fine to coarse shells, light gray, (SM) (continued)	100	56											
		7																	
		9																	
		15	24																
		5																	
		1																	
		5	6																
		3																	
		4																	
		6	10																
		4																	
		7																	
		6	13																
		6																	
		5																	
		-19.0	100.5	4														9	
3																			
2																			
3	5																		
1																			
4																			
3	7																		
2																			
4																			
4	8																		
1																			
1																			
6	7																		
6																			
7																			
-29.5	111.0			6				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	100	65									
		7																	
		10	17																
		4																	
		16																	
		16	32																
		16																	
		21																	
		17	38																
		20																	
		12																	
		6	18																
		4																	
		3																	
		4	7																
		-29.5	111.0	3															
6																			
4																			
3																			
4	7																		
3																			
4																			
6	10																		
5																			
5																			
5	10																		
2																			
2																			
3	5																		
1																			
2																			
-29.5	111.0	3				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	100	70											
		6																	
		5																	
		5																	
-29.5	111.0	5				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	100	71									19.1	34	SC
		5																	
		5	10																
		2																	
-29.5	111.0	2				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	100	72											
		2																	
		3	5																
		1																	
-29.5	111.0	2				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	100	73											
		3																	
		1																	
		4																	
-29.5	111.0	7				100.5' to 111': SAND, clayey, trace fine to coarse shells, green, (SC)	53	74											
		7	11																

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 5 OF 5 SHEETS										
PROJECT OUC 90-Acre Landfill Expansion					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
LOCATION COORDINATES N 1,508,212.6 E 597,539.0					ELEVATION TOP OF BORING 81.6		VERTICAL NAVD88										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
-35.5	117.0	4				111' to 117': SAND, clayey, green, (SC) (continued)	100	75									
		4	10														
		6															
		4															
		6					100	76			11.9			32	SC		
		11	17				100	77									
		6					100	78									
		12	27														
		15															
		9															
		15	30														
		15															
-38.5	120.0	4				117' to 120': SAND, clayey, trace fine to coarse shells, green, (SC)	100	79			18.4			26	SC		
		11	25														
		14															
		6															
		12	23				100	80									
		11															
-43.5	125.0	6					120' to 125': SAND, with clay, green, (SP-SC)	100	81								
		21	53														
		32															
		18															
		26	60														
		34															
		5															
		7	17														
		10					100	83									
		17															

Boring terminated 125 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System
2. W/H: Weight of Hammer
3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 10/25/11

Appendix 3

**Soil Boring Logs for
Stormwater Management Area**

Boring Designation SP-01

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 2 SHEETS																					
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83																					
2. HOLE NUMBER SP-01				LOCATION COORDINATES N 1,503,807.0 E 597,974.6		10. SIZE AND TYPE OF BIT																					
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 33																					
4. NAME OF DRILLER				13. TOTAL NUMBER CORE BOXES		0																					
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING																					
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		82.7																					
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 7/15/11																					
8. TOTAL DEPTH OF BORING 49.5				16. ELEVATION TOP OF BORING		87.5																					
				17. TOTAL CORE RECOVERY FOR BORING		N/A																					
				18. SIGNATURE AND TITLE OF INSPECTOR Crowe Gary Geologist																							
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS										
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class												
83.0	4.5	1			[Symbol]	0' to 4.5': SAND, light brown, (SP)	100	1	0	97	3				4	SP											
		2																									
		6																									
		6	8																								
		8																									
		8																									
		7	16																								
		6																									
		7																									
		7																									
75.5	12.0	5	13		[Symbol]	4.5' to 12': SAND, with silt, dark brown, (SP-SM)	100	4																			
		6																									
		11																									
		5	17																								
		8																									
		11																									
		6	19																								
		7																									
		10																									
		6	17																								
7																											
17																											
65.0	22.5	2	24		[Symbol]	12' to 22.5': SAND, with silt, trace organics, very dark brown, (SP-SM)	80	9	0	93	7				24	SP-SM											
		6																									
		8																									
		11																									
		8	19																								
		10																									
		10																									
		6	20																								
		6																									
		7																									
5	13																										
8																											
15																											
16	23																										
21																											
26																											
10	47																										
22																											
27																											
16	49																										
19																											
24																											
12	43				[Symbol]	22.5' to 25.5': SAND, with silt, brown, (SP-SM)	100	16																			
17																											
17																											

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 2 SHEETS												
PROJECT					COORDINATE SYSTEM		HORIZONTAL		VERTICAL										
Proposed Horizontal Expansion of					State Plane		NAD83		NAVD88										
LOCATION COORDINATES					ELEVATION TOP OF BORING														
N 1,503,807.0 E 597,974.6					87.5														
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class				
62.0	25.5	11 17 18	34			22.5' to 25.5': SAND, with silt, brown, (SP-SM) <i>(continued)</i>	66	17	0	93	7				31	SP-SM	25.0		
59.0	28.5	8 14 13	35			25.5' to 28.5': SAND, silty, brown, (SM)	75	18									27.5		
		4 8 13	27																
		53.0	34.5	6 8 10	21			28.5' to 34.5': SAND, trace silt, light brown, (SP)	75	20	0	95	5			32	SP	30.0	
				6 6 8	18														
3 3 6	14															32.5			
1 4 5	9																		
47.0	40.5			2 4 6	9			34.5' to 40.5': SAND, with silt, light brown, (SP-SM)	70	24									35.0
				3 2 6	10										33	SP-SM	37.5		
		3 7 11	8																
		3 3 7	18																
		41.0	46.5	1 2 1	10			40.5' to 46.5': SAND, clayey, gray, (SC)	66	28									40.0
				0 1 1	3										31	SC	42.5		
0 0 0	2																		
0 0 0	W/H																45.0		
39.5	48.0			1 0 1	W/H			46.5' to 48': CLAY, sandy, greenish gray, (CH)	100	32			57	61	44	48	CH	47.5	
				2 3	1														
		38.0	49.5	7			48' to 48.5': SAND, clayey, greenish gray, (SC)	100	33			35	42	28	38	SC			
48.5' to 49.5': SAND, silty, gray (SM)																			

Boring terminated 49.5 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

Boring Designation SP-02

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 2 SHEETS										
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER SP-02				LOCATION COORDINATES N 1,503,800.8 E 597,371.6		10. SIZE AND TYPE OF BIT										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 32										
4. NAME OF DRILLER				13. TOTAL NUMBER CORE BOXES		0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		82.7										
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED COMPLETED										
8. TOTAL DEPTH OF BORING 48.0				16. ELEVATION TOP OF BORING		88.7										
				17. TOTAL CORE RECOVERY FOR BORING		N/A										
				18. SIGNATURE AND TITLE OF INSPECTOR												
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
87.2	1.5	1				0' to 1.5': SAND, gray brown, (SP)	100	1	0	97	3			5	SP	0.0
85.7	3.0	3	6			1.5' to 3': SAND, with silt, dark brown, (SP-SM)	100	2	0	95	5			8	SP-SM	2.5
84.2	4.5	6	10			3' to 4.5': SAND, brown, (SP)	100	3	0	96	4			7	SP	
		8	15			4.5' to 18': SAND, with silt, dark brown, (SP-SM)	100	4								5.0
		5	15				100	5	0	95	5			21	SP-SM	7.5
		3	11				100	6								
		2	10				100	7								10.0
		5	7				90	8	0	93	8			26	SP-SM	
		6	23				80	9								12.5
		5	24				85	10	0	93	7			28	SP-SM	
		9	31				85	11								15.0
		4	32				90	12								17.5
70.7	18.0	6	50			18' to 27': SAND, reddish brown, (SP)	100	13								
		6	47				100	14	0	96	4			29	SP	20.0
		17	38				100	15								
		9	38				100	16	0	96	5			28	SP	22.5

DRILLING LOG (Cont Sheet)					INSTALLATION		SHEET 2 OF 2 SHEETS									
PROJECT Proposed Horizontal Expansion of					COORDINATE SYSTEM State Plane		HORIZONTAL NAD83									
LOCATION COORDINATES N 1,503,800.8 E 597,371.6					ELEVATION TOP OF BORING 88.7		VERTICAL NAVD88									
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC		ASTM Class
61.7	27.0	8	29			18' to 27': SAND, reddish brown, (SP) (continued)	100	17								25.0
		12														
		19														
		4	31													
55.7	33.0	10				27' to 33': SAND, with silt, light brown (SP-SM)	100	18								27.5
		12														
		3	22													
		6														
		5														
		1	11													
		1														
		2														
		1	3													
		0														
		1														
		49.7	39.0	2			1			33' to 39': SAND, with silt, gray, (SP-SM)	100	21	0	94	7	
1																
2																
2																
1																
1																
1																
1																
46.7	42.0	0	3			39' to 42': SAND, silty, gray, (SM)	95	23							32.5	
		1														
		1														
		1														
		1	2													
		0														
		1	1													
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	25	0	90	10		27	SP-SM	35.0	
		0														
		0														
		0														
		0	W/H													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	26							37.5	
		0														
		0														
		0														
		0	W/H													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	27							40.0	
		0														
		0														
		0														
		0	W/H													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	28							42.5	
		0														
		0														
		0														
		0	W/H													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	29							45.0	
		0														
		0														
		0														
		0	1													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	30			57		44	CH	47.5	
		0														
		0														
		0														
		0	1													
		0														
		0														
		0														
40.7	48.0	0	W/H			42' to 48': CLAY, sandy, greenish gray, (CH)	100	31			58	71	56	50	CH	47.5
		0														
		0														
		0														
		0	W/H													
		0														
		0														
		0														

W/H
Boring terminated 48 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

Boring Designation SP-03

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS										
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER SP-03				LOCATION COORDINATES N 1,504,129.2 E 598,130.9		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 13										
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES		0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL		BEARING										
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		80.1										
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 8/2/11										
8. TOTAL DEPTH OF BORING 20.0				16. ELEVATION TOP OF BORING		85.8										
				17. TOTAL CORE RECOVERY FOR BORING		N/A										
				18. SIGNATURE AND TITLE OF INSPECTOR		COMPLETED 8/2/11										
				Stevens Gregory		Geotechnical Engineer										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	
84.3	1.5	1				0' to 1.5': SAND, with roots, gray, (SP)	60	1	0	97	3			4	SP	
82.8	3.0	3	3			1.5' to 3': SAND, with silt, with roots, dark brown, (SP-SM)	60	2	0	93	7			24	SP-SM	Organic Content=5.4%
		5														
		7														
		10	12			3' to 9': SAND, with silt, dark brown, (SP-SM)	50	3	0	95	6			16	SP-SM	
		13														
		24														
		13	37				100	4								
		15														
		18														
		10	33				100	5	0	93	7			18	SP-SM	
		13														
		14														
		10	27				100	6	0	95	5			19	SP-SM	Organic Content=2.0%
76.8	9.0	16														
		19														
		10	35			9' to 12': SAND, with silt, organic silt, dark brown, (SP-SM)	100	7								
		21														
		16														
		3	37				70	8	0	93	7			27	SP-SM	Organic Content=5.6%
73.8	12.0	5														
		8														
		10	13			12' to 13.5': SAND, silty, organic silt, dark brown, (SM)	70	9	0	87	13			32	SM	Organic Content=8.4%
72.3	13.5	16														
		18														
		16	34			13.5' to 18': SAND, with silt, organic silt, dark brown, (SP-SM)	80	10								
		35														
		50														
		24	85				80	11								
		38														
		34														
		14	72				80	12	0	92	8			29	SP-SM	Organic Content=5.6%
67.8	18.0	22														
		29														
		17	51			18' to 20': SAND, with silt, dark reddish brown, (SP-SM)	80	13								
		24														
		35														
65.8	20.0	50														
		59														
Boring terminated 20 feet below ground surface.																
1. Soils are field visually classified in accordance with the Unified Soil Classification System																
2. W/H: Weight of Hammer																
3. W/R: Weight of Rod																

Boring Designation SP-04

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS											
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER SP-04				LOCATION COORDINATES N 1,504,011.7 E 597,722.9		10. SIZE AND TYPE OF BIT 2 7/8" Drag Bit											
3. DRILLING AGENCY Ardaman and Associates, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL CME 55		12. TOTAL SAMPLES DISTURBED 13 UNDISTURBED 0											
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER 82.3											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				15. DATE BORING 8/2/11		STARTED 8/2/11											
7. DEPTH DRILLED INTO ROCK				16. ELEVATION TOP OF BORING 87.8		COMPLETED 8/2/11											
8. TOTAL DEPTH OF BORING 20.0				17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Stevens Gregory Geotechnical Engineer											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
86.3	1.5	2 5 6				0' to 1.5': SAND, with silt, gray, (SP-SM)	70	1	0	94	6			15	SP-SM		
		8 9 15	11			1.5' to 9': SAND, brown, (SP)	60	2	0	96	4			9	SP		
		12 13 15	24				60	3									
		9 9 10	28				60	4	0	97	3			20	SP		
		6 8 9	19				60	5									
		6 9 9	17				100	6	0	96	4			20	SP		
78.8	9.0	12															
		8 9 11	21			9' to 12': SAND, with silt, dark brown, (SP-SM)	100	7									
		10 13 16	20				100	8									
75.8	12.0																
		7 12 15	29			12' to 13.5': SAND, silty, organic silt, dark brown, (SP-SM)	60	9	0	90	10			29	SP-SM	Organic Content=7.6%	
74.3	13.5																
		5 11 15	27			13.5' to 15': SAND, silty, organic silt, dark brown, (SM)	60	10	0	87	13			27	SM	Organic Content=8.5%	
72.8	15.0																
		7 10 10	26			15' to 16.5': SAND, with silt, organic silt, dark brown, (SP-SM)	60	11	0	90	10			31	SP-SM	Organic Content=9.1%	
71.3	16.5																
		3 4 10	20			16.5' to 20': SAND, with silt, dark brown, (SP-SM)	70	12	0	91	9			31	SP-SM	Organic Content=6.8%	
		12 15 18	14				70	13									
67.8	20.0	20															
		33															
Boring terminated 20 feet below ground surface.																	
1. Soils are field visually classified in accordance with the Unified Soil Classification System																	
2. W/H: Weight of Hammer																	
3. W/R: Weight of Rod																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 2 SHEETS											
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER SP-05				LOCATION COORDINATES N 1,504,131.0 E 597,357.5		10. SIZE AND TYPE OF BIT											
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 14											
4. NAME OF DRILLER				13. TOTAL NUMBER CORE BOXES		0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		82.9											
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 7/22/11											
8. TOTAL DEPTH OF BORING 21.0				16. ELEVATION TOP OF BORING		88.5											
				17. TOTAL CORE RECOVERY FOR BORING		N/A											
				18. SIGNATURE AND TITLE OF INSPECTOR													
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
87.0	1.5	1				0' to 1.5': SAND, with roots, gray, (SP)	50	1	0	97	3			4	SP		
85.5	3.0	2	3			1.5' to 3': SAND, with silt, brown, (SP-SM)	50	2	0	94	6			7	SP-SM		
		4															
		5	8			3' to 9': SAND, brown, (SP)	50	3	0	96	4			6	SP		
		6															
		7															
		5	13				50	4									
		5															
		10															
		2	15				100	5	0	97	4			21	SP		
		2															
		4															
		2	6				100	6									
79.5	9.0	3															
		6															
		6	9			9' to 13.5': SAND, with silt, organic silt, dark brown, (SP-SM)	100	7	0	95	5			20	SP-SM	Organic Content=3.1%	
		10															
		19															
		12	29				80	8	0	88	12			26	SP-SM	Organic Content=5.4%	
		20															
		20															
		9	40														
		10					30	9									
75.0	13.5	13															
		12	23			13.5' to 21': SAND, reddish brown, (SP)	60	10	0	95	5			28	SP		
		15															
		19															
		6	34				40	11									
		11															
		11															
		6	22				50	12									
		9															
		10															
		3	19				80	13	0	96	4			28	SP		
		9															
		11															
		4	20														
67.5	21.0	5					80	14									
		7															
12 Boring terminated 21 feet below ground surface. 1. Soils are field visually classified in accordance with the Unified Soil Classification System 2. W/H: Weight of Hammer																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

DRILLING LOG (Cont Sheet)	INSTALLATION		SHEET 2
			OF 2 SHEETS
PROJECT	COORDINATE SYSTEM		HORIZONTAL
Proposed Horizontal Expansion of	State Plane		NAD83
LOCATION COORDINATES	ELEVATION TOP OF BORING		VERTICAL
N 1,504,131.0 E 597,357.5	88.5		NAVD88

ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class	

3. W/R: Weight of Rod

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

Boring Designation SP-06

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS											
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER SP-06				LOCATION COORDINATES N 1,503,522.9 E 597,756.5		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55											
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 13											
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES		0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		81.9											
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 8/2/11											
8. TOTAL DEPTH OF BORING 20.0				16. ELEVATION TOP OF BORING		87.9											
				17. TOTAL CORE RECOVERY FOR BORING		N/A											
				18. SIGNATURE AND TITLE OF INSPECTOR		COMPLETED 8/2/11											
				Stevens Gregory		Geotechnical Engineer											
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
80.4	7.5	1			[Symbol]	0' to 7.5': SAND, brown, (SP)	60	1	0	98	2				7	SP	
		2															
		4															
		3															
		6															
		5															
		7															
		7															
		12															
		8															
		10															
		72.9	15.0	7													
9																	
12																	
10																	
21																	
13																	
16																	
17																	
29																	
32																	
3																	
61																	
71.4	16.5	4	12	[Symbol]	15' to 16.5': SAND, with silt, trace organic silt, dark reddish brown, (SP-SM)	60	11	0	94	6				32	SP-SM	Organic Content=3.3%	
		15															
		5															
		28															
		7															
		9															
		4															
		16															
		4															
		8															
		8															
		12															
67.9	20.0	5	28	[Symbol]	16.5' to 20': SAND, with silt, reddish brown (SP-SM)	50	12										
		7															
		9															
		4															
		16															
		4															
		8															
		8															
		12															
		12															
		12															
		12															

Boring terminated 20 feet below ground surface.

1. Soils are field visually classified in accordance with the Unified Soil Classification System

2. W/H: Weight of Hammer

3. W/R: Weight of Rod

Boring Designation SP-07

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS										
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83										
2. HOLE NUMBER SP-07				LOCATION COORDINATES N 1,503,314.7 E 598,145.2		11. MANUFACTURER'S DESIGNATION OF DRILL CME 55										
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 13										
4. NAME OF DRILLER M. Brackins				13. TOTAL NUMBER CORE BOXES		0										
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING										
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		81.1										
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 8/2/11										
8. TOTAL DEPTH OF BORING 20.0				16. ELEVATION TOP OF BORING		87.4										
				17. TOTAL CORE RECOVERY FOR BORING		N/A										
				18. SIGNATURE AND TITLE OF INSPECTOR		COMPLETED 8/2/11										
				Stevens Gregory		Geotechnical Engineer										
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
		1				0' to 3': SAND, with roots, gray, (SP)										
		2					60	1			2			6	SP	
		2														
		3	4				60	2								
84.4	3.0	4														
		6	6			3' to 4.5': SAND, brown, (SP)										
		7					70	3			4			12	SP	
82.9	4.5	9														
		13	16			4.5' to 13.5': SAND, with silt, brown, (SP-SM)										
		15					60	4								
		15														
		6	30				100	5			7			19	SP-SM	
		9														
		11					100	6								
		6	20													
		8					100	7			6			22	SP-SM	
		9														
		13					100	8								
		8	21													
		9					100	9			7			21	SP-SM	
		12														
		9	21													
73.9	13.5	13					100	9								
		17														
		6	30			13.5' to 15': SAND, silty, organic silt, dark brown, (SM)	60	10			14			22	SM	
72.4	15.0	9														
		10														
		9	19			15' to 18': SAND, with silt, organic silt, dark brown, (SP-SM)	80	11			9			27	SP-SM	
		8														
		9														
		8	17													
		11					80	12								
69.4	18.0	13														
		7	24			18' to 20': SAND, silty, dark reddish brown, (SM)	90	13			22			23	SM	
		12														
		15														
67.4	20.0	23														
		27														
Boring terminated 20 feet below ground surface.																
1. Soils are field visually classified in accordance with the Unified Soil Classification System																
2. W/H: Weight of Hammer																
3. W/R: Weight of Rod																

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

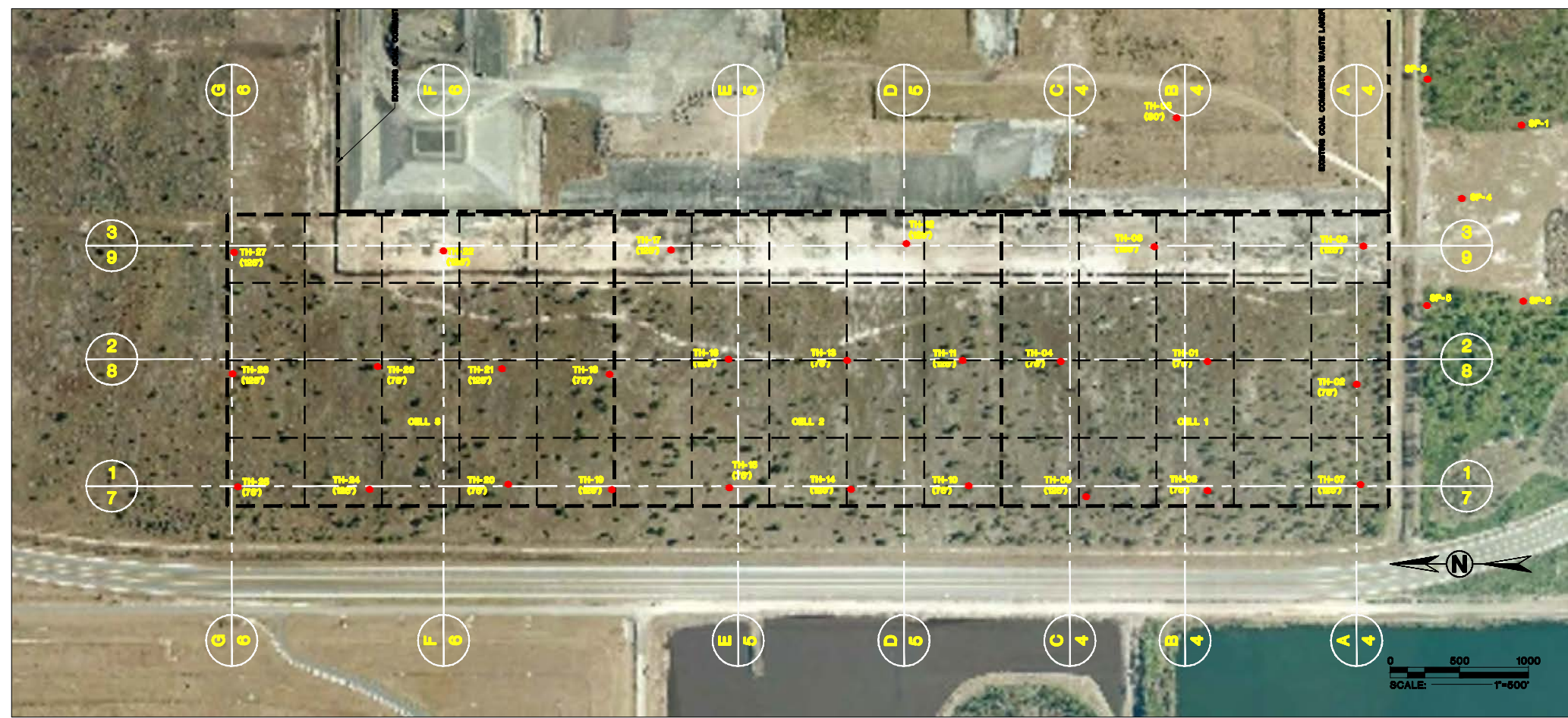
Boring Designation SP-08

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 2 SHEETS											
1. PROJECT Proposed Horizontal Expansion of				9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83											
2. HOLE NUMBER SP-08				LOCATION COORDINATES N 1,503,325.9 E 597,360.7		10. SIZE AND TYPE OF BIT											
3. DRILLING AGENCY Ardaman and Associates, Inc.				12. TOTAL SAMPLES		DISTURBED 14											
4. NAME OF DRILLER				13. TOTAL NUMBER CORE BOXES		0											
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG FROM VERTICAL ---		BEARING											
6. THICKNESS OF OVERBURDEN				14. ELEVATION GROUND WATER		82.3											
7. DEPTH DRILLED INTO ROCK				15. DATE BORING		STARTED 7/22/11											
8. TOTAL DEPTH OF BORING 21.0				16. ELEVATION TOP OF BORING		88.5											
				17. TOTAL CORE RECOVERY FOR BORING		N/A											
				18. SIGNATURE AND TITLE OF INSPECTOR													
ELEV	DEPTH	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory								REMARKS
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
87.0	1.5	1				0' to 1.5': SAND, with roots, gray, (SP)	60	1	0	97	3			4	SP	Organic Content=4.1%	
85.5	3.0	2	3			1.5' to 3': SAND, with silt, trace organic silt, very dark brown, (SP-SM)	50	2	0	92	8			10	SP-SM		
		4												5	SP		
82.5	6.0	5	8			3' to 6': SAND, light brown, (SP)	40	3	0	97	3						
		6					50	4									
		7	13														
		6															
		4	12			6' to 10.5': SAND, brown, (SP)	60	5	0	98	2			21	SP		
		4															
		2	8				100	6									
78.0	10.5	4															
		2	10				100	7									
		3															
		6															
		2	9			10.5' to 16.5': SAND, with silt, organic silt, dark brown, (SP-SM)	100	8	0	92	8			27	SP-SM	Organic Content=5.4%	
		3															
		5	8				50	9									
		3															
		5															
		10															
		5	15				40	10	0	90	10			27	SP-SM	Organic Content=4.6%	
		15															
		19	34				50	11									
72.0	16.5	19															
		21															
		12	40			16.5' to 18': SAND, with silt, dark brown, (SP-SM)	50	12	0	95	5			29	SP-SM		
70.5	18.0	19															
		21															
		8	40			18' to 21': SAND, reddish brown, (SP)	50	13									
		15															
		20															
		9	35														
67.5	21.0	15					50	14									
		21															
Boring terminated 21 feet below ground surface. 1. Soils are field visually classified in accordance with the Unified Soil Classification System 2. W/H: Weight of Hammer																	

ACE 1836-A (DRILLING LOG) 10-13-0249 OUC LANDFILL EXPANSION-SPT.GPJ ACE MVD WITH RAPID CPT 06-09-08.GDT 11/9/11

Appendix 4

Soil Boring Profiles

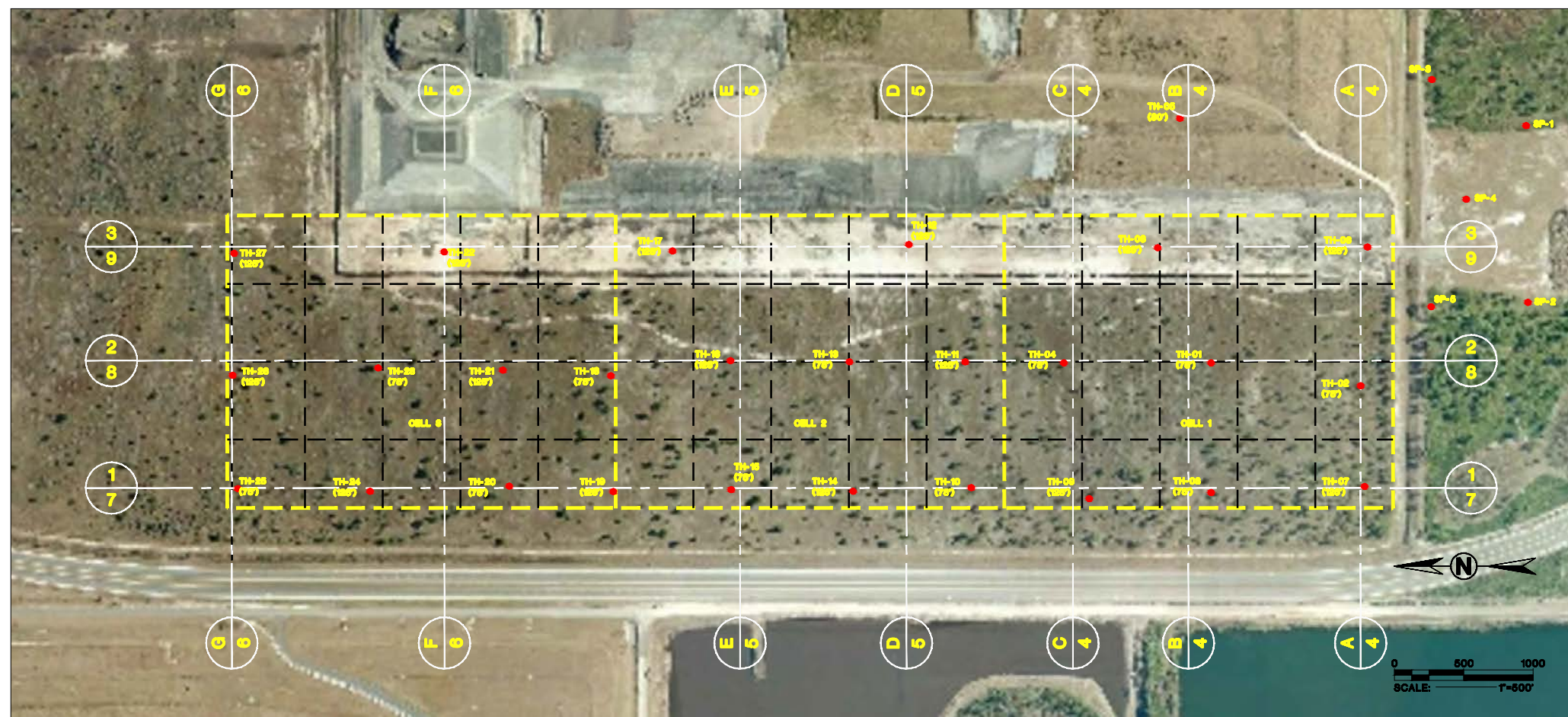
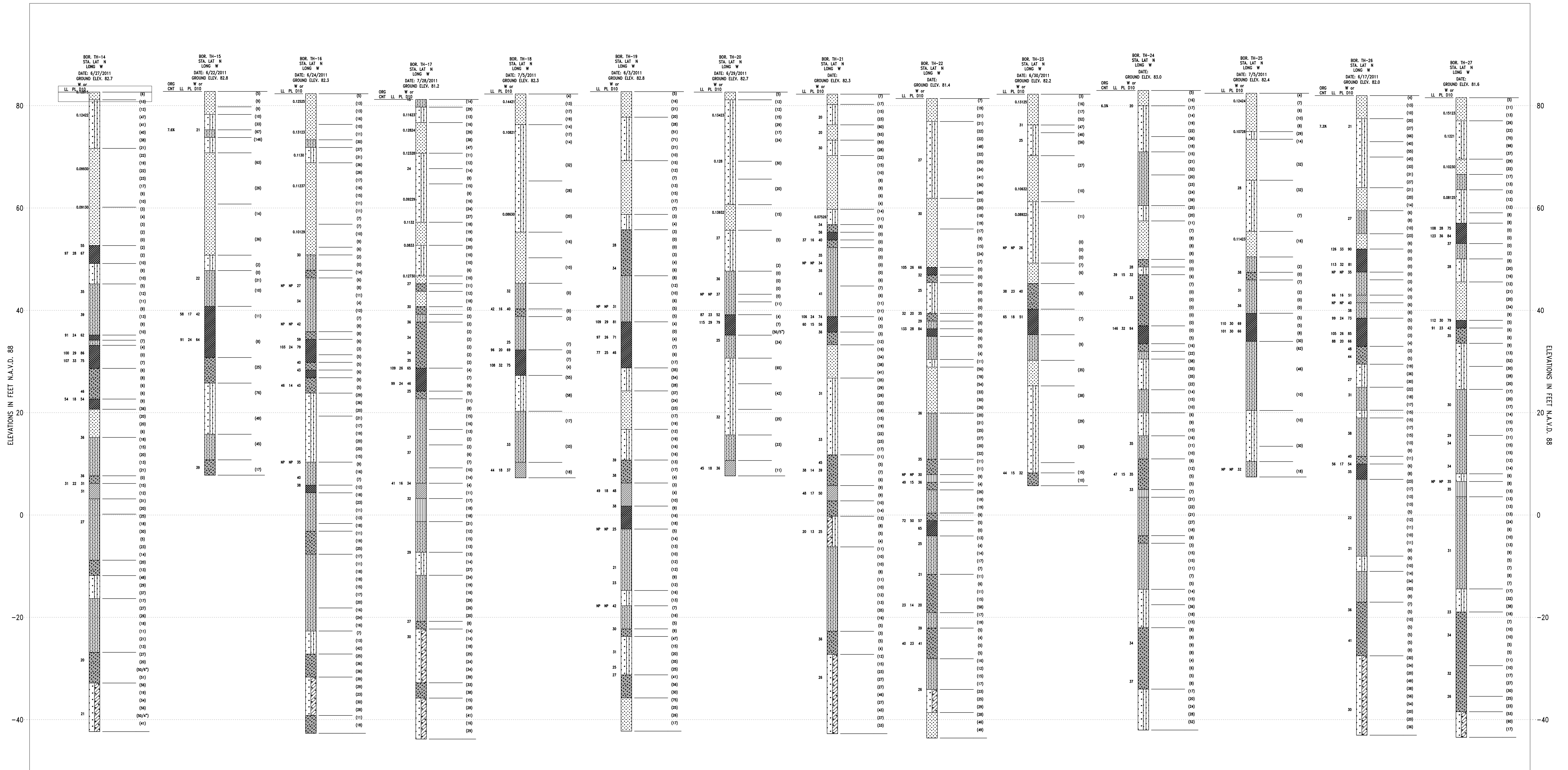


Legend:

	Poorly Graded Sand with Silt
	SM – Silty Sand
	SC – Clayey Sand
	SP – Sand, Poorly Graded
	CH – Fat Clay
	CL – USCS Lean Clay
	ML – Inorganic Silt

[illegible]

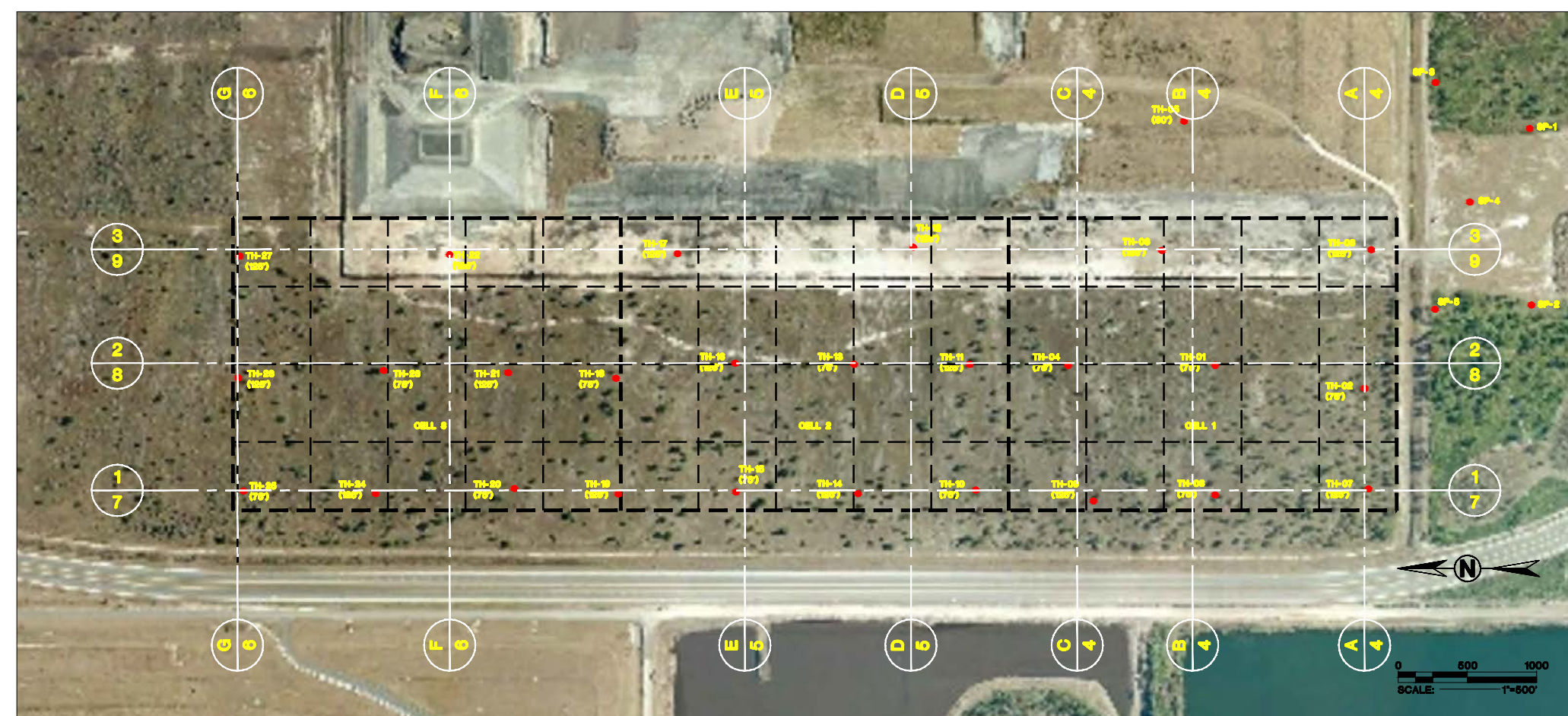
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- Legend:
- (1) Poorly Graded Sand with Silt - Poorly Graded Sand with Silt
 - (2) SM - Silty Sand
 - (3) SC - Clayey Sand
 - (4) SP - Sand, Poorly Graded
 - (5) CH - Fat Clay
 - (6) CL - USCS Lean Clay
 - (7) ML - Inorganic Silt

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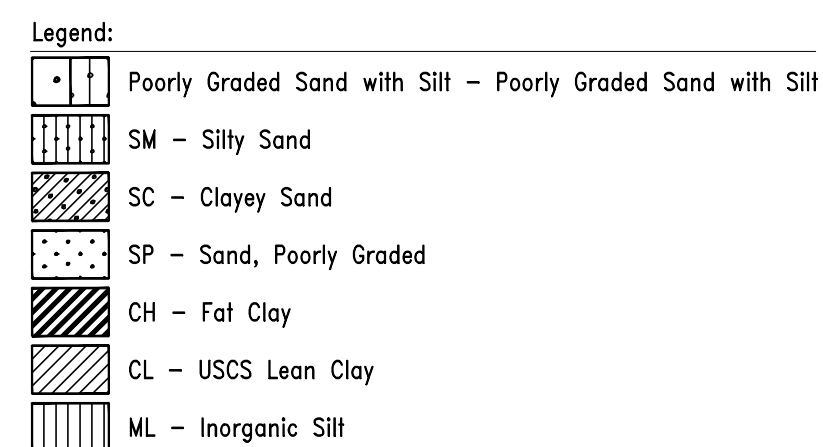


-  **Ardaman & Associates, Inc.**
Geotechnical, Environmental, and
Materials Consultants
A Tetra Tech Company
8008 S. Orange Ave. Orlando, FL 32809
TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950



FIGURE NO.

1



 **Ardam & Associates, Inc.**
Geotechnical, Environmental, and
Materials Consultants
A Tetra Tech Company
8008 S. Orange Ave. Orlando, FL 32809
TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950

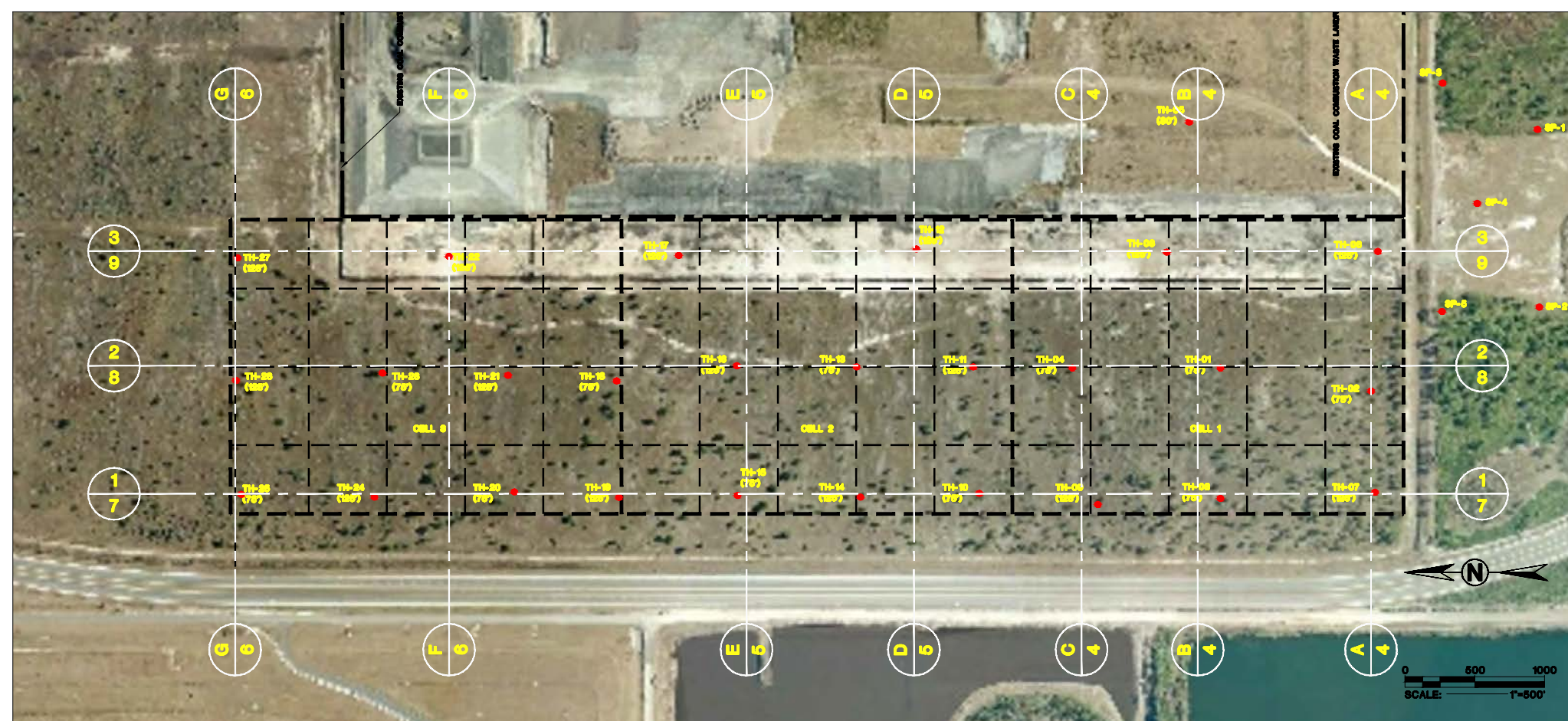
OUC STANTON ENERGY CENTER
ORANGE COUNTY, FLORIDA

TABLE 1

5

The figure displays four stratigraphic logs for borings TH-20, TH-24, TH-21, and TH-23. Each log includes a depth scale on the left (0 to 100 feet), a central column for lithology, and a right column for test results. The logs are oriented vertically, with depth increasing downwards.

- BOR TH-20:** STA. LAT. N, LONG. W, DATE: 6/29/2011, GROUND ELEV. 82.7. The log shows a mix of sand, silt, and clay, with test results ranging from 15 to 100.
- BOR TH-24:** STA. LAT. N, LONG. W, DATE: 6/29/2011, GROUND ELEV. 83.0. The log shows a mix of sand, silt, and clay, with test results ranging from 15 to 100.
- BOR TH-21:** STA. LAT. N, LONG. W, DATE: 6/30/2011, GROUND ELEV. 82.5. The log shows a mix of sand, silt, and clay, with test results ranging from 15 to 100.
- BOR TH-23:** STA. LAT. N, LONG. W, DATE: 6/30/2011, GROUND ELEV. 82.2. The log shows a mix of sand, silt, and clay, with test results ranging from 15 to 100.

[illegible]

- Legend:**
- | | |
|--|------------------------------|
| | Poorly Graded Sand with Silt |
| | SM – Silty Sand |
| | SC – Clayey Sand |
| | SP – Sand, Poorly Graded |
| | CH – Fat Clay |
| | CL – USCS Lean Clay |
| | ML – Inorganic Silt |

[illegible]

Ardaman & Associates, Inc.
Geotechnical, Environmental, and
Materials Consultants
A Tetra Tech Company
8008 S. Orange Ave. Orlando, FL 32809
TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950



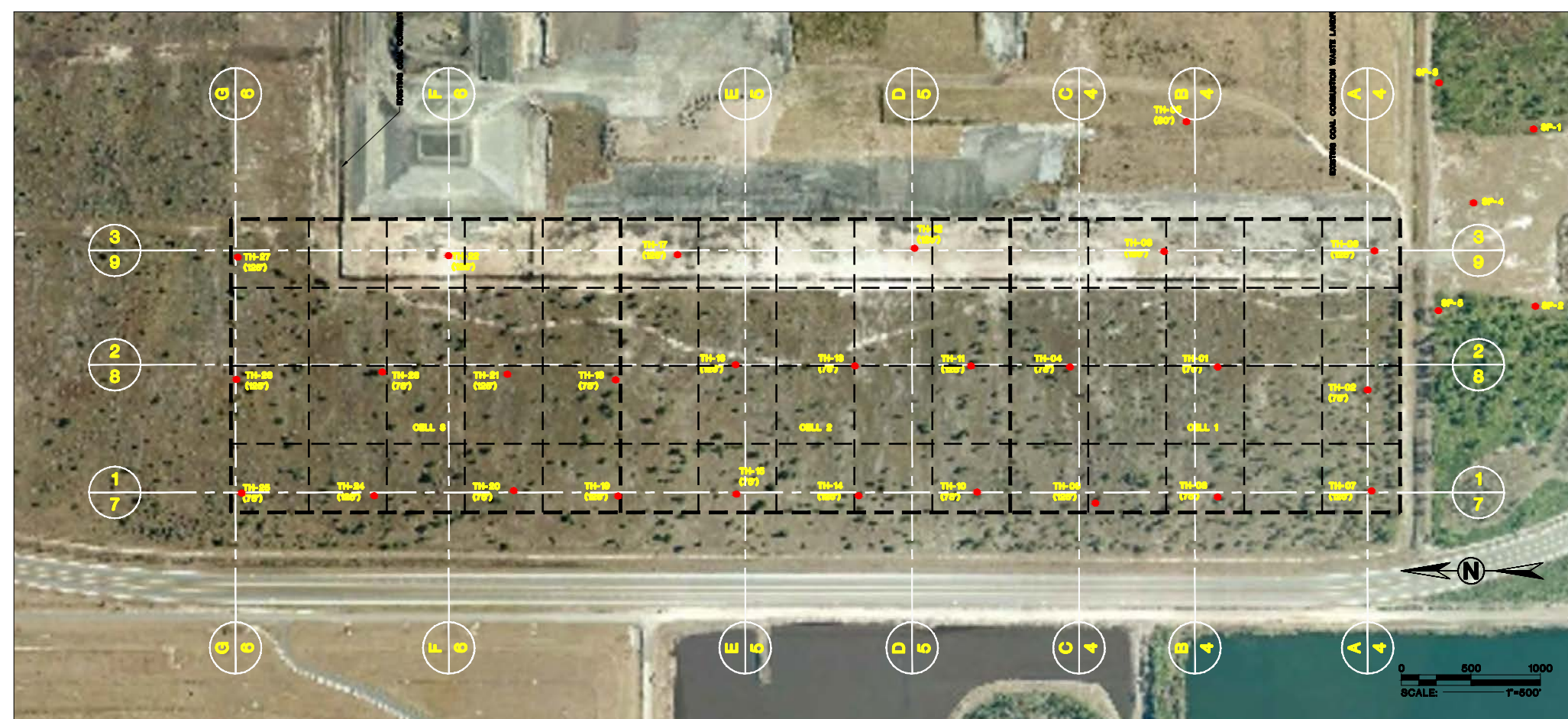
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ORANGE COUNTY, FLORIDA

CELL 3 SECTIONS F AND G

FIGURE NO.

6

The image displays a geological cross-section of the New York State Thruway, showing 10 boreholes (BOR TH-03 to BOR TH-25) with their respective logs, elevations, and soil descriptions. The cross-section is oriented horizontally, with elevations in feet N.A.V.D. 88 on the vertical axis. Each borehole log includes stationing, date, ground elevation, and a detailed description of soil layers with their respective thicknesses and depths. The logs are color-coded to represent different soil types: brown for silty clay, yellow for silty sand, green for sand, and blue for gravel. The cross-section shows a variety of soil conditions, including silty clay, silty sand, sand, and gravel, with varying degrees of consolidation and moisture content. The boreholes are spaced along the length of the thruway, providing a comprehensive view of the subsurface geology.



- Legend:**
- | | |
|--|---|
| | Poorly Graded Sand with Silt - Poorly Graded Sand with Silt |
| | SM - Silty Sand |
| | SC - Clayey Sand |
| | SP - Sand, Poorly Graded |
| | CH - Fat Clay |
| | CL - USCS Lean Clay |
| | ML - Inorganic Silt |

[illegible]

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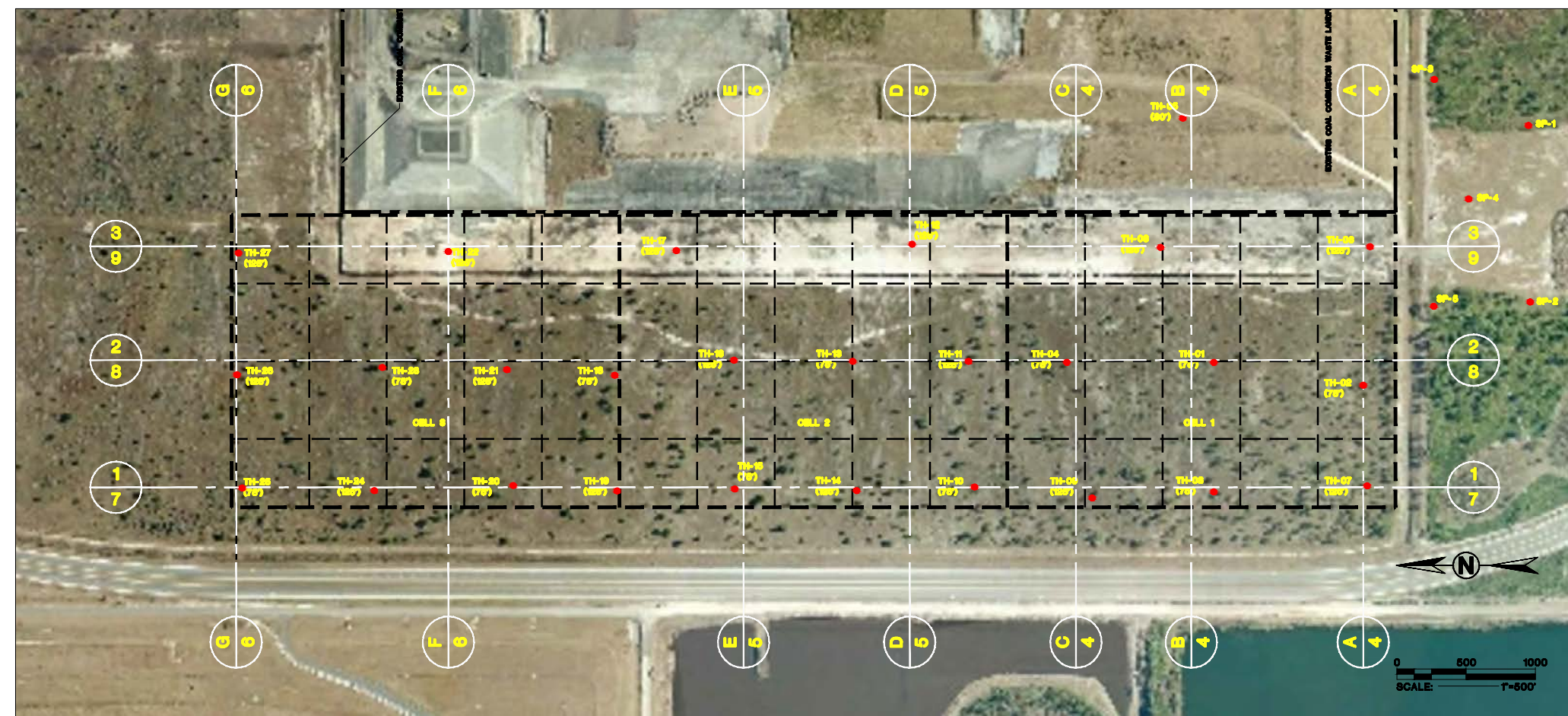
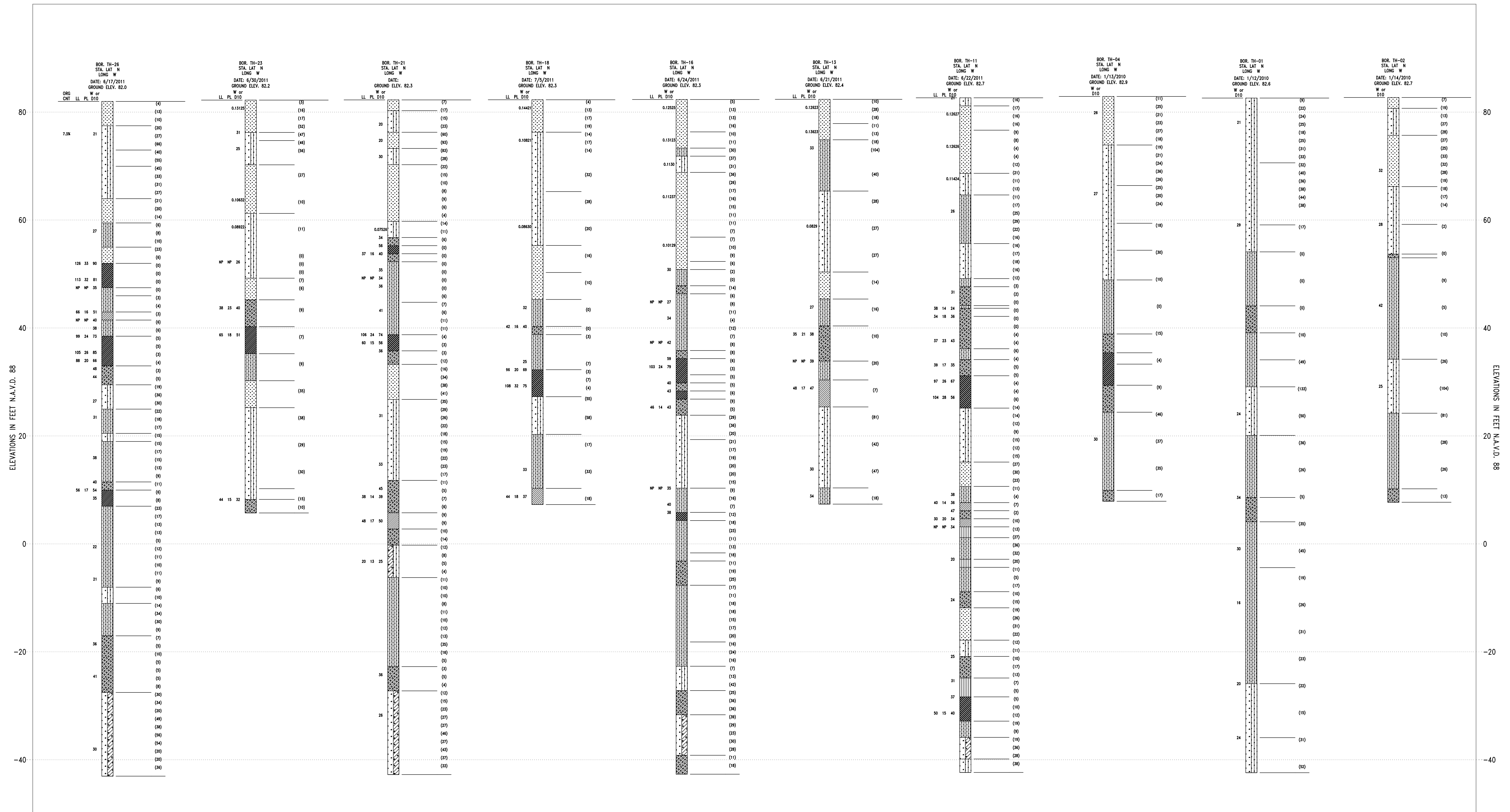


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SECTION 1

FIGURE NO.

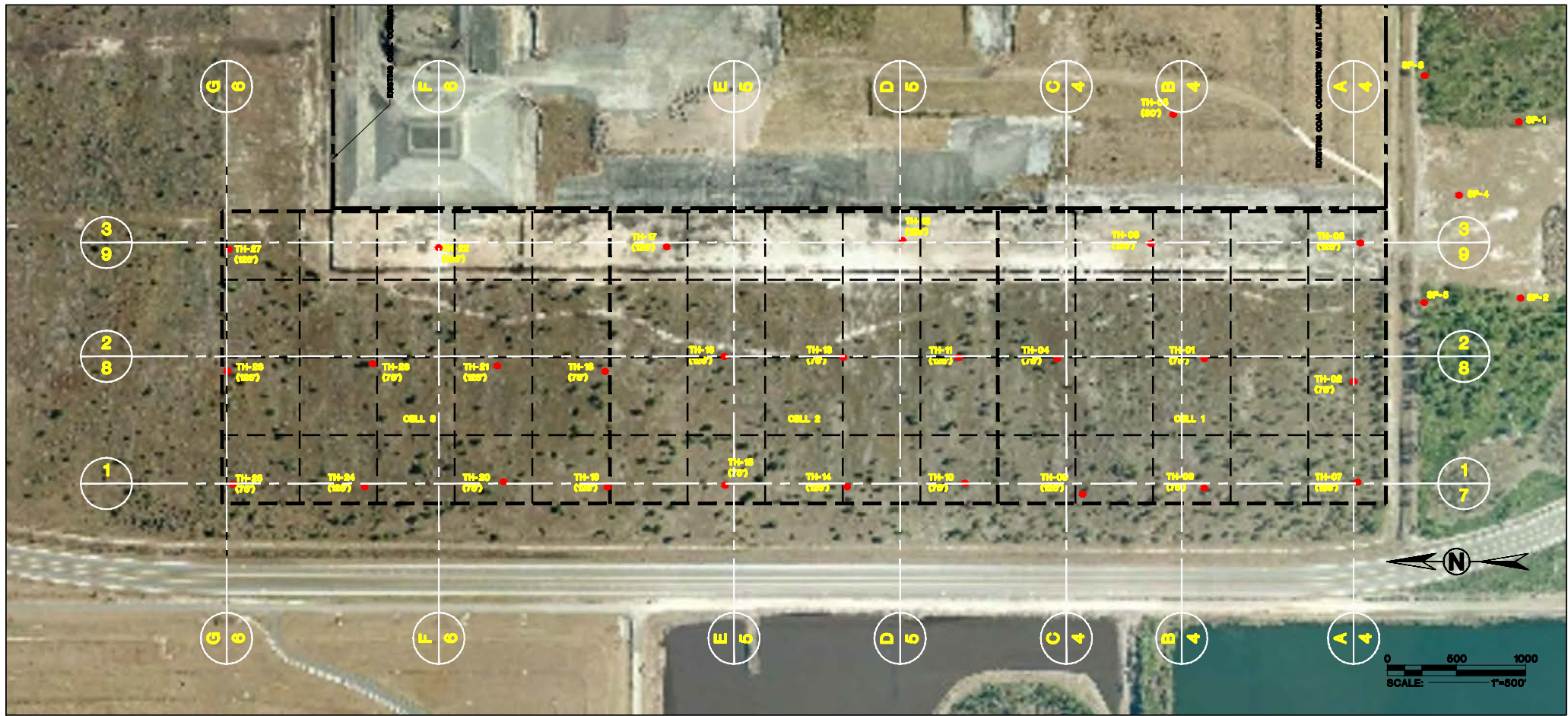
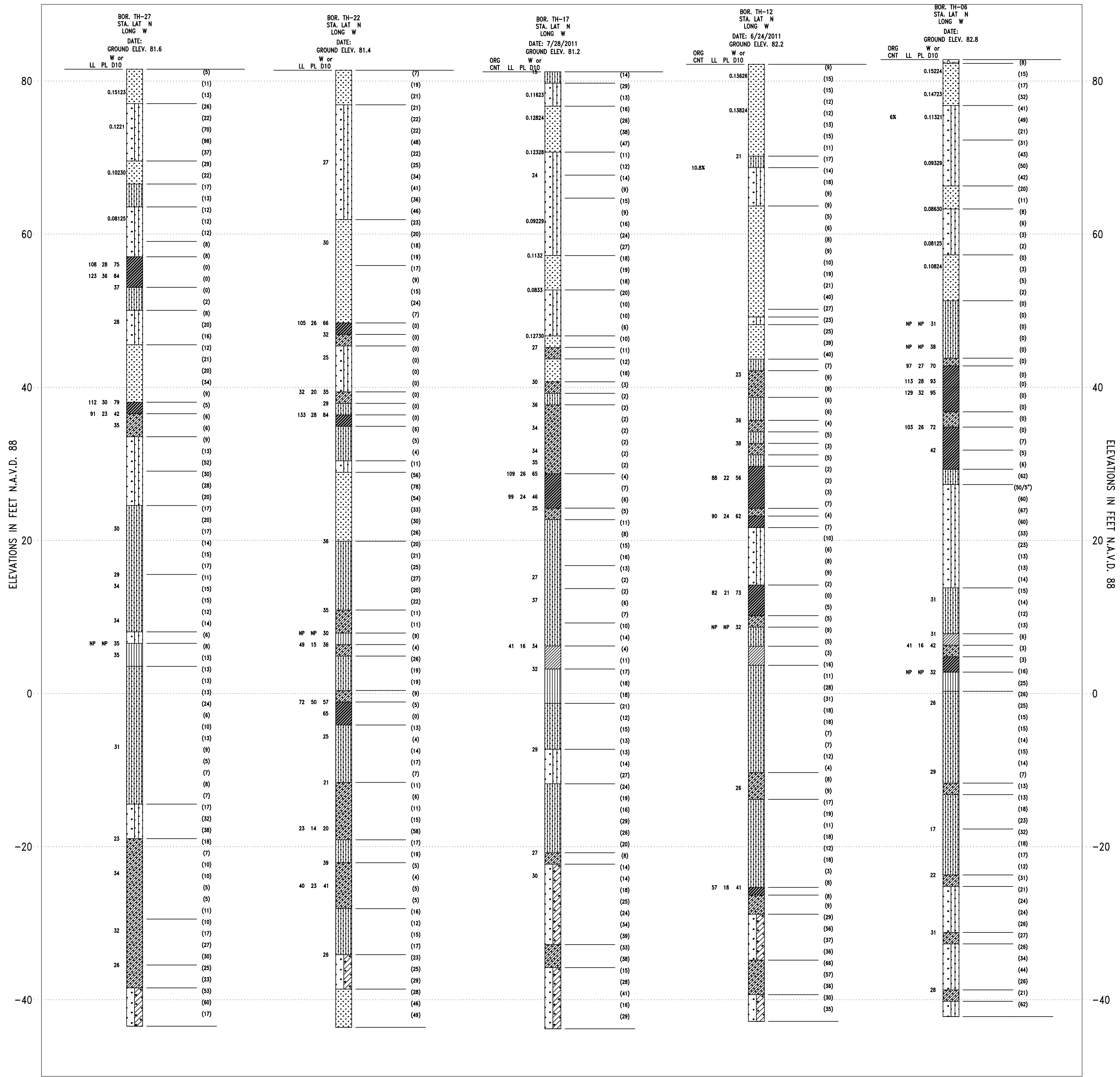
7



- Legend:**
- | | |
|---|------------------------------|
|  | Poorly Graded Sand with Silt |
|  | SM – Silty Sand |
|  | SC – Clayey Sand |
|  | SP – Sand, Poorly Graded |
|  | CH – Fat Clay |
|  | CL – USCS Lean Clay |
|  | ML – Inorganic Silt |

[illegible]

SECTION 3-3



- Legend:
- Poorly Graded Sand with Silt - Poorly Graded Sand with Silt
 - ▨ SM - Silty Sand
 - ▩ SC - Clayey Sand
 - ▧ SP - Sand, Poorly Graded
 - ▦ CH - Fat Clay
 - ▤ CL - USCS Lean Clay
 - ▥ ML - Inorganic Silt