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April 2, 2001

HAI #99-331.01
Phase 1
File 13.2

Via UPS Overnight

Mr. Kim Ford, P.E.
Solid Waste Section
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

D.E.P.
APR 04 2001
Southwest District Tampa

Subject: **Request for Additional Information, dated January 10, 2001**
Sid Larkin & Son, Inc.
Enterprise Recycling and Disposal Facility, Class III Landfill
Pasco County, Florida
Pending Permit Numbers 177982-001-SC and 177982-002-SO

Dear Mr. Ford:

On behalf of Sid Larkin & Son, Inc. (SLS), Hartman & Associates, Inc. (HAI) is submitting for your review, responses to the hydrogeological comments of your request for additional information, dated January 10, 2001, for the above referenced facility. Your comments are stated first with our responses following. Basically, we are submitting a revised Hydrogeological Investigation, Section 5, of the application to address these comments.

Comments from Kim Ford:

Comment 7. 62-701.410(2). Additional information is needed to verify a continuous confining unit. Conclusions and recommendations are needed for each cell (disposal area). Additional soil borings are requested to confirm the presence of clay over limerock for each cell, with locations to be proposed to the Department prior to drilling, and a list of all special construction procedures, related professional monitoring and certifications of completion for each special site development activity. Site plans should include recommendations for preparation of each disposal area prior to acceptance of waste and any other recommendations to ensure site stability.

Response: An additional (15) borings were recently conducted by a mining company, Angelo's Aggregate Materials Inc., on the landfill site, see revised Figure 4 in Section 5, for locations. These borings further confirm the presence of the clay layer over limerock at the site (the raw logs, of Angelo's Geologist are attached). An additional 6 borings completed across the site shown on Figure 4, also all confirmed the presence of a sandy clay over limerock for each cell. The proposed base of the landfill does not breach this confining layer nor does it encounter limestone, see geologic cross-sections Figures 5, 6, 6.1 and 6.2 in Section 5.

We have revised the certificate of construction, Section 3.15, of the Engineering Report to recognize observation of the in-situ clays at the base of the landfill and the testing of landfill soils to ensure stability, see Section 3.15. Notes have also been added to the Site Plan, Figure 3-6 referring to cell preparation and certification prior to waste acceptance.

Comments from John Morris:

Comment 3. H.1.b – Rate and Direction of Groundwater Flow (Rule 62-701.410(1)(a)1, F.A.C.)

a. It is indicated in Section 5.2.2 of the Hydrogeological Investigation (HAI, November 2000) that groundwater flow in the surficial aquifer is generally from the west to the east across the site, and that a steeper hydraulic gradient is present along the western half of the site. It appears that the steeper hydraulic gradient at the western half has been based on the lack of groundwater at piezometer P-1 (bottom elevation of screen about 94.6 feet) during March 2000. Groundwater contours for the western half of the site shown on Figures 9, 10, and 11 for March, May, and October 2000, respectively, are inferred and do not represent actual measurement of groundwater. Please provide the locations of proposed supplemental borings and piezometers to determine the uppermost aquifer at the western half of the site, to describe the hydraulic gradient across the site, and to verify the direction of groundwater flow.

Response: Section 5.2.2 of the Hydrogeological Investigation has been revised based on our supplemental borings and piezometers installed in February and March 2001. Our borings and piezometers basically found no surficial aquifer on the western portion of the site above on elevation of 130 ft NGVD. The uppermost aquifer on the western portion of the site at this time (drought condition) is the Floridan aquifer. Figures 11.1 and 14.1 depict the surficial and Floridan aquifer water levels on March 26, 2001, respectively. These measurements verified that the hydraulic gradients and groundwater flow directions of these aquifers were basically to the east-northeast across the site, see Section 5.2.2 for further details.

Comment 3. b. It is indicated in Section 5.2.2 of the Hydrogeological Investigation that the water levels presented on Figures 9, 10, and 11 represent the surficial aquifer. Review of the cross sections, boring logs and piezometer construction details appears to indicate the screen may be partially or entirely open to limestone deposits at some of the piezometers. It is unclear if piezometers P-5 and P-6 represent surficial and/or Floridan aquifer water levels, and it appears that piezometers P-8 and P-9 represent Floridan aquifer water levels. Please evaluate the construction of the piezometers, indicate what hydrogeologic unit is monitored at each piezometer, and revise the discussion of surficial aquifer water levels, as appropriate.

Response: As discussed at our February 7, 2001 meeting, piezometers P-5 and P-6 are considered surficial aquifer peizometers and P-8 and P-9 are considered Floridan aquifer piezometers. Additional piezometers P-10, P-11, P-12, and P-1A were installed in March 2001 to monitor Floridan aquifer water levels. Piezometer P-13 was installed near the center of the site to encounter the western extent of the surficial aquifer. On March 26, 2001 a full round of water levels was measured at all piezometers. Based on this information, our discussion of surficial and Floridan aquifer water levels has been revised, see enclosed Sections 5.2.2 and 5.2.4.

Comment 3. i. In the absence of site-specific effective porosity values, it is considered more conservative to use a range of values in reference literature for sandy soils. Typical porosity values for sandy soils range from 25 to 40 percent (Groundwater and Wells) to 25 to 50 percent (Freeze and Cherry). Please use a range of porosity values that is considered to be representative of native soils and revise the groundwater flow velocity calculations as appropriate.

Response: A range of effective porosity (25% to 45%) for the surficial aquifer was used to recalculate groundwater flow velocity, see revised Section 5.2.2 enclosed. The calculated groundwater flow velocity for the surficial aquifer ranged from 0.02 ft/day to 0.012 ft/day.

Comment 5. c. It appears that the discussion of site lithology provided in Section 5.1.4 of the Hydrogeological Investigation as reflected in the geologic cross sections (Figures 5 and 6) combined all the clayey sediments (clayey sand, sandy clay, clay) that occurred directly above the uppermost limestone deposits into a singular clay unit. This designation obscures the extensive clayey sand sediments that occurred at several boring locations (B-2, B-3, B-5, B-7, B-8, B-9, and B-10). Please revise the geologic cross sections to distinguish between clayey sand and sandy clay/clay sediments and Section 5.1.4 to reflect this requested change. Pending evaluation of the response provided to comment

No. 5.b., the Department will use the boring logs provided in the Geotechnical Report as the basis for evaluating the cross sections.

Response: We have revised Figures 5, 6, 6.1 and 6.2 of Section 5, to distinguish clayey sand from sandy clay/clay sediments. Section 5.1.4 has been revised to reflect the clayey sand sediment and to include sediment description from our supplemental borings. These borings confirmed that, a consistent sandy clay layer underlies the site.

HAI's Professional Geologists of record observed the drilling, prepared the logs, and prepared the Hydrogeological Investigation, that under FAC 62-701.410(1)(a) – "defines the landfill site geology". The Geotechnical Report defines soil engineering properties and <u>not</u> geological properties. HAI's logs and cross-sections in Section 5 are <u>the</u> representation of the site's geology, see Appendix 5-A for all boring logs.

Comment 5. d. Please provide supplemental geologic cross-sections oriented north to south to characterize lithology in the central and western portions of the site.

Response: The requested additional north-south geological cross-sections in the central and western site areas are provided as Figures 6.1 and 6.2, see enclosed Section 5.

Comment 5. e. Please add the piezometers installed at the site on the cross sections described in comment Nos. 5.c. and 5.d., including the screened intervals of each piezometer.

Response: The piezometers have been added to all cross-sections as described above.

Comment 8. <u>L.1.c – Groundwater Monitoring (Rule 62-701.510(3), F.A.C.)</u>

a. The appropriateness of the proposed locations of the background and downgradient wells in the surficial aquifer that are provided in Section 5.3.1 of the Hydrogeological Investigation will be reviewed when responses to comment Nos. 3.a. and 3.b. are received.

Response: The locations of our proposed monitor wells have been revised slightly based on the March 2001 water level measurements. The surficial aquifer flows from a high at P-13 to the east-northeast and the Floridan aquifer flows from a high at P-9 to the north, east and south, see Figures 11.1 and 14.1, respectively. Based on these results, we have proposed additional downgradient Floridan monitor wells and relocated the upgradient surficial well (MW-1) to near P-13 and slightly deepened the surficial monitor wells, see revised Section 5.3.1.

Comment 8. b. It is indicated in Section 5.3.1 of the Hydrogeological Investigation that the Pasco County permit requires the installation one background well and two downgradient wells in the Floridan aquifer. Please note that with a north-northwest direction of flow in the Florida aquifer (Section 5.2.4 of the Hydrogeological Investigation) it appears that well MW-1B is downgradient of proposed disposal areas, and wells MW-5B and MW-8B are upgradient of proposed disposal areas.

Response: The site-specific flow direction of the Floridan aquifer was re-evaluated based on March 26, 2001 water levels from the deeper piezometers. Based on Figure 14.1, MW-1B (P-1A) can be used as a background well and MW-5B and MW-7B [P-12] (MW-8B deleted) used as downgradient wells. To address the north and south gradients of the Floridan, proposed monitor wells MW-2B and MW-12B have been added to the monitoring plan.

Comment 8. c. It is unclear if the piezometers installed at the site represent the surficial and/or Floridan aquifers. The appropriateness of the proposed surficial aquifer monitor well construction details provided in Section 5.3.2 and Figure 16 of the Hydrogeological Investigation will be reviewed when responses to comment Nos. 3.a.and 3.b. are received. Please note, the requirements of Rule 62-701.510(3)(d)4. F.A.C., that well screens shall be placed within the saturated thickness of the uppermost aquifer and that well screens shall not act as conduits through confining layers. Please describe the hydrogeologic zone (based on soil boring or cross section data) to be monitored for each proposed surficial aquifer monitor well location.

Response: Section 5.3.2 and Figure 16 have been revised based on the most recent boring and piezometer data. The extent and base of the surficial aquifer has been estimated based on our extensive borings and geologic cross-sections. Subsequently, the surficial aquifer monitor wells have been designed to not breach the confining layer over the Floridan.

Comment 8. f. Please revise Section 5.3.2.2 of the Hydrogeological Investigation to indicate how the proposed surficial aquifer monitor wells shall be developed.

Response: Sections 5.3.2.2 and 5.3.2.3 have been revised to describe monitor well development using a submersible pump for the surficial monitor wells and possibly air-lifting for the Floridan wells.

Comment 9. L.1.f. – Routine Sampling Frequency (Rule 62-701.510(6), F.A.C.)

a. Please note the requirements of Rules 62-701.510(6)(a)1 and (6)(a)2, F.A.C., that an initial sampling event shall be conducted at all wells for analysis of the parameters listed in Rule 62-701.519(8)(a) and (8)(d), F.A.C. Please revise Section 5.4.2 of the Hydrogeological Investigation accordingly.

Response: Section 5.4.2 of the Hydrogeological Investigation, has been revised accordingly.

Comment 10. L.1.h – Water Quality Monitoring Reports (Rule 62-701.510(9), F.A.C.) Please revise Section 5.4.5 of the Hydrogeological Investigation to reference the submittal of technical reports at two year intervals to comply with the requirements of Rule 62-701.510(9)(b), F.A.C.

Response: Please see the revised Section 5.4.5 of the Hydrogeological Investigation.

We trust that these revisions will satisfy the Department's concerns and together with our March 20, 2001 submittal will allow for the approval of the applicable construction and operation permits for the facility. Please call us if you have any questions or comments regarding this submittal, so that an additional request for information will not be required.

Very truly yours,

Hartman &Associates, Inc.

Jennifer L. Deal, E.I.
Engineer III

James E. Golden, P.G.
Senior Hydrogeologist/Associate

JEG/sas/99-331.01/Ph 1/corresp/Ford-2.jeg

Attachments

Addressee (3)
cc: Robert Butera, P.E., FDEP Tampa
Jon Larkin, SLS

ENTERPRISE RECYCLING AND DISPOSAL FACILITY
CLASS III LANDFILL PERMIT APPLICATION

D.E.P.
APR 0 4 2001
Southwest District Tampa

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SECTION 5

HYDROGEOLOGICAL INVESTIGATION AND GROUNDWATER MONITORING PLAN

HYDROGEOLOGICAL INVESTIGATION AND GROUNDWATER MONITORING PLAN

PREPARED FOR

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HAI #99-331.01/Phase 5
APRIL 2001

SECTION 5
HYDROGEOLOGICAL INVESTIGATION AND GROUNDWATER MONITORING PLAN

The proposed Class III Landfill is located in eastern Pasco County, approximately three miles southeast of Dade City and five and a half miles northeast of Zephyrhills, see Figure 1. The Withlacoochee River runs almost a mile to the east of the property. More specifically, the site is located at the northeastern corner of the intersection of Enterprise Road and Auton Road.

5.1 PHYSICAL SETTING

The property is located on the eastern edge of the Brooksville Ridge physiographic province near the Western Valley. This ridge is wide with an irregular surface and extends through the north-central portion of Pasco County. The topography varies across the subject site, generally sloping slightly to the northeast in the northern half of the property and to the southeast or southwest in the southern half of the property toward a depression south of the site (Figure 2).

5.1.1 Regional Geology and Hydrogeology

The Brooksville Ridge is characterized by a thin layer of sand and clayey sand underlain by a clayey unit that varies from 10 to 30 feet in thickness of Pliocene to recent age. This clayey unit ranges in thickness from about 0 to 50 feet in Pasco County. The thickness of the clay unit in the area of the proposed site is estimated to be approximately 25 feet. Below the sands and clays which comprise the surficial aquifer system is a thick sequence of sedimentary rock comprised mainly of limestone and dolomite, which comprise the Floridan aquifer system. From youngest to oldest, the sedimentary units include the Oligocene age Suwannee Limestone, the Eocene age Ocala Limestone, and the Eocene age Avon Park Formation. The Suwannee Limestone generally thins to the east and is thin or absent beneath the Brooksville Ridge. The limestone surface in the ridge area is irregular and may vary more than 100 feet in elevation over a short distance. The limestone surface elevation varies from -10 feet NGVD near the coast to around 140 feet NGVD on the crest of the Brooksville Ridge (SWFWMD, 1988). In the vicinity of the subject site, the top of the limestone layer is at approximately 40 feet NGVD.

5.1.2 Soils

According to the Soil Survey of Pasco County, Florida, published by the U.S. Department of Agriculture Soil Conservation Services (USDA-SCS), the majority of the subject site and surrounding areas are covered by fine sands. A copy of the USDA-SCS Soils Survey Map showing the mapped areas of the major soil types at the subject site and its vicinity is presented in Figure 3.

USDA-SCS soil type 12 - Astatula fine sands encompass a small portion in the northeastern portion of the site. Astatula sands are nearly level to gently sloping, and excessively drained mainly in the sandhills. Seasonal high water table (SHWT) is typically at a depth of 72 inches in this soil. The permeability is very rapid throughout the soil. Both the available water capacity and natural fertility of the Astatula soil are low.

USDA - SCS soil type 32 - Lake fine sands comprise the majority of the soils found on the property. These soils are nearly level to gently sloping and excessively well drained. They occur along ridgetops and on low hillsides in the uplands. Permeability is rapid throughout the soil and the water table is below a depth of 120 inches. The available water capacity is very low in all layers and the natural fertility and organic matter content are both low.

USDA - SCS soil type 72 – Orlando fine sands are found in a small area in the northeastern portion of the property. These soils are nearly level to gently sloping and well drained. The water table is typically at a depth greater than 72 inches with permeability of the soil rapid throughout. The available water capacity is low in the surface layer and very low in the other layers.

5.1.3 Topography

According to the topographic survey conducted by Hartman and Associates, Inc. (HAI) for the purposes of this application, shown in Figure 2, the land surface of the subject site has elevations ranging from 174 feet NGVD in the west to 76 feet NGVD in the northeast corner of the property. The site's topography shows the land surface is generally sloped towards the east and northeast.

5.1.4 Site Lithology

Site lithology was determined initially through ten (10) Standard Penetration Test (SPT) borings and six (6) auger borings conducted on-site by HAI and Universal Engineering Sciences (UES) during our geotechnical investigation; see Figure 4. An additional six (6) SPT borings (B-12 through B-17) and one (1) auger boring were completed by HAI and UES to address the Department's review comments. Angelo Iafrate Mining also conducted 15 SPTs across the site. The unconsolidated surficial deposits consist of a mixture of sand, clay and silt of various compositions and multiple colors. Occasionally interbedded layers of rock and clay were encountered in the higher topographic areas and siltier strata discovered in the lower topographic areas. Limestone was encountered between 18 feet NGVD, in the low area in the northeast portion of the site at boring location B-5, and 109 feet NGVD at boring location B-1, atop the ridge along the western boundary of the site.

A layer of clayey sand, sandy clay and clay was consistently encountered at all boring locations across the property. Borings B-1 and B-2 show evidence of 30 to 40 feet of these clay and sandy clay lithologic strata overlying the limestone layers, found approximately 60 feet below land surface (bls). This stratum grades to approximately 15 feet thick as it moves across the site towards the east. This clay layer thickness is evident in boring logs from B-7 and B-8 which also show the limestone occurring at depths ranging from 35 to 55 feet bls.

This clay and sandy clay lithologic unit is also evident across the northern portion from the site in boring locations B-3, B-4, and B-5. At these locations the semi-confining unit ranges in thickness from 30 to 40 feet. Limestone was discovered between 44 and 61 feet bls at boring locations B-3, B-4, and B-5. Boring B-6, which lies in the northeastern corner of the property, showed evidence of a sandy clay layer approximately 10 feet thick at a depth of 40 feet bls. This is consistent with the general thinning trend seen in this stratum from west to east across the site.

Two borings, B-9 and B-10, were completed in the southern portion of the property. Boring B-10, the westernmost of the two, showed 60 feet of alternating layers of silty sand and sandy clay with a 5-foot layer of slightly sandy clay sitting atop the limestone, which was encountered at approximately 60 feet bls. Further east at boring B-9, 75 feet of sandy clay and clayey sand were encountered between land surface and the top of the limestone.

Out of the 15 SPT borings completed by Angelo's (DCLO1-1 through DCLO1-15), only 2 borings, DCLO1-7 and DCLO1-10 did not encounter a sandy clay or clay layer before their terminus. To confirm a confining layer at these locations, HAI completed deeper SPTs (B-15 and B-16) at these borings, respectively.

Boring B-15 encountered slightly silty to clayey sands beginning at about 50 feet below grade, but a good sandy clay was not encountered until 150 feet below grade. Soils were stable, medium dense to dense throughout the SPT at B-15, with no signs of raveling or loose soils. Therefore, this indicated depression in the limestone layer appears to be a stable feature with no surficial indications. Boring B-16 encountered clayey sand at a depth of 65 feet bls and a competent sandy clay at a depth of 90 feet bls.

Boring B-17 was augered to a depth of 65 feet bls, to investigate the depth of the limestone layer, and encountered only sand and sandy clay to this depth, confirming the predicted limestone depth at this location.

Boring logs are included in Appendix 5-A. Detailed geologic cross-sections depicting the surficial stratigraphy can be found in Figures 5, 6, 6.1 and 6.2. All borings were abandoned with cement grout once completed.

HAI's initial investigation consisted of six (6) auger borings (L-12 to L-17) which were performed on the subject property to investigate the site-specific geology, see Appendix 5-A. The boring depths ranged from 30 feet to 60 feet bls and are located as shown in Figure 4. In general the borings showed a layer of sand to clayey sand overlying a layer of sandy clay to clay. The sand layer ranged from approximately 48 to 64 feet thick on the west side of the property and 9 to 34 feet thick on the east side of the property as shown in Figure 5. None of the borings extended through the clay layer, but did extend 5 to 21 feet into the clay. The elevations of the top of the clay layer ranged from 71 to 102 feet NGVD on the west side of the property and 61 to 91 feet NGVD on the east side.

Undisturbed Shelby tube samples of the clay unit above the Floridan aquifer were taken at strategic locations across the site and permeability tests were conducted. The results of these tests are summarized in Table 5-1 of this report, see Section 5.2.3. This layer acts as a confining unit between the unconfined surficial aquifer and the underlying Floridan aquifer and is found

consistently across the site. Additional shelby tubes and laboratory permeabilities were collected of the sandy clays at the base of borings B-15 and B-16.

The elevation of the top of the Floridan aquifer limestone is shown on Figure 7. The potentiometric surface is shown at approximately 64 feet NGVD at the subject site on the May 1999 Potentiometric Surface Map created by the U.S.G.S. and the Southwest Florida Water Management District (SWFWMD), see Section 5.2.4.

5.1.5 Surface Water Drainage Patterns

Stormwater runoff from undeveloped sites is generally controlled by land surface topography and on-site drainage features, if any. On the other hand, stormwater runoff of developed sites is generally collected in designated stormwater retention ponds and the site peripheries are typically graded in such a way to prevent stormwater runoff contributions to or from neighboring sites.

Stormwater on the site appears to be directed to the eastern and northeastern portions of the property. All stormwater from the site appears to be contained and held for percolation within the subject property boundaries. An Environmental Resource Permit has been applied for from the FDEP to support the stormwater management system for the developed site, see Section 6.0.

5.1.6 Sinkhole Assessment

Sinkholes are a common geologic feature in areas underlain by limestone and other rock types, which are susceptible to dissolution, by natural groundwater. The term sinkhole is used to describe closed depressions in the land surface that are formed by subsidence or collapse of surficial materials due to the solution of near surface limestone or other soluble rocks. Based on the results of the geologic exploration conducted at the site, the subject property does not appear to have a high potential for sinkhole development. The conditions which generally indicate active sinkhole formation potential including: subsurface raveling or excessively loose soil layers; depressed surficial groundwater table; and evidence of recent slumping or erosion were not noted on the property.

Our investigation found no significant evidence of any of these sinkhole indicators. Although localized points of drilling fluid circulation loss were experienced at borings B-1, B-2, B-3, B-5, B-7 and B-10, these losses were at the contact between the clay and limestone, or within the

limestone at depth, which are common occurrences and not evidence of sinkhole development. The depressional area at the northeastern corner of the site was investigated by boring B-5 and piezometer cluster P-3, P-3A, and P-3B. In boring B-5, a 30-foot thick sandy clay layer was encountered. In the same boring neither excessively loose soils nor raveling, nor significant water table depression were encountered, confirming that this depression is not an active sinkhole. These same observations apply to borings B-15 and B-16.

5.1.7 Lineaments and Fault Areas

A lineament survey of the subject property was performed by HAI with the use of aerial photography and the topographic maps for the area, also see Geotechnical Report by UES, Inc., Section 3.4. The area around the site was searched for lineaments formed by large features, such as straightened river beds, and alignments of smaller topographic and hydrologic features, such as sinkholes and ponds. Two lineaments were inferred near the site, both trending northwest to southeast. These features are apparent as elongated wetlands and aligned ponds and lakes. The northernmost of the two lineaments connects Tobe Lake, Sumner Lake and Duck Lake. This alignment passes north of the property. The second alignment connects Boiler and Ferguson Lakes to Larkin and Point Lakes and passes to the south of the site. These individual topographic features probably developed as low areas and lagoons between coastal sand dunes that were altered by erosion and karstic solution. Figure 1 depicts the inferred Karst lineament features.

A review of faults and seismic impacts zones relative to the subject property was also conducted. New municipal solid waste landfills are prohibited within 200 feet of a fault that has had displacement in Holocene time and within a seismic impact zone. There are no such faults identified within the State of Florida. It is difficult to identify faulting in the heterogeneous Holocene sediments especially with incomplete core or rock cuttings (The Geology of Florida, Anthony Randazzo, 1997). No evidence of faulting was observed from onsite testing or review of aerial and topographic maps of the area.

5.2 SITE HYDROGEOLOGY

The site hydrogeology was studied through laboratory analysis of undisturbed samples from Shelby tubes of aquifer sediments, and the installation of a network of fifteen (15) piezometers in order to obtain water level information, slug tests and sieve analyses, see Figure 4. The

following section discusses the results of this investigation of the aquifer systems at the subject site.

The site's hydrogeology can be characterized by two separate hydrostratigraphic units: (1) the surficial aquifer system which includes a confining unit; and, (2) the Floridan aquifer system. In the area of investigation, the surficial aquifer confining unit lies above and within the saturated surficial aquifer. The details of groundwater flow within these hydrostratigraphic units are discussed below.

5.2.1 Piezometer Installation

Groundwater levels and flow at the site has been measured through a network of nine (9) piezometers installed in March, 2000. Piezometer P-1, at the top of the hill, was abandoned in May, 2000 after no water table was encountered. P-1A was installed at the P-1 location to a depth of 115 feet to encounter the Florida aquifer. Piezometer P-9 was installed to supplement data in May, 2000. An additional five (5) piezometers were installed in March, 2001. There are currently fifteen (15) piezometers on site, see Figure 4. Piezometers P-1A, P-10, P-11 and P-12 were installed into the Floridan aquifer. Piezometer P-13 was installed to evaluate water table levels at B-15.

The design details of each of the piezometers are presented in Figure 8 of this report. The piezometers were installed by 4 ¼-inch flight auger with either 5 or 15-foot screen lengths. All piezometers have a either a 6/20 or 20/30 sand pack to 3 feet above the top of the screen with natural backfill to land surface for the surficial piezometers and a 2-foot fine sand seal for the upper Floridan piezometers. The annulus of each of the deeper piezometers (P-3B, P-8, and P-9, P-1A, P-10, P-11 and P-12) was filled with neat cement grout from approximately 5 feet above the screen to land surface. The top of casing and ground surface elevation at each piezometer was surveyed by HAI to 0.01 feet NGVD. The completed HAI well survey included the top of casing, horizontal locations and ground elevations at the installed piezometers is presented in Table 5-2, and Appendix 5-A.

5.2.2 Surficial Aquifer Flow

The surficial aquifer system is comprised of the surficial sands, clayey sands, and clay, which exist throughout most of Pasco County. In Pasco County, this aquifer ranges in thickness

from 0 to 100 feet with an average thickness of about 25 feet. Borings performed on the proposed site indicate that the surficial aquifer thickness varies from 15 to 40 feet in the area of the proposed landfill.

Throughout most of Pasco County the surficial aquifer system is incapable of yielding sufficient quantities of water to be of potable or economic importance. This system is used primarily for lawn irrigation.

The water in the surficial aquifer system is generally of good quality with the exception of some areas with higher than recommended iron concentrations along the Withlacoochee River. Because this system is under unconfined conditions and receives recharge water directly from the surface.

Groundwater movement in the surficial aquifer system generally follows local and regional topographic features such as drainage swales, creeks, rivers, lakes, and wetlands. In the vicinity of the proposed landfill, the groundwater movement follows the topographic contours and is generally east toward the Withlacoochee River. The surficial aquifer at the adjacent Pasco County landfill generally flows to the north-northwest toward the slough to the west, see Appendix D.

Surficial aquifer water levels were measured on four events and, water table elevation contour maps depicting flow across the site were generated. Table 1 presents water level measurements and Figures 9, 10, 11, and 11.1 show the estimated surficial aquifer groundwater flow direction for March 28, May 2, October 26, 2000 and March 26, 2001. The groundwater flow maps show a flow trend generally from west to east across the site. Currently, the surficial aquifer is dry above an elevation of about 130 feet NGVD on site. Our inferred water table contours on Figures 9, 10 and 11 represent surficial aquifer water table conditions during wet periods.

Table 5-2 shows a summary of laboratory and field permeability test values from the site's sediments and at various depths within the aquifer. The average (geometric mean) horizontal hydraulic conductivity (K_H) value for the slug tests for the surficial aquifer is 3.22 ft/day. The K_H values from the slug tests were fairly consistent and ranged from 2.88 to 6.19 ft/day. The slug test K_H at piezometer P-3A was not included since it is screened in the confining layer. The vertical hydraulic conductivity (K_V) value at boring location B-5 (temporary pond location) for the unsaturated surficial sands was measured in the laboratory at 8.5 ft/day. The laboratory K_V

values for the confining unit within the surficial aquifer ranged from 2.15 x 10^{-5} to 7.60 x 10^{-3} ft/day. The geometric mean of these laboratory permeability K_V values is 1.5 x 10^{-4} ft/day, or 5.3 x 10^{-8} cm/sec, indicative of a confining layer. Appendix 5-B presents geotechnical laboratory reports, while calculations for the slug tests are located in Appendix 5-C.

The SHWT at the site was estimated to have an average elevation of +75 to 80 feet NGVD. Historical data from the nearby East Pasco Class I Landfill shows water table fluctuations as great as 10 to 15 feet between drought and wet years, see Appendix 5-D. Therefore, we estimate a typical seasonal water table fluctuation at the site of 5 to 10 feet, and a 10 to 15 feet of fluctuation between drought and wet years. An estimated SHWT contour map is depicted on Figure 12.

Due to the lack of the surficial aquifer groundwater elevations from the western edge of the site to the center, the eastern property map, Figure 11.1, was used for the purposes of calculating the hydraulic gradient and the average linear horizontal groundwater flow velocity, in the surficial aquifer across the site. The groundwater velocity was then calculated herein based on the average hydraulic conductivity value and the average hydraulic gradient across the site using the modified Darcian equation:

$$V_H = \frac{K_H i_H}{n_e}$$

where: V_H = *average horizontal groundwater velocity (ft/day);*
K_H = *average horizontal hydraulic conductivity (3.22 ft/day);*
i_H = *average horizontal gradient eastern (0.0017 ft/ft); and*
n_e = *effective porosity (25% - 45% range for sandy soils)*

The resultant V_H value for the surficial aquifer in the eastern portion of the property is:

$$V_H = \frac{3.22 \text{ ft/day } (0.0017)}{0.25} = 0.02 \text{ ft/day or } 8 \text{ ft/year}$$

$$V_H = \frac{3.22 \text{ ft/day } (0.0017)}{0.45} = 0.012 \text{ ft/day or } 4.4 \text{ ft/year}$$

Therefore, the estimated average surficial aquifer horizontal flow rate (arithmetic mean) across the site is approximately 6.2 ft/year. This rate will allow shallow monitoring wells to detect any groundwater quality standard exceedances through the proposed semi-annual sampling schedule.

5.2.3 Surficial Aquifer Confining Unit

In the area of the proposed landfill the thickness of the surficial aquifer sandy clay-clay confining unit ranges from an estimated 15 feet to about 30 feet. The vertical hydraulic conductivity (K_V) value of the confining unit was evaluated based on twelve (12) laboratory constant-head permeability tests of Shelby tube samples. The average calculated K_V value (geometric mean) is approximately 1.5 x10^{-4} ft/day (5.3 x 10^{-8} cm/sec) as seen in Table 5-2. Laboratory reports are included in Appendix 5-B.

The average vertical groundwater velocity (V_v) from the surficial aquifer to the Floridan aquifer can be estimated by using a hydraulic gradient between the surficial water table (P-5) and the Floridan potentiometric surface and the vertical hydraulic conductivity of the surficial confining unit at the site. The vertical hydraulic gradient (i_v) calculated based on March 28, 2000 water levels at this piezometer and the May, 1999 Floridan aquifer potentiometric surface elevation (65 ft NGVD) shows an upward gradient, since the Floridan aquifer potentiometric surface elevation is currently about 4 feet above surficial aquifer water levels. This confinement is also expressed by the increase in head between P-3A and P-3B. However, at our estimated SHWT elevation of 74 feet NGVD in the surficial aquifer, a downward gradient may be operative during wet periods. Using a confining unit thickness of 20 feet, a surficial aquifer thickness of 30 ft, and a worse case head difference of 9 ft, the i_v is 0.3 ft/ft.

However, based on our March 26, 2001 water level measurements, there is a vertical gradient between P-3 and P-3B of 0.02 ft/ft.

The effective porosity (n_e) through the travel path is estimated at 0.22 based on average effective porosities of 0.35 in the surficial aquifer and 0.03 in the sandy clays of the intermediate confining unit (Todd, 1964). This n_e value represents the weighted average porosity from the water table to the top of the Floridan aquifer.

Hereafter we calculate the estimated V_v value between the surficial and Floridan aquifers at the site:

$$V_v = \frac{K_v i_v}{n_e}$$

$$V_v = \frac{1.5 \times 10^{-4}\ ft/day\ (0.30\ ft/ft)}{0.22} = 2.0 \times 10^{-4}\ ft/day\ or\ 0.08\ ft/year$$

This calculation shows that the vertical flow rate between the surficial and Floridan aquifer systems, during a wet season, through the confining layer is estimated to be a low 2.6 x 10^{-4} ft/day or 0.08 ft/year, or approximately 5 feet over the approximate 60-year monitoring period at the landfill. With the fluctuation of potentiometric surfaces through the year and the periodic reversal of vertical flow direction, the vertical flow rate will actually be smaller.

Thus, a comparison of groundwater flow rates within the aquifers indicates that the groundwater will flow over 78 times more rapidly in a horizontal direction than it will flow in a vertical direction. This indicates that the preferential flow direction of groundwater in the surficial aquifer is horizontal. Therefore, properly positioned downgradient monitoring wells in the surficial aquifer at the edge of the zone of discharge will be able to detect groundwater quality standard and target level exceedances at the landfill prior to the groundwater traveling vertically to the base of the surficial aquifer or the vertical extent of the zone of discharge.

The consistent sandy clay-clay confining layer encountered across the site, along with the results of our geotechnical and hydrogeological investigations, supports an exemption pursuant to FAC 62-701.340(3)(d) for the Class III landfill from the requirements for a liner and leachate controls in rule FAC 62-701.400, since no significant threat to the environment will result from the exemption.

5.2.4 Floridan Aquifer Flow

The upper Floridan aquifer system contains the limestone and dolomite layers that underlie the surficial aquifer confining unit. This system ranges from 700 to 1050 feet thick in Pasco County with a thickness of approximately 1000 feet in the vicinity of the proposed landfill. The elevation of the upper Floridan aquifer system ranges from –10 feet NGVD near the coast to 140 feet NGVD along the crest of the Brooksville Ridge with depths ranging from land surface to more than 100 feet below land surface. In the site area, the elevation is at about 30 to 60 feet NGVD.

The upper Floridan aquifer system is the principal water supply source for domestic, agricultural, and industrial use in Pasco County. This aquifer is very productive and is capable of supplying high demand irrigation and municipal needs. In general, groundwater quality in this system is good with the exception of higher than recommended (for drinking water) iron concentrations in several areas scattered throughout the County including some higher readings near the proposed site.

The Florida Geological Survey (FGS) indicates that the subject property is in an area of very low to moderate (2 to 10 inches/year) recharge to the upper Floridan aquifer. The potentiometric surface of the Floridan aquifer, which is the level to which water would rise in a well, was around 65 feet NGVD in September 1997. A water level measurement taken from a monitor well (DW-1) on September 9, 1999 in the northeast corner of the subject property showed the water table of the Floridan aquifer at an elevation of approximately 65 feet NGVD. These measurements are nearly the same indicating that little to no water is recharged to the upper Floridan aquifer system from the surficial aquifer system.

Groundwater flow and artesian heads within the Floridan aquifer are measured bi-annually by the USGS and SWFWMD in this part of Pasco County. The September 1998 and May 1999 Floridan potentiometric surface maps are shown on Figures 13 and 14, respectively. As shown, the potentiometric surface at the site ranges from approximately 64 to 73 feet NGVD on these dates. Based on these regional maps, flow direction of groundwater in the Floridan aquifer is estimated to be to the north-northwest across the site. A site-specific Floridan aquifer flow map, based on the deep piezometers into the limestone, is presented on Figure 14.1. As shown, the local groundwater flow direction of the Floridan on March 26, 2001 was to the northeast, east and south from a high at P-9. It is expected to be a variable flow direction, similar to the Pasco landfill to the north, which has predominantly shown Floridan aquifer flow to the east-northeast.

5.2.5 Water Supply Well Inventory

Local water supply and groundwater monitoring wells within one mile of the proposed landfill site were identified during a review of available information from SWFWMD and an area survey. Figure 4 in Appendix 5-E illustrates the locations of the water wells within a 1-mile radius of the landfill. Fifty two (52) private potable wells and thirty-two (32) business (irrigation) wells were identified by our survey of the area. Four (4) of the wells listed are within 500' of the proposed landfill. These wells were accurately located by an HAI field survey. Well numbers 36, 53, and

54 on Figure 4, Appendix E are listed as domestic wells but no other information was available. Well number 67 is listed as a 12" well, 710 feet in depth which serves as an irrigation well for grain and citrus. Well 67 belongs to Sid Larkin and Son and is listed on SWFWMD water use permit # 20-2698.005. All local agency sources of data on these private wells were exhausted without obtaining further details. The proposed landfill footprint is outside of a 500-foot radius from the closest identified private potable wells.

5.2.6 Existing Contaminated Areas

No previous or existing contamination areas are known to exist on the proposed landfill site.

5.3 GROUNDWATER MONITORING PLAN

The purpose of this Groundwater Monitoring Plan (GMP) is to monitor representative groundwater quality at the proposed landfill. The objective of this report was to develop a GMP for the proposed landfill that will detect exceedances of State of Florida groundwater quality standards and Pasco County landfill permit groundwater quality standards, at the edge of the designated zone of discharge for the facility if they occur. The zone of discharge is defined as the volume of aquifer underlying and surrounding the site to the base of the uppermost aquifer and out 100 feet from the landfill, or to the property line, whichever is less, within which an opportunity for treatment, mixture or dispersion of wastes into the receiving groundwater is afforded. The proposed detection monitor wells will be strategically located 50 feet from the landfill within the zone of discharge to monitor background and downgradient water quality for the surficial and Floridan aquifers at the site. Two (2) upgradient and fifteen (15) downgradient wells for a total of 17 monitor wells are proposed and their proposed locations are presented in Figure 15.

5.3.1 Groundwater Monitoring System Design

As discussed in Section 5.2.2, water table elevation measurements in the surficial aquifer have shown a general flow trend from west to east across the site and the surficial is currently absent above or elevation of approximately 130 ft, NGVD. To intercept this flow within the surficial and Floridan aquifer, eleven (11) downgradient surficial aquifer and four (4) Floridan detection wells are proposed, to monitor groundwater quality at the fully built-out landfill. These wells are proposed to be phased in as cells are developed. The surficial detection wells are spaced at

intervals of 500 feet and the background wells by no more than 1500 feet within the landfill's setback area. Our proposed detection well phasing schedule follows:

1. Initial: background wells – MW-1, MW-1B
2. Cells 1 & 2 detection wells – MW 5-A, MW 5-B, MW-6, MW-7A, MW-7B, MW-8, MW-9, and MW-10
3. Prior to Landfilling in Cell 3: MW-11, MW-12A, MW-12B
4. Prior to Landfilling in Cell 5: MW-3 and MW-4
5. Prior to Landfilling in Cell 9: MW-13
6. Prior to Landfilling in Cell 11: MW-2A and MW-2B

Background monitor well MW-1 is proposed to be abandoned prior to landfilling Cell 8. MW-1A would replace MW-1 upgradient during wet periods as the landfill moves to the west. Well MW-14 would be used to replace MW-1, if needed during dry periods. Surficial monitor well MW-13 also would be installed as the landfill moves west and the aquifer enters a wet season.

Although our geotechnical investigation revealed a 15 to 30 ft thick clay confining layer that consistently separates the base of the proposed landfill and surficial aquifer from the upper Floridan aquifer, Floridan aquifer wells are proposed as a prudent measure and to comply with Pasco County's monitoring requirements.

The landfill's Pasco County permit condition No. 29 requires two (2) upgradient (one shallow and one deep) monitoring wells and two downgradient (one shallow and one deep) prior to excavation. To comply with this condition, background monitor wells MW-1 (shallow) and MW-1B (deep), and well clusters MW-5A, MW-5B and MW-7A, MW-7B is proposed. As discussed in Section 5.2.4, the Floridan aquifer generally flows to the north-east and east across the site.

5.3.2 Monitoring Well Design and Installation

The proposed monitor wells will be installed by a Florida licensed water well contractor utilizing a 6-inch I.D. hollow stem auger. Prior to start of the day's activities and in between each monitor well installation, all drilling equipment will be steam cleaned and rinsed with potable water. Well construction details are based on field conditions encountered at the site during the geotechnical investigation conducted in March, 2000. Actual monitor well construction details will depend on field conditions encountered at the time of installation. Design details of proposed downgradient

shallow detection wells MW-2A through MW-13 and proposed upgradient background well MW-1 are shown in Figure 16. Figure 17 presents the proposed design details of the Floridan aquifer wells.

However, because of drought conditions and the slope of the base of the surficial aquifer currently there is no water table present in areas where land surface is above 130 ft NGVD. This results in background well MW-1A being dry and MW-1B primarily monitoring the upper Floridan aquifer. Therefore, we recommend that until the surficial aquifer water table can rebound, MW-1 act as the initial upgradient surficial aquifer background well.

5.3.2.1 Well Screen and Filter Pack Selection

The methods used for the geologic and hydrogeologic investigations conducted at the proposed landfill site included conducting SPT's and split-spoon sampling, describing the collected lithologic samples, grain size analysis of the surficial aquifer. These data allow us to design sand filter pack size and well screen size at the proposed monitor well locations.

Grain size determinations or full-grain sieve analysis tasks (ASTM D-422) were performed on samples selected from the boring sites located at strategic sites across the proposed landfill site. Table 3 summarizes the findings of the grain size analyses. Samples were chosen by selecting the finest grained sample collected from each proposed screen interval.

Using data collected from the grain size analyses, recommendations for sand filter packs and screen slot sizes were determined for each test location pursuant to ASTM D5092-90 when possible. Sand filter pack size was determined by multiplying the 30% passing size from each formation sample curve by a factor of 4. For samples which were too fine (>30% passing the 200 screen) to be calculated by the ASTM method, the 50% passing size of these samples was multiplied by 2 (Driscoll, 1986). Commercial filter pack curves were then compared to the calculated value to choose a suitable pack size. The smaller sand filter pack curve was chosen if the grain size value as calculated above was plotted greater than 1/3 the distance between curves. Grain size curves and resulting calculations are included as Appendix 5-F.

Screen slot size was determined by the size of the sand filter pack. If a 30-40 sand filter pack was chosen, a 0.015" slot screen was suggested. If a 30-65 sand pack was chosen, a 0.006" slot screen was suggested. The high percentage of material passing the No. 200 sieve during sand

grain analysis made the use of a 30-65 sand pack and 0.006" slot screen necessary to prevent the passage of very fine grained material into the proposed monitoring wells. The screen and filter pack recommendations for each detection well are also summarized in Table 4.

5.3.2.2 Monitoring Well Installation

The proposed monitor wells will be constructed of 2-inch diameter Schedule 40 PVC consisting of threaded and coupled flush joints. A sump a minimum of 2 ft in length and 2-inches in diameter will be connected to the bottom of the screen to accumulate sediment. No solvents or glues will be used during construction.

HAI proposes to use 20-foot, by 2-inch diameter, PVC Schedule 40 screens for the new surficial aquifer wells at the water table. This screen length was chosen to provide some interception of saturated aquifer thickness in the wells during drought conditions. This length should be sufficient as soil information on-site indicates the water table fluctuates as much as 10 to 15 feet between seasonal high and low levels. The filter pack previously designed will be installed to 2 ft above the screened interval and have a minimum 2-inch annular space. A 3-foot 60/45 fine sand seal will be placed above the filter pack to effectively seal any surface flow into the screened area. Cement grout containing 2 to 4 percent bentonite will occupy the remaining annular space to ground surface. The annular space between the drilled hole and the monitoring well casing shall be backfilled with 2 to 4 percent bentonite, cement grout from the top of the 60/45 fine sand seal to ground surface. The tremie pipe method will be used to grout the well annulus.

An aluminum locking protective casing and concrete pad will be installed around each proposed monitor wells. The protective casing shall be a minimum of six inches in diameter, five feet in length, and extend above the top of the monitor well cap two inches. The dimensions of the concrete pad poured around the protective casing, at ground surface, will be 2 ft by 2 ft by 6 in thick. The surficial aquifer monitor wells will be developed by a 2-inch stainless steel submersible pump until turbidity values are below 20 NTUs, and other field parameters are stabilized.

5.3.2.3 Floridan Monitoring Well Installation

The Floridan aquifer wells MW-1B, MW-2B, MW-5B, MW-7B, and MW-12B will be constructed to prohibit the interconnection between the surficial and Floridan aquifer waters. The wells will have a 2-inch diameter, schedule 40 PVC flush-threaded casing with a 20-foot, 2-inch diameter, 0.01 inch slotted well screen. A neat cement grout mixture, with up to 6 percent bentonite content, will be used to fill the 2-inch annulus. A bentonite or fine sand seal will be placed above the open hole in the Floridan to prevent cement contamination. The wells will be finished with a 2 x 2 foot concrete pad and a 6-inch lockable galvanized steel well protector.

Upon completion, the top of casing elevation will be surveyed and tied into the other existing piezometers and monitoring wells elevation survey on the site. Development of the wells will consist of air-lifting and pumping with a small submersible pump until the water is clear (below 20 NTUs). See Figure 17 for proposed well design details. Permanent Floridan monitor wells MW-1B (P-1A) and MW-7B (P-12) were installed in March, 2001 as part of the hydrogeologic investigation. The wells were completed as proposed on Figure 17, see Appendix 5-A for driller's logs. Well completion reports for these wells will be submitted in the next 30 days.

All proposed monitor wells will have an identification number clearly and permanently marked on the outside of each protective casing. The elevation of each of the monitor well's measuring point (top of casing) and concrete pad will be surveyed to 0.01 ft NGVD.

5.3.3 Monitoring Well Abandonment

Any monitor wells, which require abandonment due to damage or landfill expansion will be plugged with cement grout in accordance with Department requirements upon notification in writing.

5.4 SAMPLING AND ANALYSIS PLAN

5.4.1 Quality Assurance

A site specific quality assurance plan is not required for a solid waste facility compliance sampling per rule FAC 62-160.300(7). Therefore, all monitor well sampling and laboratory analyses will be conducted pursuant to FDEP standard procedures.

Within 90 days of the effective date of this permit, the owner will submit to Pasco County and the FDEP, documents certifying that the organization(s) and laboratory(s) performing the sampling and analysis have an FDEP approved Comprehensive Quality Assurance Plan (CompQAP) in which they are approved for the sampling and analysis intended to be used for the compliance actions at the site. The documentation shall, at a minimum contain the Title Page and Table of Contents of the approved CompQAP meeting the requirements of Rule 62-160, F.A.C. If the organization(s) or laboratory(s) performing the sampling and analysis change at any time during the compliance actions, documentation of their FDEP Approved CompQAP will be required. If at any time sampling and analysis are to be conducted which are not in the approved CompQAP, documentation of amendments and approvals pursuant to Rule 62-160.210, F.A.C. shall be required. HAI's letter of approved CompQAP No. 950504 is presented in Appendix 5-G.

5.4.2 Background Water Quality

Background groundwater quality will be determined by an analysis of one water sample taken from each of the proposed monitor wells. The results of this initial sampling event will be submitted to the FDEP and Pasco County to support the permit application prior to the receipt of any solid wastes. The initial background sampling event will be for the parameters listed below.

Background Water Quality Parameters	
Field parameters	Laboratory parameters
Static water level in wells before purging	Total ammonia – N
Specific conductance	Bicarbonate
ph	Chlorides
Dissolved oxygen	Iron
Turbidity	Mercury
Temperature	Nitrate
Colors and sheens (by observation)	Sodium
	Total dissolved solids (TDS)
	Those parameters listed in 40 CFR Part 258
	Appendix I and 40 CFR Part 258 Appendix II.

Background water quality sampling and analysis to meet Pasco County conditions will also be conducted on wells MW-1 and MW-1B.

Some nearby background groundwater quality data has been obtained for the adjacent East Pasco Class I Landfill. These results indicate the following information about background surficial aquifer groundwater quality:

1. Benzene was detected above maximum contaminant levels (MCL's) in two wells along the western boundary of the landfill on several occasions;
2. pH of the groundwater can be low (4.5 to 6.25);
3. Iron concentrations in the surficial aquifer generally exceed the MCL;
4. Aluminum, cadmium, nickel, antimony, thallium, and vinyl chloride were detected above their MCLs, but generally the exceedences appeared to be single occurrences.

The results of samplings at the East Pasco County Landfill for 1992 through 1994 are included in Appendix 5-H along with a well location map. The parameters reported include specific conductance, pH, ammonia-N, chlorides, iron, mercury, nitrate, sodium, TDS, and benzene. The range of results for each parameter is listed in Appendix 5-H, Table 1. Also in March, 1990, the Ambient Groundwater Quality Monitoring Program (AGWQMP) in cooperation with the FDEP published groundwater quality testing results for seven surficial aquifer wells and twenty Floridan aquifer wells in Pasco County. The closest surficial aquifer well to the subject site was located in Zephyrhills Park, and the closest Floridan aquifer well was located along U.S. Hwy 98 east of SR 35A. The testing results for selected parameters are provided in Appendix 5-H, Table 2, and the well location maps and complete parameter lists are provided in Appendix 5-H.

5.4.3 Groundwater Monitoring Parameters

Pursuant to FAC 62-701, the proposed detection monitor wells will be sampled and analyzed initially and semi-annually. As mentioned previously, the laboratory and field sampling organization will have FDEP approved CompQAP's. The owner, or their representative, will inform Pasco County and the FDEP of the next sampling at least 14 days prior to the sampling to allow split sampling. Keys to all monitoring well locks will be kept on site.

Field parameters to be analyzed include the following: pH; turbidity; temperature; specific conductance; dissolved oxygen; water elevations; and, color or sheens by visual observation.

Additional laboratory parameters to be analyzed in accordance with FAC 62-701 and Pasco County Land Development Code Section 312.4A(12b) include the following: total ammonia-N; bicarbonate; chlorides; iron; mercury; nitrate; sodium; TDS; and those parameters listed in 40 CFR Part 258 Appendix I.

Quarterly monitoring required by the Pasco County permit will be conducted at wells MW-1, MW-1B, MW-5A, MW-5B, MW-7A and MW-7B for all of the parameters above, except for 40 CFR Part 258, Appendix I.

The owner may request a modification to delete specific laboratory parameters from routine analyses of compliance/detection wells based upon a demonstration that these parameters are not reasonably expected to be in or derived from the waste which is disposed at the landfill.

5.4.4 Assessment Monitoring and Corrective Action

Assessment monitoring of groundwater quality will be initiated if monitoring parameters are detected, and confirmed, in detection wells at concentrations significantly above background water quality, or at levels exceeding groundwater water quality standards of FAC 62-520. Confirmation sampling of the applicable wells will be conducted within 15 days of the initial exceedance. The owner will notify the FDEP and Pasco County within 14 days of confirmation sampling results. The assessment monitoring plan will follow requirements of FAC 62-701.510(7). This may entail the installation of compliance monitor wells at the edge of the zone of discharge.

Corrective actions will be initiated if the results of the contamination assessment report conducted under assessment monitoring indicates that groundwater quality standards are likely to be violated outside of the zone of discharge. A remedial action plan will be submitted to the FDEP and Pasco County within 60 days, which will present corrective actions to prevent such violations, in accordance with FAC 62-701.510(7)(b).

5.4.5 Implementation Schedule

Approximately 60 days after permit approval by FDEP and Pasco County, the proposed initial background and detection monitor well array will be ready for sampling and analyses. Only those monitor wells strategically located to monitor the current landfill cells would be installed and the other wells phased in as the landfill progresses, see schedule section 5.3.1. The FDEP and Pasco County will be notified in writing at least 10 days prior to monitor well installation and sampling. Well completion reports will be submitted to the FDEP and Pasco County within 30 days of installation. In addition, a record drawing of well installations will be submitted within 60 days of well completion to the County.

A semi-annual report that analyzes and summarizes the groundwater quality data, standards exceeded, groundwater level measurements, groundwater contour maps with flow direction, Quality Assurance documentation, and recommended future actions for that period in compliance with FAC 62-701.510 (9) will be submitted to both Pasco County and the FDEP. Reports of the Pasco County quarterly sampling events will also be submitted to Pasco County and the FDEP.

All field and laboratory quality assurance records and reports will be maintained for the design period of the landfill. A technical report to comply with FAC 62-701.510(9)(b) summarizing and interpreting the groundwater quality data and water levels during the past two years will be submitted to the FDEP and Pasco County every two years and upon permit renewal.

TABLES

TABLE 5-1

WATER LEVEL MEASUREMENTS
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

Piezometer I.D.	Top of Piezometer Elevation (ft NGVD)	Ground Elevation (ft NGVD)	Water Level (ft btoc) 3/28/00	Water Elevation (ft NGVD) 3/28/00	Water Level (ft btoc) 5/2/00	Water Elevation (ft NGVD) 5/2/00	Water Level (ft btoc) 10/26/00	Water Elevation (ft NGVD) 10/26/00	Water Level (ft NGVD) 3/26/01	Water Level (ft NGVD) 3/26/01
P-1	171.73	169.6	Dry (>90)	Dry (<79)	AB	AB	AB	AB	AB	AB
P-1A(2)	174.48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	115.87	58.61
P-2	96.83	95.6	35.56	61.27	36.69	60.14	35.89	60.94	38.22	58.61
P-3	78.94	77.8	17.53	61.41	18.52	60.42	17.90	61.04	20.25	58.69
P-3A	78.40	77.7	17.05	61.35	18.04	60.20	17.36	61.04	19.73	58.67
P-3B(1)	79.65 (80.97)	78.5	44.82*	34.83*	21.12	60.36	19.83	61.14	22.17	57.48
P-4	84.55	83.3	23.30	61.25	24.35	59.85	23.47	61.08	25.95	58.60
P-5	94.56	93.3	33.25	61.31	33.33	61.23	33.54	61.02	35.91	58.65
P-6	94.16	92.9	32.87	61.29	33.91	60.25	33.11	61.05	35.53	58.63
P-7	102.81	101.1	41.38	61.43	42.34	60.47	41.72	61.09	44.09	58.72
P-8(1)	133.94 (135.29)	132.7	72.67	61.27	75.60	58.34	74.39	59.55	76.64	57.30
P-9(1)	140.73 (138.60)	136.9	NM	NM	78.51	60.09	(Damaged)	(Damaged)	82.00	58.73
P-10(2)	132.60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	74.03	58.57
P-11(2)	150.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51.18**	99.58**
P-12(2)	93.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34.60	58.64
P-13(2)	112.91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53.39	59.52

NOTES: *Measurement taken prior to full well development
**Anomalous Measurement

btoc - Below top of casing
(1) reinstalled 5/2000 (2) installed 3/2001
NM - Not Measured
AB = Abandoned
N/A = Not Available

TABLE 5-2

LABORATORY AND FIELD PERMEABILITY TEST VALUES
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

Boring/Piezometer	Field Slug Test Horizontal Hydraulic Conductivity (ft/day)	(cm/sec)	Test Interval (ft NGVD)	Laboratory Permeability Test Vertical Hydraulic Conductivity (ft/day)	(cm/sec)
P-2 (B-3)	2.88*	1.02E-03	55-70	—	—
P-3 (B-5)	6.19*	2.18E-03	50-65	—	—
P-3A (B-5)	0.30*	1.05E-04	33-38	—	—
P-5 (B-7)	1.03	3.63E-04	55-70	—	—
P-7 (B-9)	3.40*	1.20E-03	58-73	—	—
P-8 (B-10)	2.62	9.23E-04	58-73	—	—
B-2	—	—	92	7.01E-05	2.47E-08
B-3	—	—	71	1.87E-04	6.60E-08
B-4	—	—	73	2.15E-05	7.58E-09
P-3B (B-5)@Pond	—	—	64	8.50	2.99E-03
B-5	—	—	38	2.94E-05	1.04E-08
B-6	—	—	66	4.20E-04	1.48E-07
B-6	—	—	61	1.45E-04	5.11E-08
B-7	—	—	70	3.02E-05	1.07E-08
B-8	—	—	68	3.70E-03	1.31E-08
B-9	—	—	81	7.60E-03	2.68E-06
B-10	—	—	81	2.94E-05	1.04E-08
B-15	—	—	-36	8.43E-04	2.97E-07
B-16	—	—	8	1.29E-03	4.55E-07

*Recalculated 3/01

TABLE 5-3

GRAIN SIZE ANALYSIS
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

Boring ID	Sample Number	Percent Passing Sieve No. 10	40	60	100	200	Soil Classification	Sample Depth Interval (ft bls*)
B-1	15	68	63	60	44	32	Clayey Limestone	70-72
B-1	18	70	63	58	52	42	Clayey Limestone	85-87
B-2	12	93	88	85	74	38	Clayey Sand	60-62
B-3	4	99	97	92	66	43	Clayey Sand	15-17
B-3	7	99	94	88	77	42	Clayey Sand	35-37
B-4	4	100	100	97	82	64	Sandy Clay	15-17
B-5	4	99	97	79	27	8	Silty Sand	15-17
B-5	5	97	96	77	29	7	Silty Sand	20-22
B-6	4	93	88	72	37	27	Silty Sand	15-17
B-6	5	100	97	95	79	67	Sandy Clay	25-27
B-7	6	100	99	95	78	42	Clayey Sand	25-27
B-7	7	100	99	92	62	22	Clayey Sand	30-32
B-8	5	98	97	86	38	23	Clayey Sand	25-27
B-8	6	100	99	96	77	57	Sandy Clay	30-32
B-9	9	100	100	100	63	13	Silty Sand	40-42
B-9	11	100	99	98	92	46	Clayey Sand	50-52
B-10	10	79	67	62	53	35	Clayey Sand	55-57
B-10	12	37	23	20	17	13	Limestone	65-67
B-11	7	99	98	97	96	95	Clay	33-35
B-12	11	100	99	96	75	48	Sandy Clay	40-42
B-12	13	99	99	89	76	56	Sandy Clay	48-50
B-13	11	100	99	99	90	78	Sandy Clay	48-50
B-15	23	100	97	83	38	15	Clayey Sand	108-110
B-15	32	100	98	90	51	27	Clayey Sand	150-152
B-15	33	99	97	88	56	48	Sandy Clay	152-155
B-16	19	100	92	71	28	18	Clayey Sand	90-92

NOTE: *bls – Below Land Surface

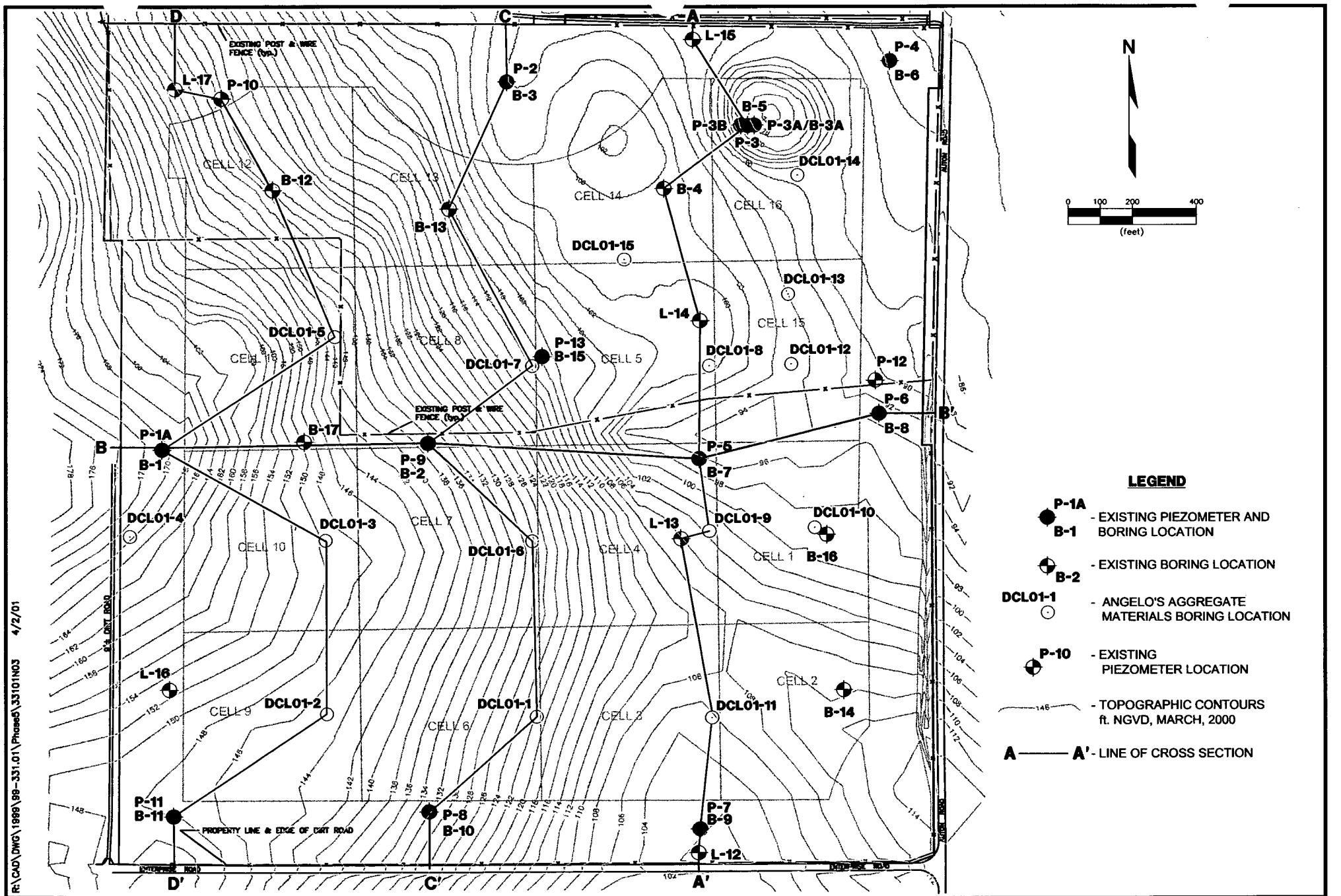
TABLE 5-4

PROPOSED MONITOR WELL DESIGN
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

Monitor Well ID	Well Type	Closest Boring Location	Finest Grained Lithologic Interval (ft NGVD)	Percent Finer than #200 Sieve	Designed Silica Sand Filter Pack Grade	Screen Slot Size (in)
MW-1	BG	B-15	108-110	15	30-40	0.015
MW-2A	DD	B-1	82.6-84.6	42	30-65	0.006
MW-3	DD	B-3	78.6-80.6	43	30-65	0.006
MW-4	DD	B-3	78.6-80.6	43	30-65	0.006
MW-5A	DD	B-5	60.8-62.8	8	30-40	0.015
MW-6	DD	B-6	56.3-58.3	67	30-65	0.006
MW-7A	DD	B-5	60.8-62.8	8	30-40	0.015
MW-8	DD	B-8	60.9-62.9	57	30-65	0.006
MW-9	DD	B-8	60.9-62.9	57	30-65	0.006
MW-10	DD	B-9	49.1-51.1	46	30-65	0.006
MW-11	DD	B-9	49.1-51.1	46	30-65	0.006
MW-12A	DD	B-9	49.1-51.1	46	30-65	0.006
MW-13	DD	B-10	75.7-77.7	35	30-65	0.006
MW-14*	BG	B-3	78-80	43	30-65	0.006

BG = Background
DD – Downgradient Detection
*NOTE: To be used as a surficial aquifer background well during drought periods.

FIGURES

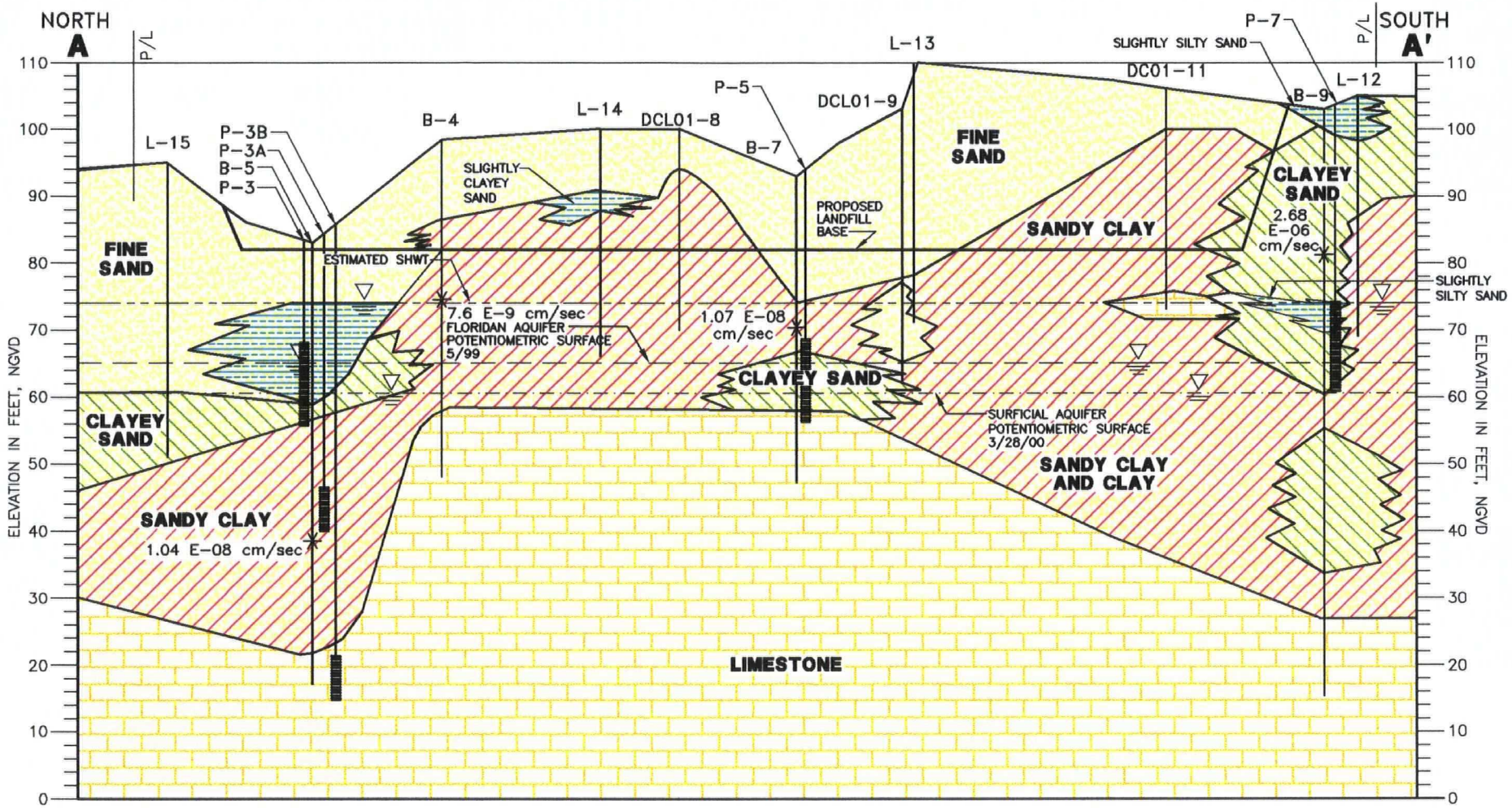


R:\CAD\DWG\1999\99-331.01\Phase5\33101N03 4/2/01

FIGURE 4

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET - SUITE 1000 - ORLANDO, FL 32801
TELEPHONE (407) 839-3955 - FAX (407) 839-3790

PIEZOMETER AND BORING LOCATION MAP
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA



*LABORATORY VERTICAL PERMEABILITY VALUES.

CLAYEY SAND

SANDY CLAY TO CLAY

LIMESTONE

FINE TO VF SAND

SILTY SAND

B-4 BORING

P-3 PIEZOMETER

0 87.5 175 350

APPROX. HORIZONTAL SCALE, FEET

99-331.01/PHASE5/33101121/3/20/01

FIGURE 5

HARTMAN & ASSOCIATES, INC.

engineers, hydrogeologists, surveyors & management consultants

201 EAST PINE STREET – SUITE 1000 – ORLANDO, FL 32801
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GEOLOGIC CROSS SECTION A - A'
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

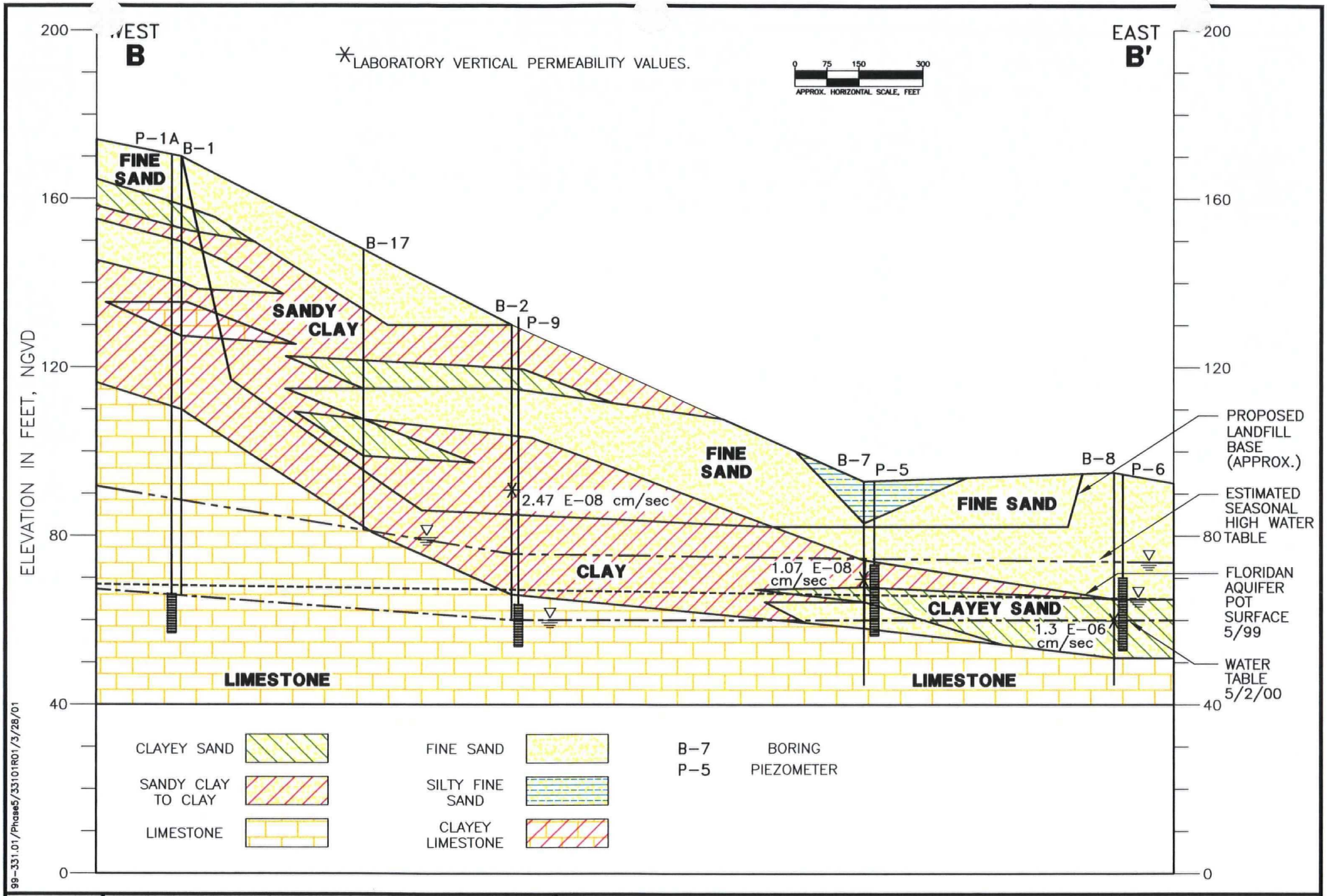

FIGURE 6

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET – SUITE 1000 – ORLANDO, FL 32801
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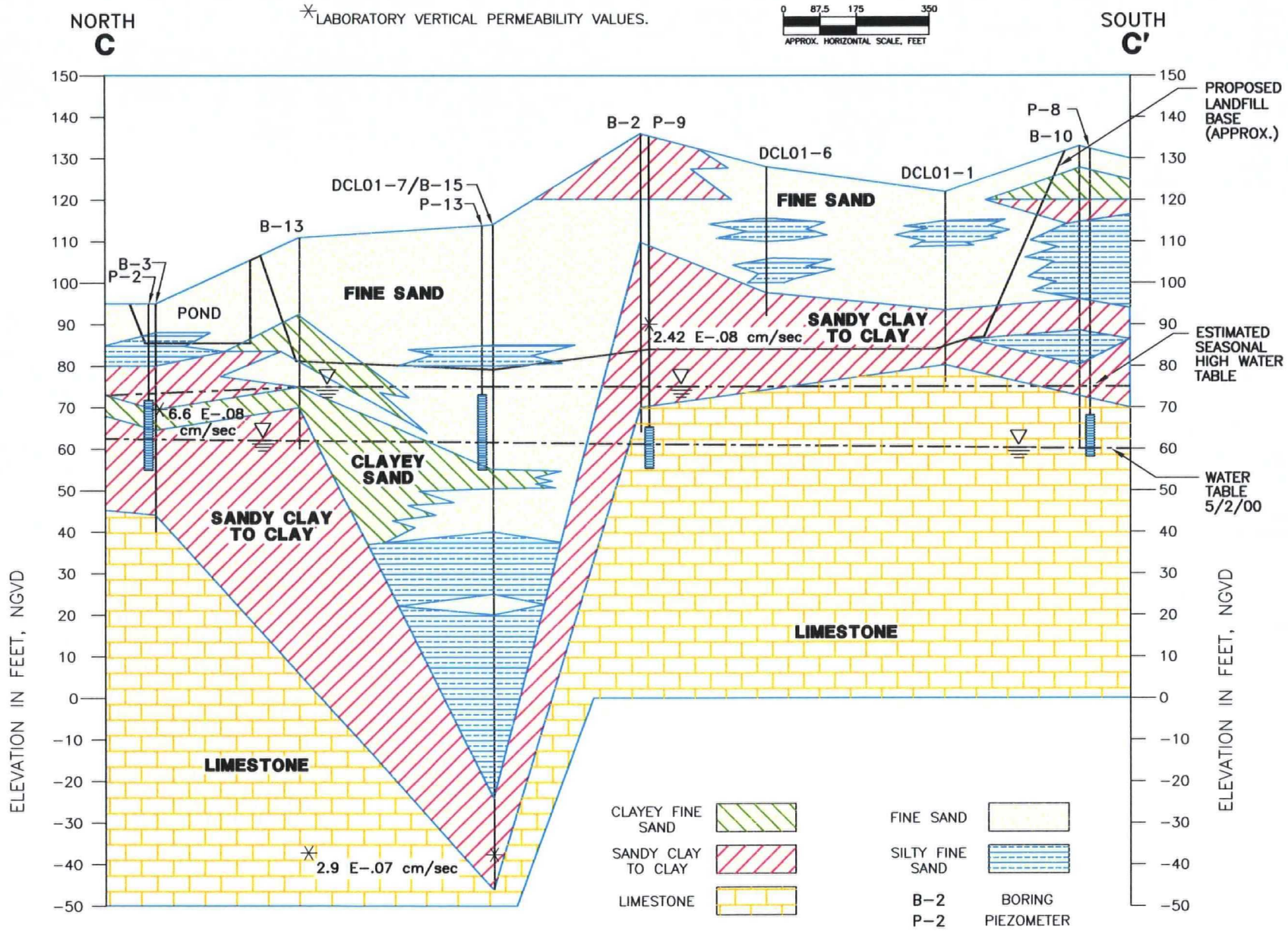
GEOLOGIC CROSS SECTION B - B'
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

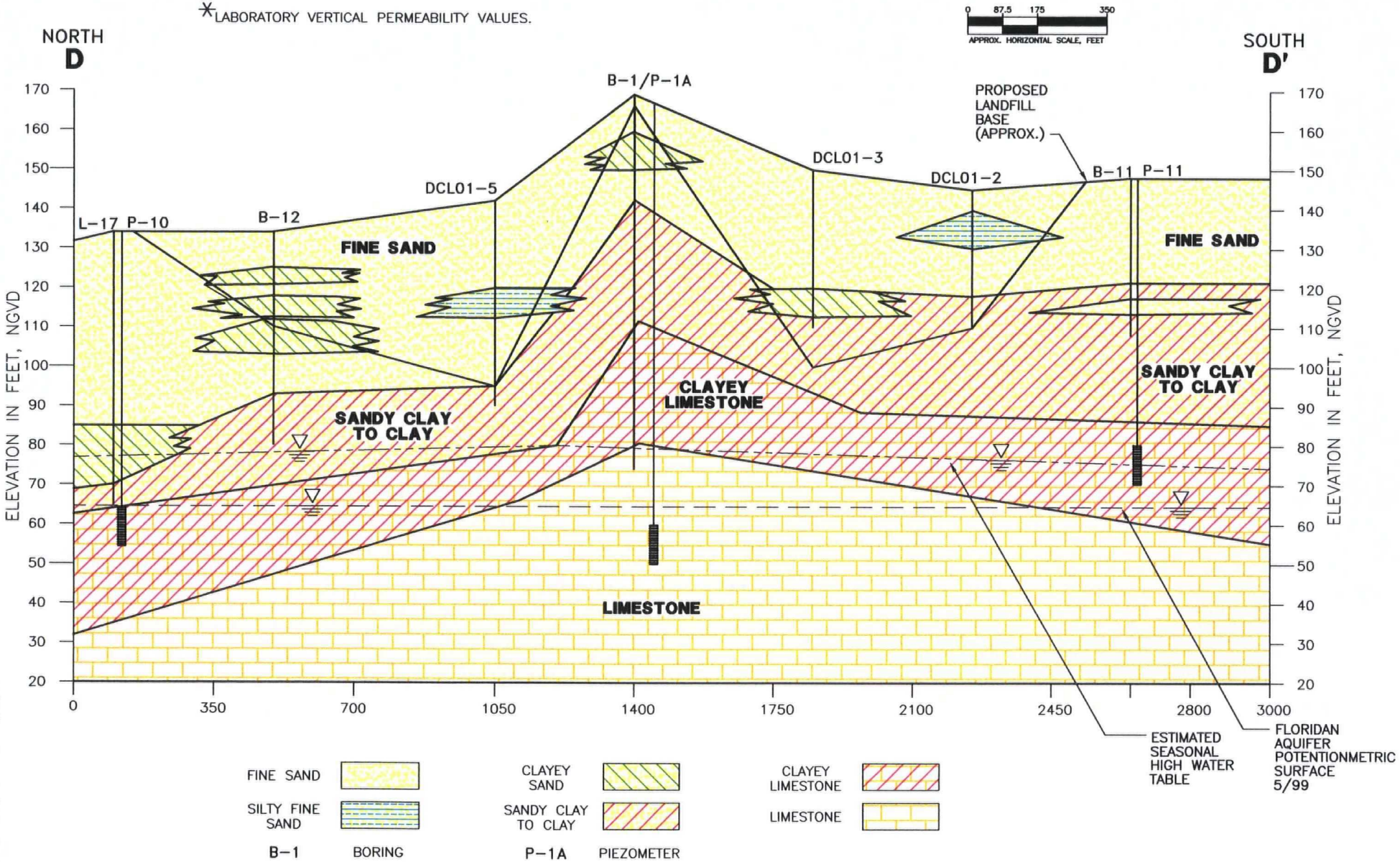


99-331.01/Phase5/33101R02 4/2/01

FIGURE 6.1

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET - SUITE 1000 - ORLANDO, FL 32801
TELEPHONE (407) 839-3955 - FAX (407) 839-3790

GEOLOGIC CROSS SECTION C - C'
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA



99-331.01/Phase5/33101R03 3/28/01

FIGURE 6.2

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET – SUITE 1000 – ORLANDO, FL 32801
TELEPHONE (407) 839-3955 – FAX (407) 839-3790

GEOLOGIC CROSS SECTION D - D'
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

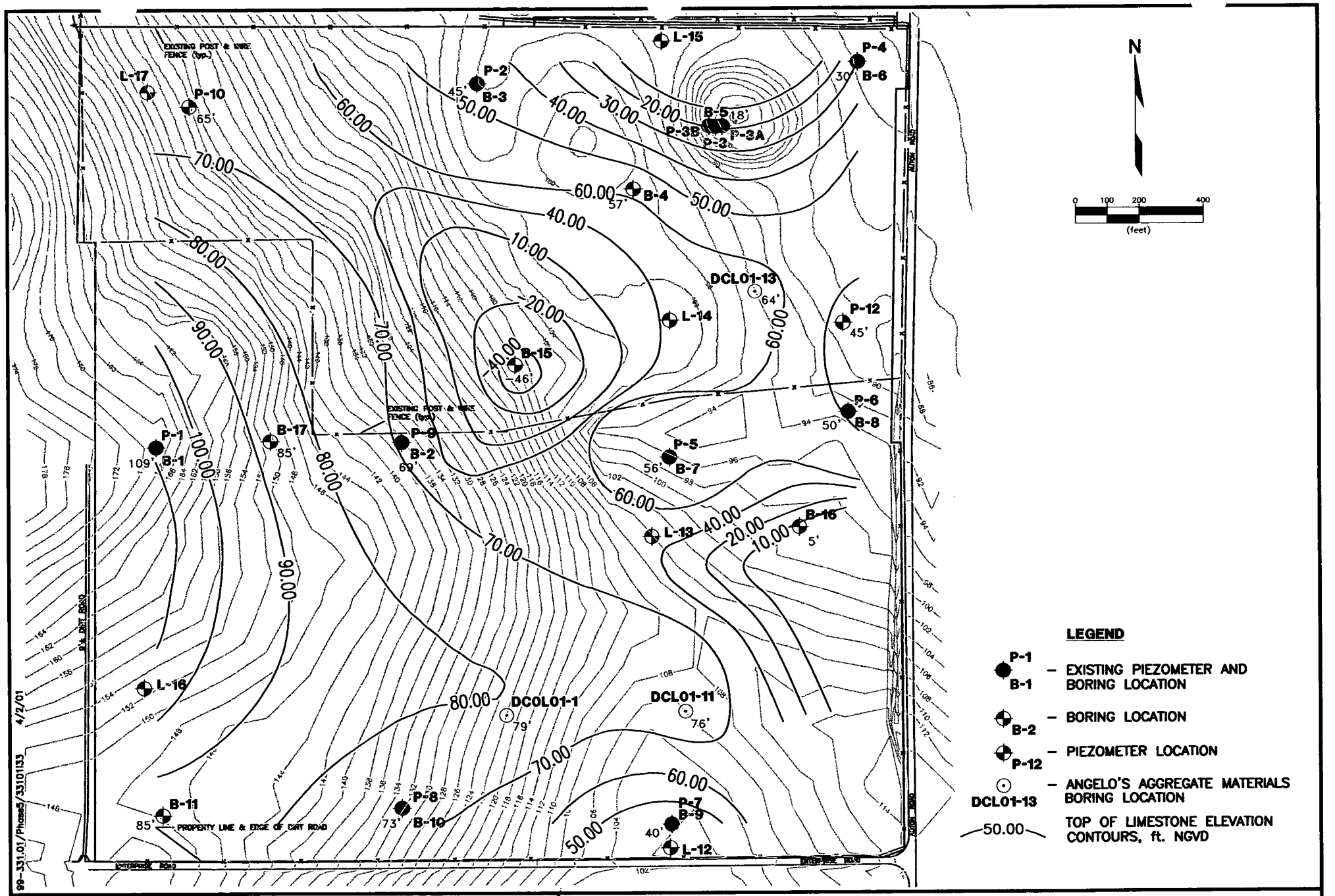
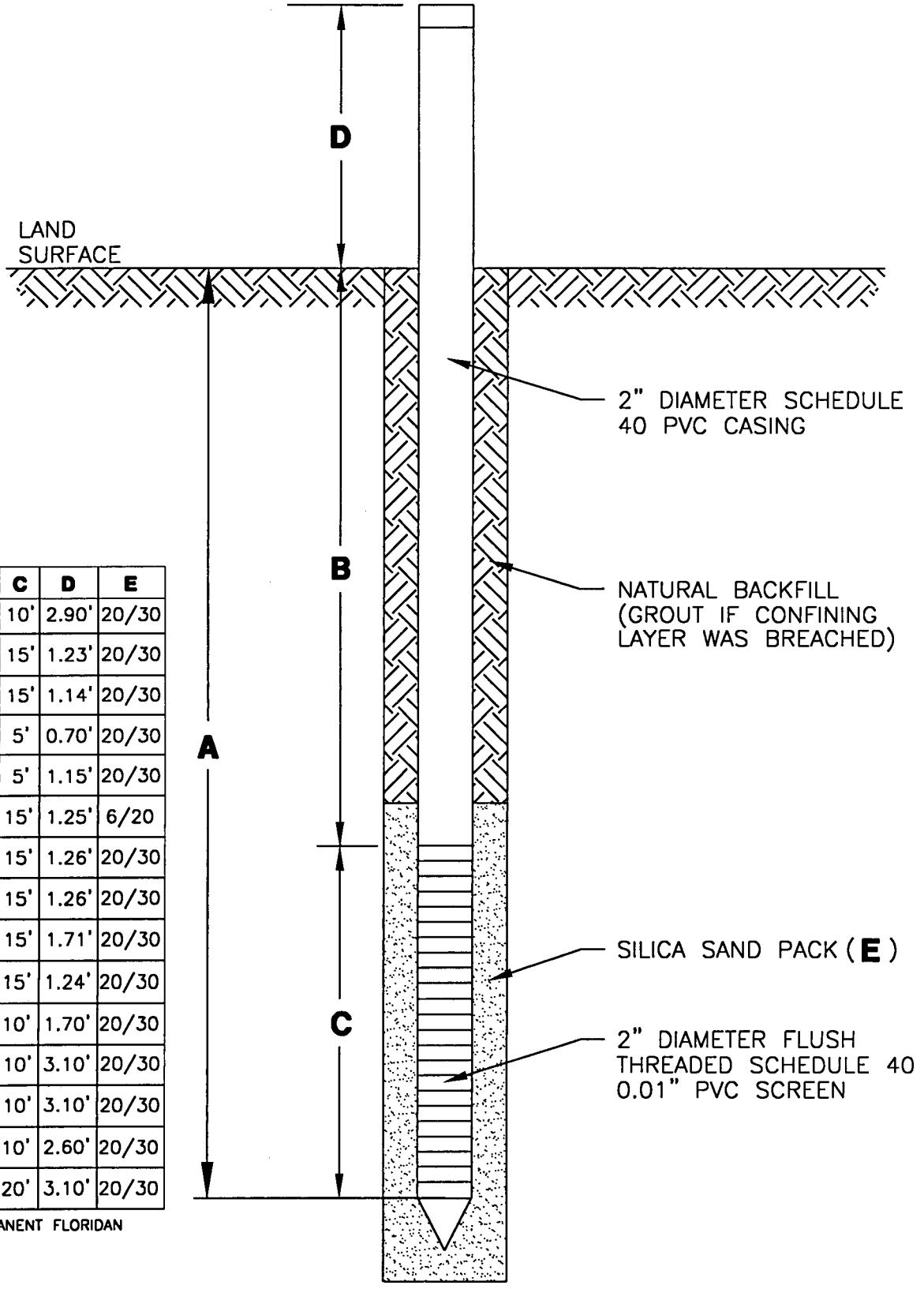


FIGURE 7

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET – SUITE 1000 – ORLANDO, FL 32801
TELEPHONE (407) 839-3955 – FAX (407) 839-3790

TOP OF THE FLORIDAN AQUIFER LIMESTONE
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA



WELL	A	B	C	D	E
P-1A*	113'	93'	10'	2.90'	20/30
P-2	40'	25'	15'	1.23'	20/30
P-3	28'	13'	15'	1.14'	20/30
P-3A	44'	39'	5'	0.70'	20/30
P-3B	68.5'	63.5'	5'	1.15'	20/30
P-4	30'	15'	15'	1.25'	6/20
P-5	38'	23'	15'	1.26'	20/30
P-6	40'	25'	15'	1.26'	20/30
P-7	43'	28'	15'	1.71'	20/30
P-8	75'	60'	15'	1.24'	20/30
P-9	81'	71'	10'	1.70'	20/30
P-10	75'	65'	10'	3.10'	20/30
P-11	60'	50'	10'	3.10'	20/30
P-12*	60'	50'	10'	2.60'	20/30
P-13	60'	40'	20'	3.10'	20/30

* DESIGNED AS PERMANENT FLORIDAN MONITOR WELLS

NOT TO SCALE

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engineers, hydrogeologists, surveyors & management consultants
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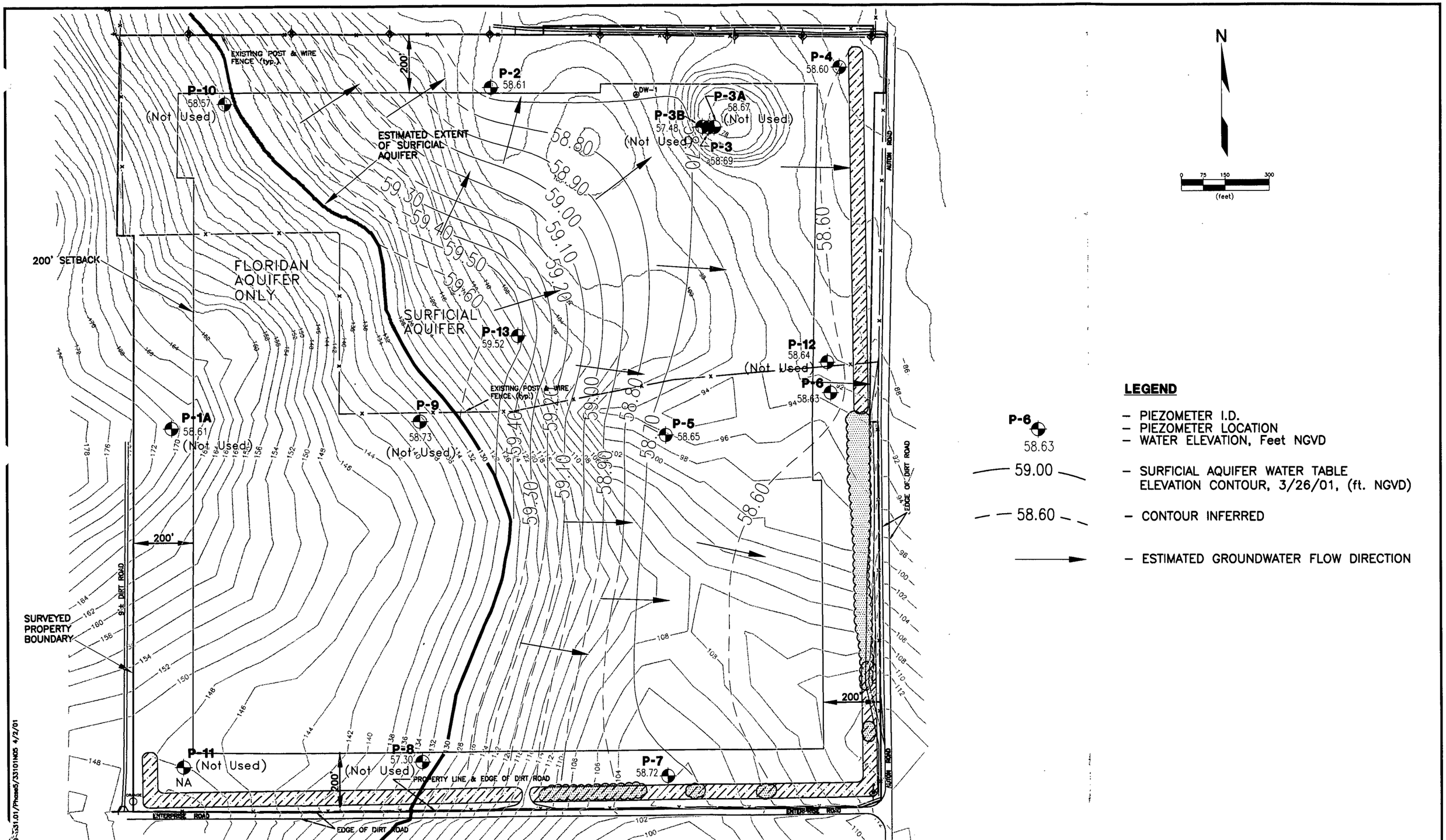
TELEPHONE (407) 839-3955 - FAX (407) 839-3790

PIEZOMETER CONSTRUCTION DETAILS
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

FIGURE 8

\0\DWG\1999\99\331.01\PHASE5\33101N07



99-1531.01/Phase5/33101M05 4/2/01

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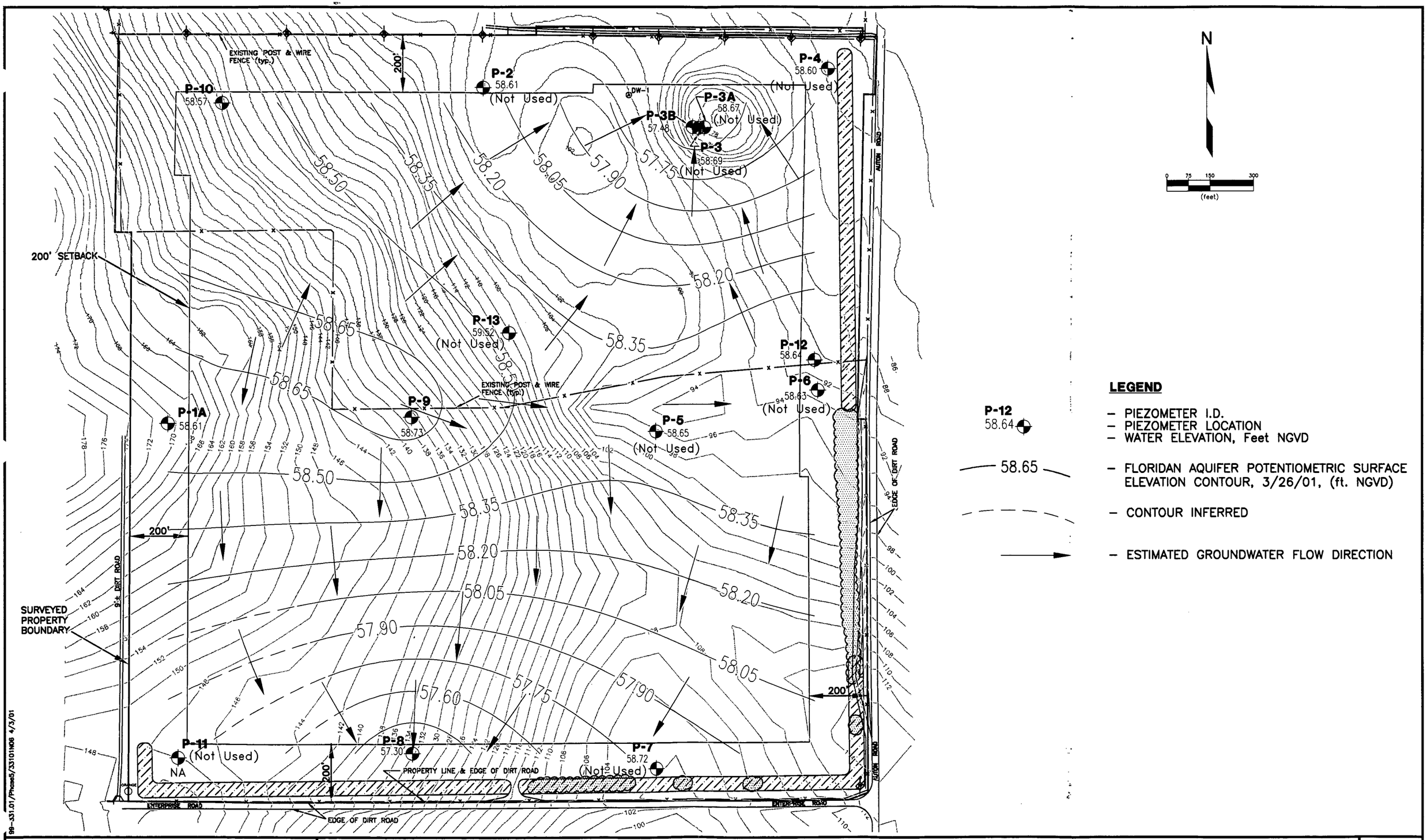
SURFICIAL WATER TABLE ELEVATION MAP, 3/26/01
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

FIGURE 11.1



99-331.01/Phase5/331011N08 4/3/01

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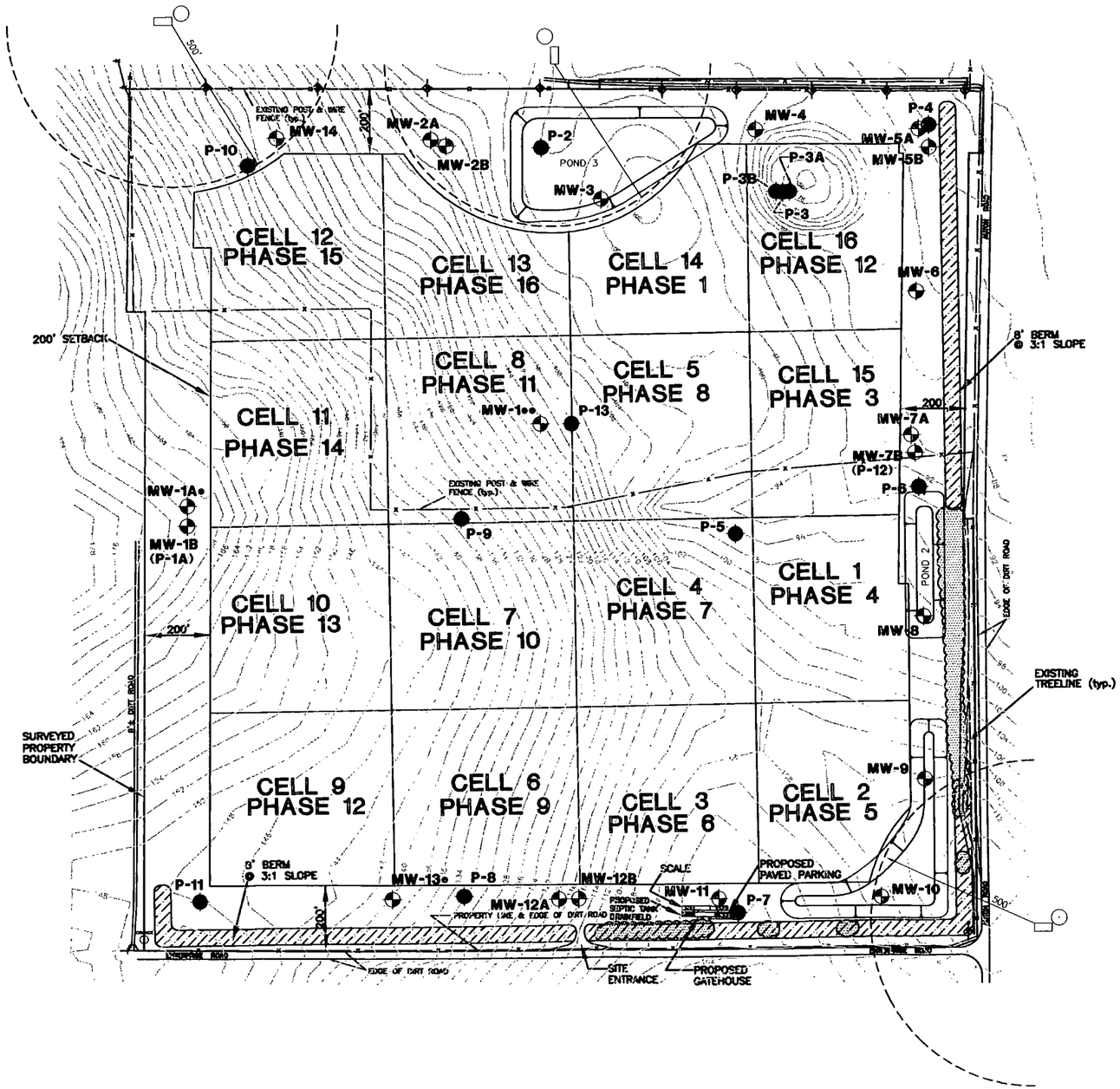
FLORIDAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION MAP, 3/26/01
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

FIGURE 14.1

FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
APR 0 4 2001
SOUTHWEST DISTRICT
TAMPA



LEGEND

- MW-2 – PROPOSED SURFICIAL AQUIFER DETECTION MONITOR WELL LOCATION
- MW-1B – PROPOSED FLORIDAN AQUIFER DETECTION MONITOR WELL LOCATION
- P-2 – EXISTING PIEZOMETER LOCATION
- ○ – PRIVATE POTABLE WELL LOCATION
- MW-13• – PERIODIC DRY SURFICIAL AQUIFER MONITOR WELL LOCATION
- MW-1•• – BACKGROUND SURFICIAL AQUIFER MONITOR WELL TO BE ABANDONED PRIOR TO CELL 8 LANDFILLING

R:\C \\19999-331.01\PHASE5\33101136 4/2/01

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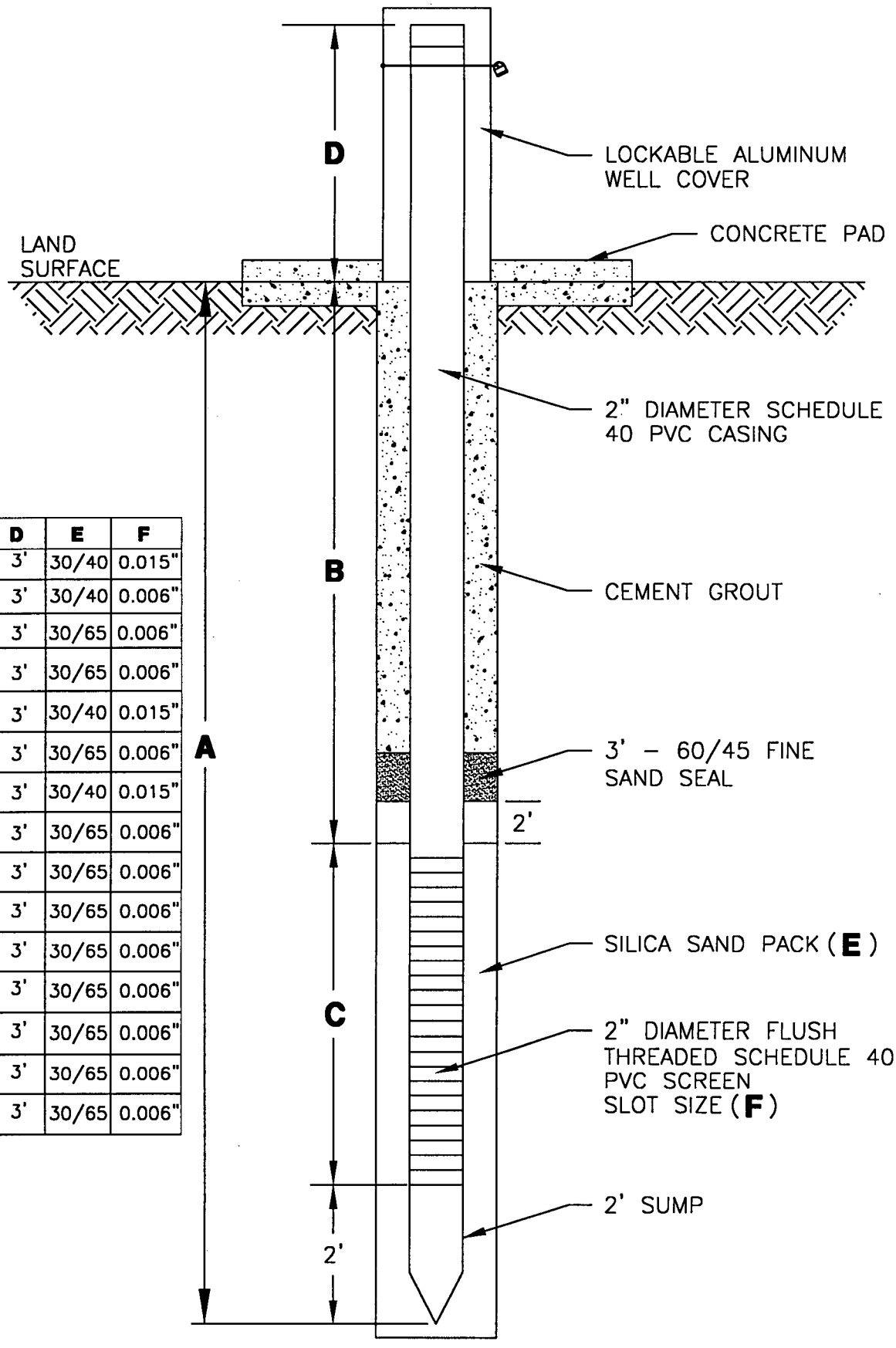
PROPOSED MONITOR WELL LOCATION MAP
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

FIGURE 15



WELL	A	B	C	D	E	F
MW-1	64'	42'	20'	3'	30/40	0.015"
MW-1A	65'	43'	20'	3'	30/40	0.006"
MW-2A	56'	34'	20'	3'	30/65	0.006"
MW-3	50'	28'	20'	3'	30/65	0.006"
MW-4	40'	20'	20'	3'	30/40	0.015"
MW-5A	35'	13'	20'	3'	30/65	0.006"
MW-6	40'	18'	20'	3'	30/40	0.015"
MW-7A	39'	17'	20'	3'	30/65	0.006"
MW-8	50'	29'	20'	3'	30/65	0.006"
MW-9	56'	34'	20'	3'	30/65	0.006"
MW-10	56'	34'	20'	3'	30/65	0.006"
MW-11	55'	33'	20'	3'	30/65	0.006"
MW-12A	62'	40'	20'	3'	30/65	0.006"
MW-13	75'	53'	20'	3'	30/65	0.006"
MW-14	70'	48'	20'	3'	30/65	0.006"

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NOT TO SCALE

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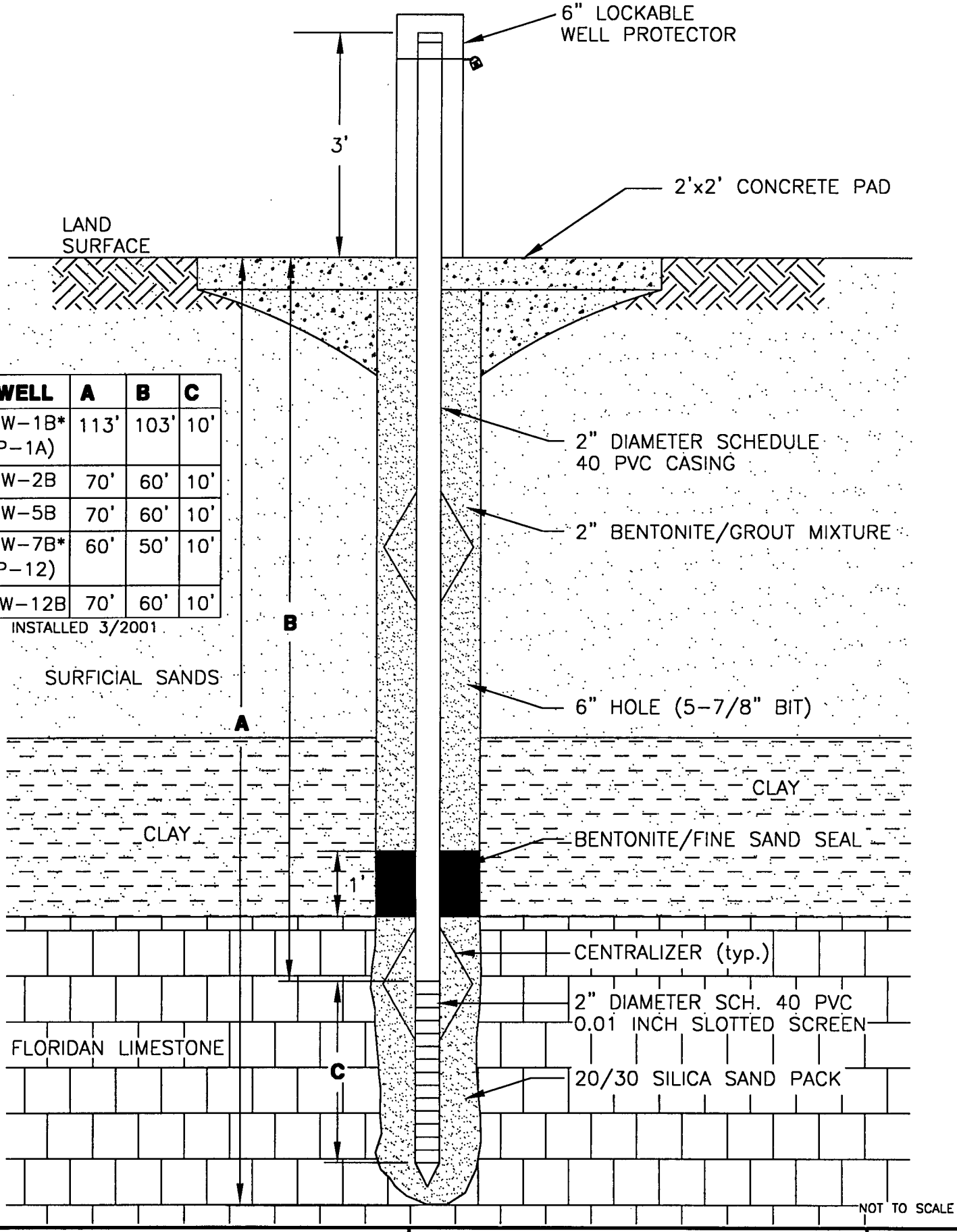
PROPOSED SURFICIAL AQUIFER MONITOR WELL DETAILS - PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY DADE CITY, FLORIDA

FIGURE 16



WELL	A	B	C
MW-1B* (P-1A)	113'	103'	10'
MW-2B	70'	60'	10'
MW-5B	70'	60'	10'
MW-7B* (P-12)	60'	50'	10'
MW-12B	70'	60'	10'

* INSTALLED 3/2001

AD\DWG\1999\99\331.01\PHASE5\33101N04 4/2/01

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201 EAST PINE STREET - SUITE 1000 - ORLANDO, FL 32801
TELEPHONE (407) 839-3955 - FAX (407) 839-3790

FLORIDAN MONITOR WELL DESIGN
PROPOSED ENTERPRISE RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

FIGURE 17

APPENDIX 5-A

B-11 through B-17
HARTMAN'S BORING LOGS

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants

FIELD BORING LOG

B-11 | 1 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
							Top soil. Dark brown to pile		
5	1			2 2 2			orange, light brown VF SAND,		
				3					
10	2			3 3 3			Dark brown, VF SAND, minor clay.		
				3					
15	3			5 5 5			Gray to light brown SAND, slightly silty.		
				4					
20	4			4 4 4			Mottled, light to brown VF SAND.		
				5					
25	5			5 6 7			light brown VF to M. SAND, slightly silty		
				6					
30	6			5 6 5			Gray Sandy CLAY. VF sand, slightly silty		

PROJECT
NUMBER: 99-331.01 FS
NAME: Enterprise Rd.

CLIENT: Sid Larkin
LOCATION: Dade City

BORING
GR. ELEV.: 148 NGVD
DIA-TYPE: Boring 9
DEPTH: 40.5
DATE STARTED: 2/26/01
DATE ENDED: 2/27/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE: Mud / SPT 45
CREW: Joe + Eddie
SUPERVISOR: Le Roy

PIEZ/WELL
CASING DIAM.: ~~NA~~
CASING TYPE: P-11
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

engineers, hydrogeologists, surveyors & management consultants

FIELD BORING LOG

B-11 | 2 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
12'				5					
35	7			2 6 3 8			Gray to light CLAY		Sample for VES sieve
40	8			6 7 7 7 3 3 5 7			SAME AS ABOVE END OF BORING		
45									
50									
55									
60									

PROJECT

NUMBER: 99-331.01

NAME:

CLIENT: Larkin

LOCATION:

BORING

GR. ELEV.: 140'

DIA-TYPE:

DEPTH: 40.5'

DATE STARTED: 2/26/01

DATE ENDED: 2/27/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW: Joe α

SUPERVISOR: Le Roy

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants

FIELD BORING LOG

B-12 | 1 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
5				3 2 2		(1)	Orange VF+F SAND		
10				2 10 14 17 17		(2)	Mottled L. Orange, Orange, + White VF to F SAND, minor clay		
15				10 25 17		(3) (4)	Orange Sandy Clay ~3" White limerock		
20				21 4 2 1		(5)	Mottled White + L. Orange F to VF SAND Mottled White + Orange VF to F SAND, minor Clay		
25				1 3 4 3		(6) (7)	Mixed with white limestone frag Mottled Wh. + Black Sandy Clay w/ small rk frag Mottled Wh, Blk, + Orange SAND, w/ small rk frag		
30				4 6 7 9		(8)	minor to slightly clayey Mottled Orange + Cream F to M SAND		

PROJECT
NUMBER: 99-331/01PS
NAME: Enterprise Rd

CLIENT: Sid Larkin
LOCATION: Dade City

BORING
GR. ELEV.: ~134 ft NGVD
DIA-TYPE:
DEPTH: 50½ ft bls
DATE STARTED: 2/20/01
DATE ENDED: 2/20/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
Mud Rotary - SFT
RIG TYPE: 45
CREW: Joe
SUPERVISOR: Leroy
UES

PIEZ/WELL
CASING DIAM.: NA
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

LF Depth
34'ft = B-12
28'ft = B-13

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-12 | 2 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				11					
35				6 7 8 9		(9)	Mottled Orange + Cream F to M SAND, trace Si +		
40				6 4 5 6		(10) (11)	Mottled L+D Orange F to M SAND, Minor Clay; Mottled Wh, Orange, + Blk Sandy CLAY		UES Sample
45				2 2 2 2		(12)	Mottled Wh, Orange, + Blk Clayey SAND		
50				4 3 5 5		(13)	Mottled Cream + Blk Sandy CLAY		UES Sample (Sieve)
5									
0									

PROJECT
NUMBER: 99-331.01 P5
NAME: Enterprise Rd

CLIENT: Sid Larkin
LOCATION: Dade City

BORING
GR. ELEV.: ~134 ft NGVD
DIA-TYPE:
DEPTH: 50' bls
DATE STARTED: 2/20/01
DATE ENDED: 2/20/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
Mud / SPT
RIG TYPE: 45
CREW: Joe
SUPERVISOR: Leroy
UES

PIEZ/WELL
CASING DIAM.: NA
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-13 | 1 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
5				5 9 5		1	Dark brown VF to M SAND		
10				5 2 1 1		2	Dark Orange F to M SAND		
15				3 3 2 3		3	Same as above		
20				3 4 2 3		4	Same as above		
25				3 6 7 13		5	Mottled Wht & L. Orange Slightly Clayey to Clayey SAND		
30				14 10 11 11		6	Mottled Wht & L. Orange Slightly Clayey SAND w/ rock frag		

PROJECT

NUMBER: 99-33.01 P5

NAME: Enterprise Rd Larkin Property

CLIENT: Sid Larkin

LOCATION: Dade City

BORING

GR. ELEV.: ~ 111 NGVD

DIA-TYPE:

DEPTH: 50½' bls

DATE STARTED: 2/20/01

DATE ENDED: 2/20/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

Mud / SPT

RIG TYPE: 45

CREW: Leroy

SUPERVISOR: Joe

Universal Eng

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-13 | 2 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				13					
35				11 13 19		7	Wh+L.Orange F to M SAND		
				19					
40				3 4 5		8	Mottled Wh+L. Orange VF to F SAND	Minor Clay	
				4		9	Mottled Wh+Orange Clayey VF to F SAND		
45				5 6 6		10	Mottled Wh+L.Orange Sandy CLAY		
50				2 3 4		11	Mottled Wt, Blk, + L. Orange Sandy CLAY		UES sample (sieve)
5				4					
0									

PROJECT

NUMBER: 99-331.01 P5

NAME: Enterprise Rd Larkin Property

CLIENT: Sid Larkin

LOCATION: Dade City

BORING

GR. ELEV.: ~111 NGVD

DIA-TYPE:

DEPTH: 50½' bls

DATE STARTED: 2/20/01

DATE ENDED: 2/20/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

Mud/SPT

RIG TYPE: 45

CREW: Joe

SUPERVISOR: Leroy

Universal Eng

PIEZ/WELL

CASING DIAM.: NA

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-14 | 1 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
							Top soil - Dark to black top soil		
5				1 2 2			Dark brown VF-M SAND, slightly silty, brown		
				3			to light minor clay. rock fragments		
10				4 9 11			Light Gray Sandy CLAY		
				13					
15				8 9 11			Dark gray Sandy CLAY light yellow to pale rusty VF sand.		
				11					
20				6 7 9			Gray Sandy CLAY, VF Sand, silty.		
				9					
25				8 11 13			Gray to white VF SAND, light brown silty		
				16					
30				3 4 5			Gray to light brown Sandy CLAY.		

PROJECT
NUMBER: 99-331-01 PS
NAME: Enterprises Rd.

CLIENT: Larkin Property
LOCATION: Grand Junction

BORING
GR. ELEV.: 110 NGVD
DIA-TYPE: Boring
DEPTH: 35.5
DATE STARTED: 2/28/01
DATE ENDED: 2/28/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
Mud Rotary - SPT
RIG TYPE: H5
CREW: Joe
SUPERVISOR: LeRoy

PIEZ/WELL
CASING DIAM.: NA
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-14 | 2 of 2

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
1				6					
				3 4 4			Grey to rusty Sandy CLAY, light brown VF Sand.		
35									
				5			END OF BORING		
0									
5									
0									
5									
0									

PROJECT

NUMBER:

NAME:

CLIENT:

LOCATION:

BORING

GR. ELEV.:

DIA-TYPE:

DEPTH:

DATE STARTED:

DATE ENDED:

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

Larkin Property Log.

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-15 | 1 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
5				3 1 2 3		1	Orange VF SAND		
10				9 14 17		2	Orange VF-F SAND		
15				17 4 2 2		3	SAME AS ABOVE		
20				1 4 5 6		5	SAME AS ABOVE		
25				6 4 5 5		6	Orange V-F SAND		
30				4 5 6 6		7	Orange-light brown VF SAND		

PROJECT
NUMBER: 99-331.01 P5
NAME: Enterprise Rd

CLIENT: Sid Larkin
LOCATION: Eagle City

BORING
GR. ELEV.: 134' NVGD
DIA-TYPE: boring
DEPTH: 160.5'
DATE STARTED: 2/21/01
DATE ENDED: 2/25/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE: Mud Rotary 45
CREW: Joe, Eddie
SUPERVISOR: Leroy
UES

PIEZ/WELL
CASING DIAM.: ~~N/A~~
CASING TYPE: P-13
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-15 | 2 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				7					
35				9 9 12		8	Orange V. fine SAND minor black mottled slightly silty.		
				13					
40				9 9 10		9	Orange - brown F-VF SAND		
				13					
45				4 15 15		10	Orange - light brown SAND with rock fragment.		
				13					
50				6 5 8		11	Orange - brown F-SAND		
				8					
55				11 12 15		12	Orange to brownish VF-F SAND with black pigments.		
				15					
60				13 17 17		13	Orange to light brown VF-M SAND & minor clay		

PROJECT

NUMBER:

NAME:

CLIENT:

LOCATION:

BORING

GR. ELEV.:

DIA-TYPE:

DEPTH:

DATE STARTED:

DATE ENDED:

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-15 | 3 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				20			rock fragments.		
				13			Orange to light brown		
65				17 17		14	VF-F SAND.		
				22					
				20 24			Light brown to rusty		
70				35		15	F-SAND.		
				47					
75							SAME AS ABOVE		
				24			Orange to Dark brown		
80				44 59/3		16	F-SAND, slightly silty.		
				30					
85				48 50/3			SAME AS ABOVE		
				22					
90				32 41			Orange F. VF SAND with minor clay materials.		

PROJECT

NUMBER:

NAME:

CLIENT:

LOCATION:

BORING

GR. ELEV.:

DIA-TYPE:

DEPTH:

DATE STARTED:

DATE ENDED:

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-15 | 4 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				48					Boring stopped 5:45pm 2/21/01
95				32 22 22		19	Orange to light brown VF-V SAND, slightly silty		
7				4 7 8 8 8		20	Orange to light brown V-SAND, slightly silty.		
100				1 2 2		21	SAME AS ABOVE		
105				3 1 2 2		22	Orange F-VF SAND slightly silty and minor clay.		
110				4 2 5 7		23	Dark Brown VF SAND slightly silty, minor clay		Push Shelby tube into formation at 18" lost drive recovery. NO SAMPLE
115				13 5 6 9		24	Brownish to light V.F SAND, slightly silty		
120				13 2 3 4		25	slightly silty, VF-F SAND, black pigment of		

PROJECT
NUMBER:
NAME:
CLIENT:
LOCATION:

BORING
GR. ELEV.:
DIA-TYPE:
DEPTH:
DATE STARTED:
DATE ENDED:

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE:
CREW:
SUPERVISOR:

PIEZ/WELL
CASING DIAM.:
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-15 | 5 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				50/6			minor clay.		
125				8 11 22		26	Light to gray NF to M SAND with black pigment of rock fragments		
130				23 22 30 50/3		27	Gray to white F-VF SAND Well sorted, slightly silty.		Boring stopped 4.30pm 2/22/01
135				30 50/6		28	Light brown VF to F SAND, well sorted.		2/25/01 Boring started at 8.30am
140				50/6		29	Gray to light brown VF to F SAND, well rounded, sorted.		
5				21 35 50/6		30	Same as above		
150				30 36 30		31	Gray to White Sandy CLAY, slightly silty.		VES sample of SAT @ 10.30

PROJECT
NUMBER:
NAME:
CLIENT:
LOCATION:

BORING
GR. ELEV.:
DIA-TYPE:
DEPTH:
DATE STARTED:
DATE ENDED:

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE:
CREW:
SUPERVISOR:

PIEZ/WELL
CASING DIAM.:
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-15 | 6 of 6

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				30			mottled.		
	SS			8 6 11 13		32	Same as above		UGS Sample Sieve/ VERTICAL K_V
				7 8 13			Gray sandy CLAY slightly silty, mottled.		
155						33			
				40					
				5 7 19		34	Dark gray CLAY		
160									
				15			END OF BORING		
5									
0									
5									
0									

PROJECT

NUMBER: 99-331.01

NAME: Lankin Lf.

CLIENT:

LOCATION:

BORING

GR. ELEV.:

DIA-TYPE: 2"

DEPTH: 160.5

DATE STARTED:

DATE ENDED: 2/25/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-16 | 1 of 4

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
							Top Soil Dark to brown Soil.		
5	1			1 2 2			Orange to dark VF		
				2			SAND, silty, minor clay		
10	2			2 3 4			Dark brown V-VF		
				4			SAND, slightly silty, minor clay.		
15	3			4 5 9			Brown to light gray		
				12			VF-M SAND.		
20	4		5 5 5 6				Light Brown to gray VF SAND, slightly clay.		
25	5			5 6 7			same as above		
				9					
30	6			8 6 8			Light brown VF SAND slightly Silty		

PROJECT
NUMBER: 99-331.01.15
NAME: Enterprise Rd

CLIENT: Larkin Property
LOCATION: Dade City

BORING
GR. ELEV.: 98' NGVD
DIA-TYPE: Boring
DEPTH: 93.5'
DATE STARTED: 2/26/01
DATE ENDED: 2/27/01

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE: Mud / SPT 45
CREW: Joe + Eddie
SUPERVISOR: Le Roy WES

PIEZ/WELL
CASING DIAM.: NA
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-16 | 2 of 4

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
35	7			7 7 8			Brown V-VF SAND with black rock fragments		
40	8			12 5 5 7			Brown VF SAND. Slightly Silty		
45	9			9 5 4 4			Same as above		
50	10			5 5 3 3			Light brown V-VF SAND, slightly silty.		
55	11			5 5 4 5			Dark brown VF SAND, with rock fragments.		
60	12			6 6 8 8			Dark brown VF SAND Slightly silty.		

PROJECT

NUMBER: 99-331.01 P5

NAME: Enterprises Rd

CLIENT:

LOCATION: Dade City

BORING

GR. ELEV.:

DIA-TYPE:

DEPTH: 55

DATE STARTED: 2/26/01

DATE ENDED:

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

engineers, hydrogeologists, surveyors & management consultants

FIELD BORING LOG

B-16 | 3 of 4

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				11					
65	13			3 4 5			Dark brown VF SAND, Clayey Sand, slightly silty.		
				5					
70	14			8 10 15			Dark brown VF SAND Slightly Silty		
				12					
75	15			4 5 10			Mottled light Brown VF SAND, Silty.		
				18					
80	16			20 21 22			light brown VF SAND, well sorted, slightly silty		
				24					
85	17			8 10 15			Same as above		
				8					
90	18			5 7 11			light Brown to Gray sandy CLAY		

PROJECT

NUMBER:

NAME:

CLIENT:

LOCATION:

BORING

GR. ELEV.:

DIA-TYPE:

DEPTH:

DATE STARTED:

DATE ENDED:

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

RIG TYPE:

CREW:

SUPERVISOR:

PIEZ/WELL

CASING DIAM.:

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.
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FIELD BORING LOG

B-16 | 4 of 4

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
				13			US #1 (30.5' - 32.0')		Push shelby tube 90.5 - 92
	19			9 8 9 9			Brown to Gray Sandy CLAY, Slightly Silty		
95							END OF BORING		
100									
5									
0									
5									
0									

PROJECT
NUMBER:
NAME:
CLIENT:
LOCATION:

BORING
GR. ELEV.:
DIA-TYPE:
DEPTH:
DATE STARTED:
DATE ENDED:

GROUNDWATER
DEPTH:
TIME:
DATE:
REMARKS:

DRILLING
RIG TYPE:
CREW:
SUPERVISOR:

PIEZ/WELL
CASING DIAM.:
CASING TYPE:
CASING DEPTH:
SCREEN DEPTH:
SCREEN LENGTH:
FILTER PACK:
RISER HEIGHT ALS:
T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-17 | 1 of 3

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
							Approximate Depths + Descrip		
							SAND Brown		BASED on Drillers Observations
5									
							L Yellow Brown SAND		
10									
							CLAY		
15									
20									
25									
							Clayey SAND		
30									

PROJECT

NUMBER: 99-331.01

NAME: Enterprise Rd Larkin Property

CLIENT: Sid Larkin

LOCATION: Dade City

BORING

GR. ELEV.: ~150 ft NGVD

DIA-TYPE:

DEPTH: 65' bls

DATE STARTED: 2/20/01

DATE ENDED: 2/20/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

Mud Rotary

RIG TYPE: 45

CREW: Joe

SUPERVISOR: Leroy

UES

PIEZ/WELL

CASING DIAM.: NA

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

HARTMAN & ASSOCIATES, INC.

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FIELD BORING LOG

B-17 | 2 of 3

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
35							SAND		
40									
45							Clayey SAND w/cemented Sand		
50							Sandy CLAY to Clayey SAND		
55									
60									

PROJECT

NUMBER: 99-331.01

NAME: Enterprise Rd Larkin Property

CLIENT: Sid Larkin

LOCATION: Dade City

BORING

GR. ELEV.: ~150 ft NGVD

DIA-TYPE:

DEPTH: 65' bls

DATE STARTED: 2/20/01

DATE ENDED: 2/20/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

Mud Rotary

RIG TYPE: 45

CREW: Joe

SUPERVISOR: Leroy

UES

PIEZ/WELL

CASING DIAM.: NA

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS

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FIELD BORING LOG

B-17 | 3 of 3

DEPTH (FT)	SAMPLE NO/TYPE	SAMPLE SYMBOL	SAMPLE % REC.	BLOWS PER 6"	N-VALUE	BORING LOG	MATERIAL DESCRIPTION CLASSIFICATION	WELL	REMARKS
65							END OF BORING		
70									
5									
0									
5									
0									

PROJECT

NUMBER: 99-331.01 P5

NAME: Enterpris Rd Larkin Property

CLIENT: Sid Larkin

LOCATION: Dade City

BORING

GR. ELEV.: ~150 ft NGVD

DIA-TYPE:

DEPTH: 65' bls

DATE STARTED: 2/20/01

DATE ENDED: 2/20/01

GROUNDWATER

DEPTH:

TIME:

DATE:

REMARKS:

DRILLING

Mud Rotary

RIG TYPE: 45

CREW: Joe

SUPERVISOR: Leroy

HES

PIEZ/WELL

CASING DIAM.: NA

CASING TYPE:

CASING DEPTH:

SCREEN DEPTH:

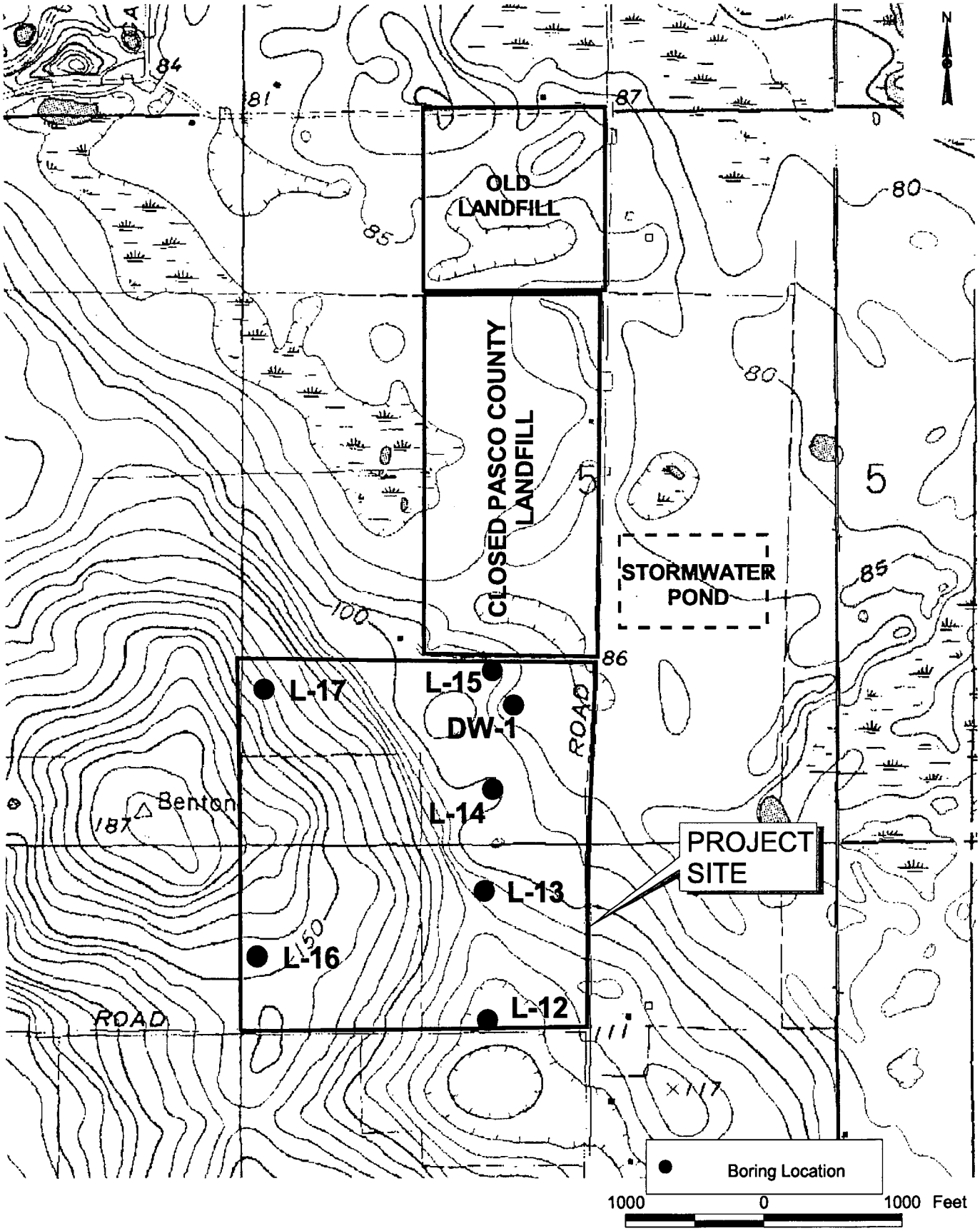
SCREEN LENGTH:

FILTER PACK:

RISER HEIGHT ALS:

T.O.C. ELEV.:

REMARKS



Sources: 7.5 Minute USGS Quadrangles - Dade City and Branchborough

s:\angelos\99-331.00\projects\maps.apr [8.5x11 boring] (12/99 svl)

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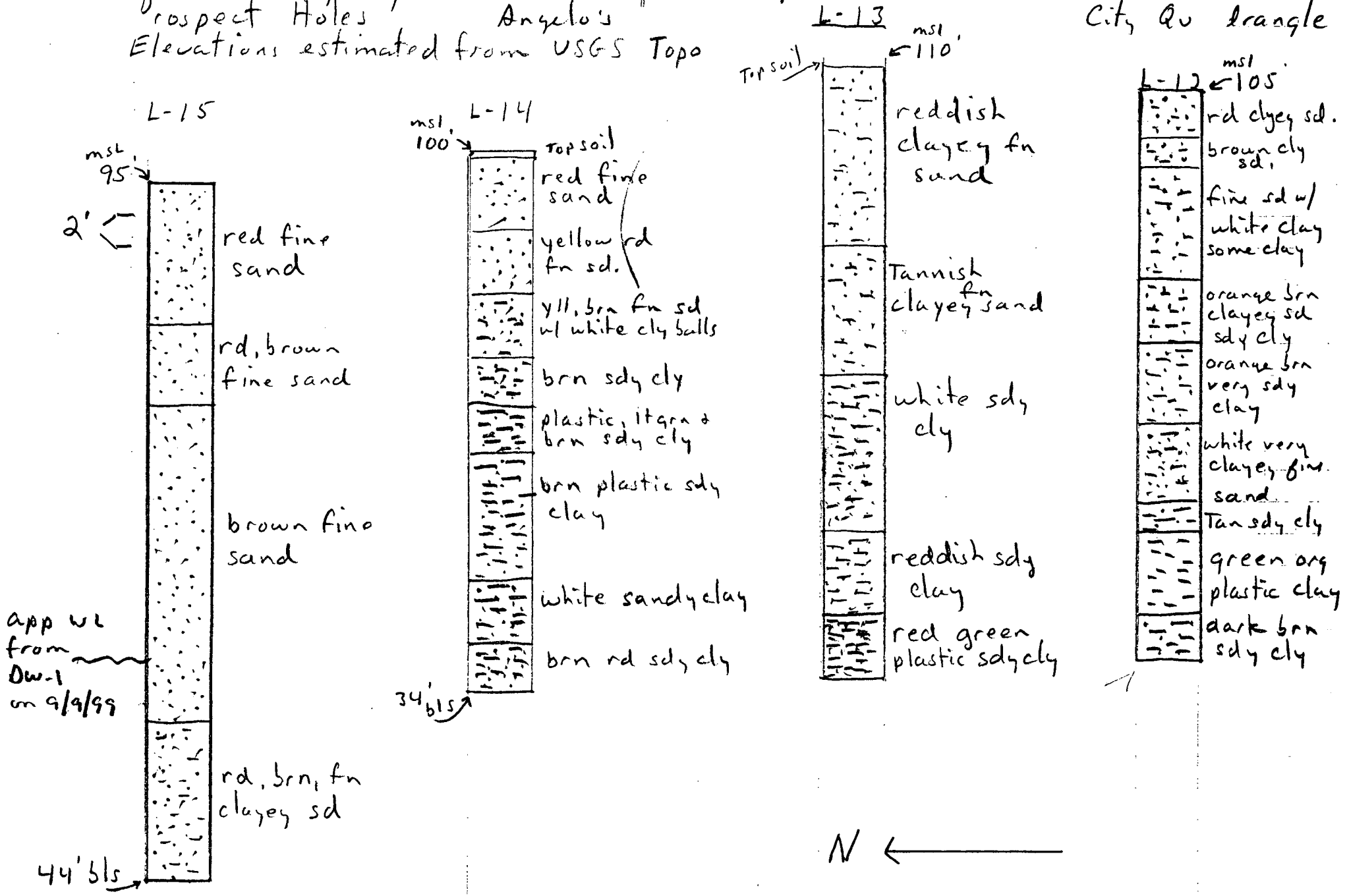
TELEPHONE (407) 839-3955 - FAX (407) 839-3780

BORING LOCATION MAP
PROPOSED CLASS III LANDFILL
DADE CITY, FLORIDA

FIGURE

Larkin Property Prospect Holes — Wade City Angelo's — drilled 9/9/99 — USGS 7.5 minute Wade City Quadrangle

Elevations estimated from USGS Topo

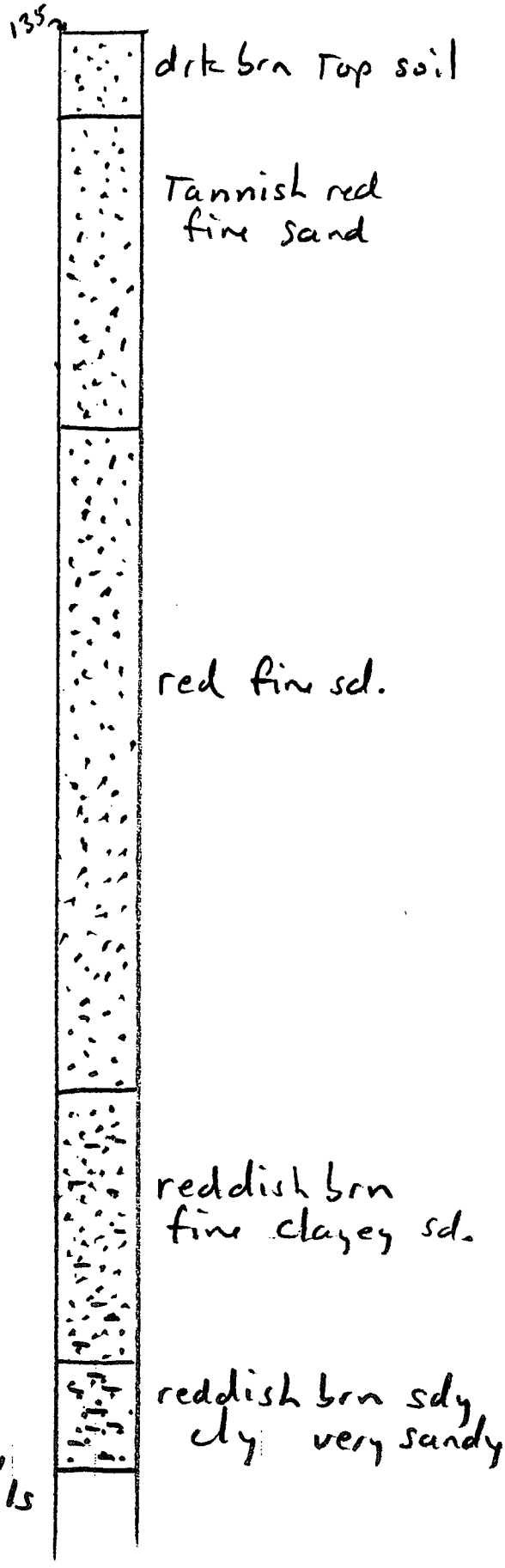


bls = below land surface

Larkin property

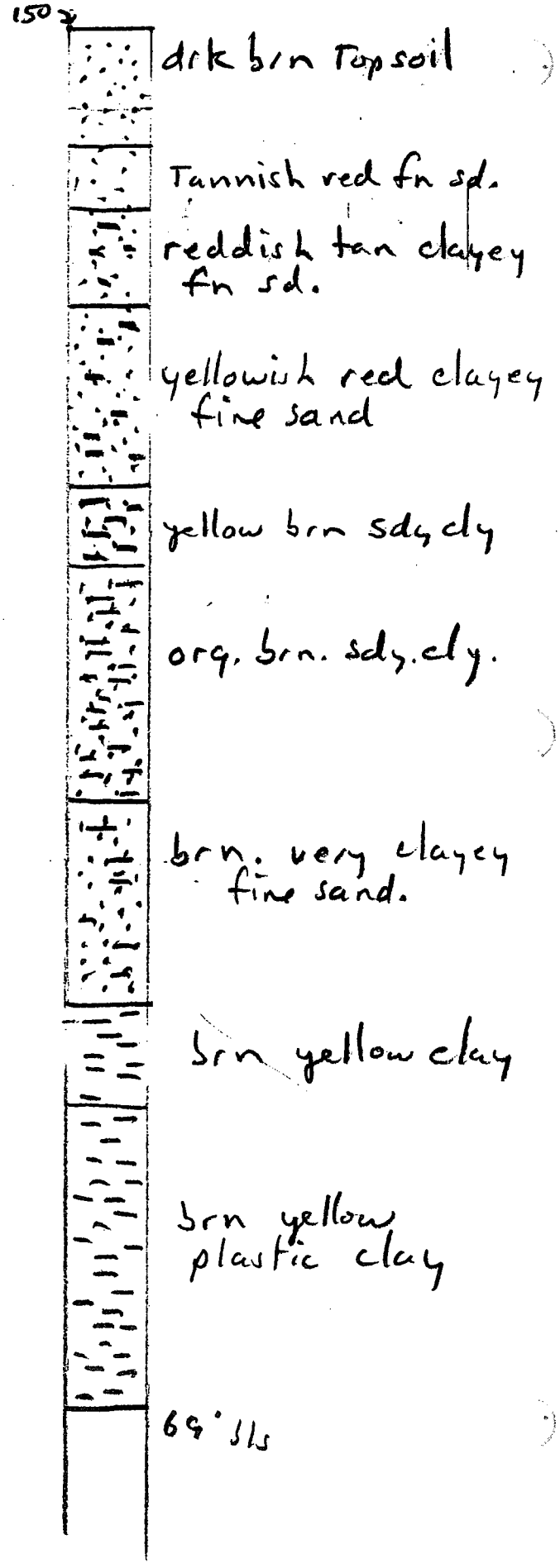
N ←

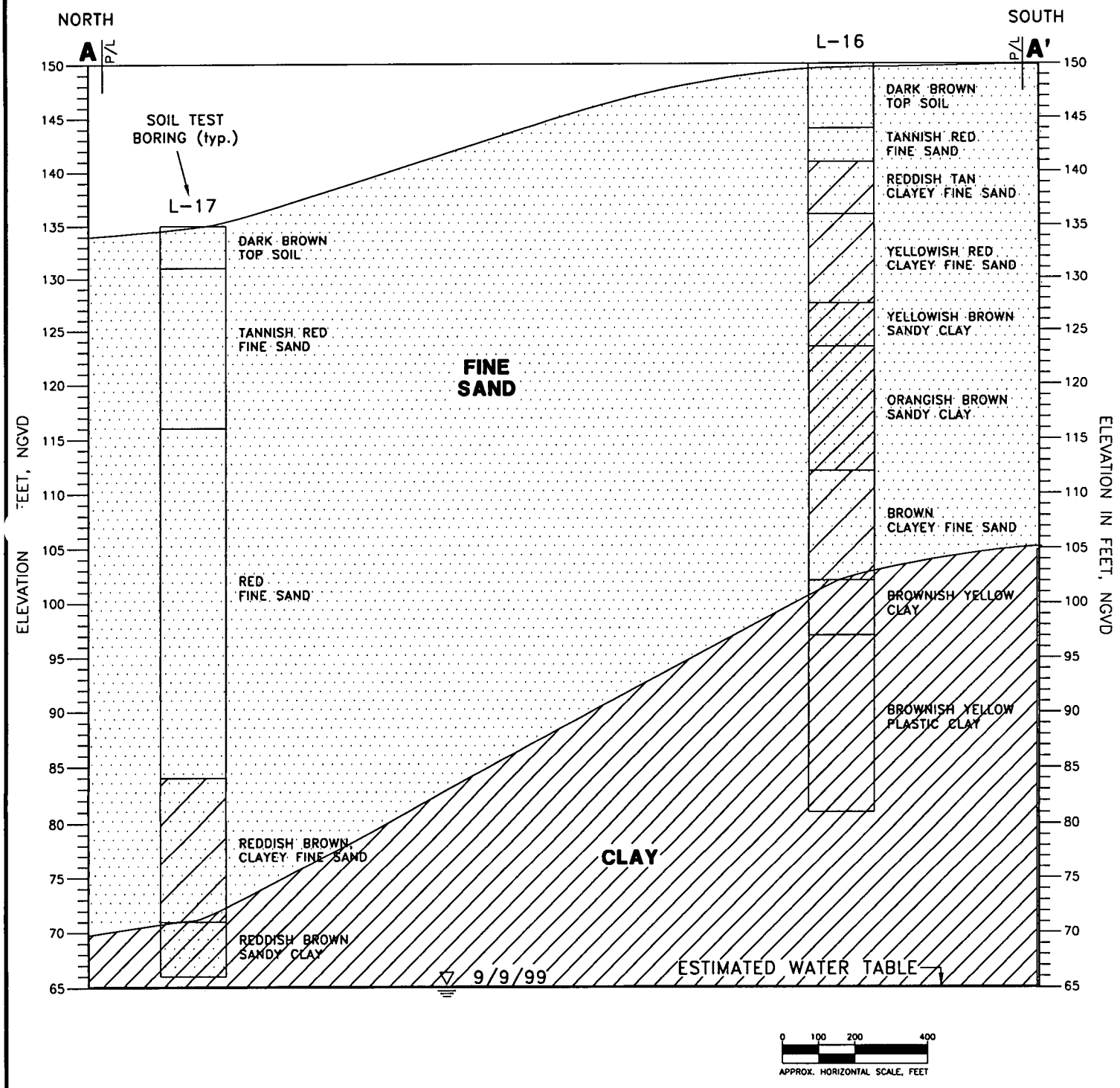
L-17



Angelo's

L-16





00105

NOTES: ELEVATIONS AND LOCATIONS ESTIMATED FROM USGS TOPOGRAPHIC MAP.
WATER TABLE ELEVATION IS APPROXIMATE AND MEASURED FROM DW-1.

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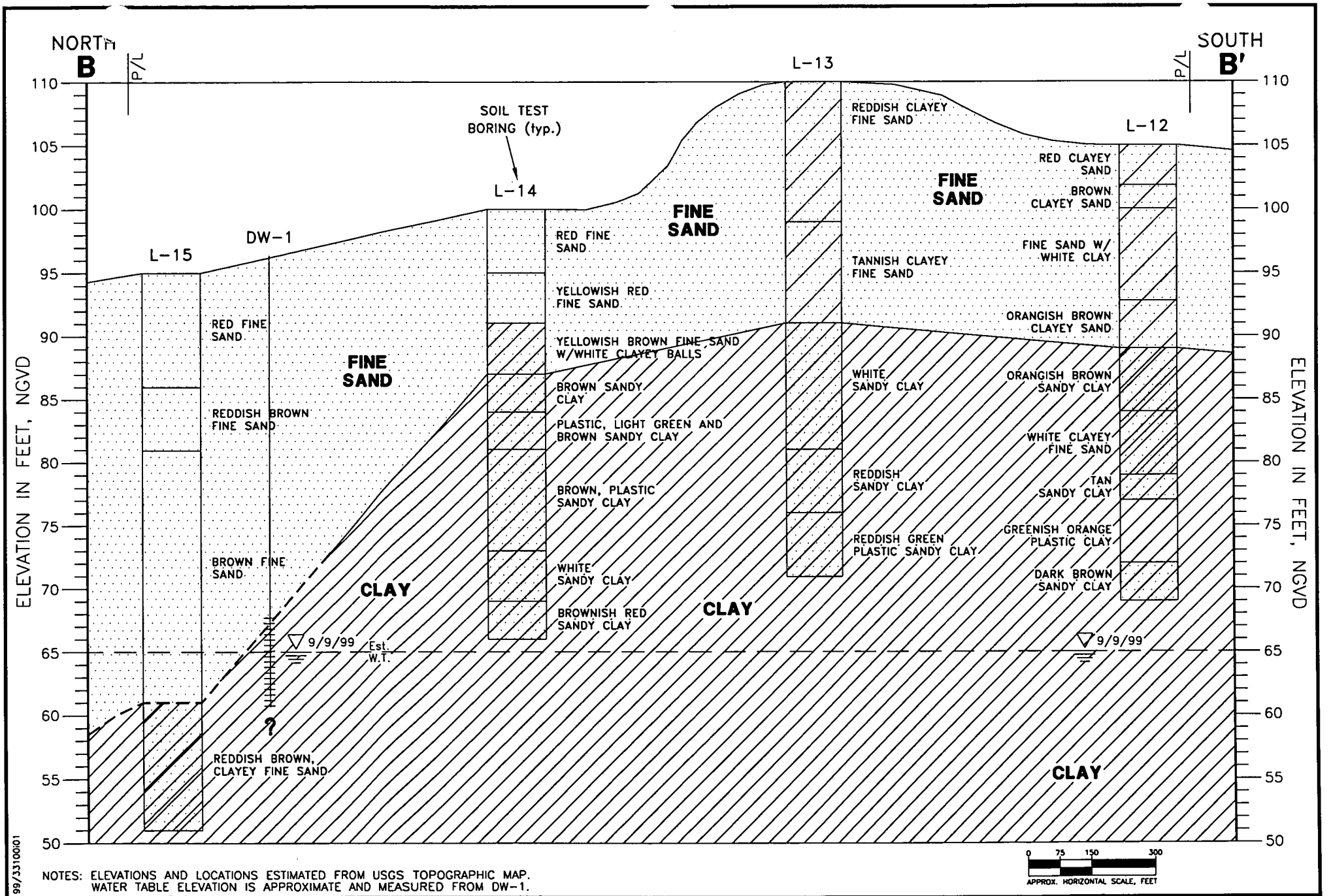
GEOLOGIC CROSS SECTION A - A'
PROPOSED LARKIN CLASS III LANDFILL

FIGURE



99/3310001

NOTES: ELEVATIONS AND LOCATIONS ESTIMATED FROM USGS TOPOGRAPHIC MAP.
WATER TABLE ELEVATION IS APPROXIMATE AND MEASURED FROM DW-1.

FIGURE

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GEOLOGIC CROSS SECTION B - B'
PROPOSED LARKIN CLASS III LANDFILL

DCL01-1 through DCL01-15
ANGELO'S BORING LOGS

Test Boring Log

Boring No. DCL 01-1

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate Co.	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: A-3, Soil Cement Exploration	Ground Elev.: 122'
Drilling Method: Drag Bit, wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-16-2001
Water Level:	Date Finished: 1-16-2001
Measuring Point:	Driller: Leroy Prince (Driller)
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 #		
FALL	30"		

Joe Veiw (Helper)

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
5		1 1 1 1			Dark Redish Brown Sand. .25mm well rounded & sorted	70% Rec.
10		2 4 7 8			Silty Sand fine-med grain. Dark Yellowish orange.	70% Rec.
14		4				

Test Boring Log

Boring No.: DCL01-1

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		5			silty Sand. Dark yellowish orange	100%.
		5				
15		6				
		4			Dark yellowish orange Sand. Fine-med grain. Rounded-Subrounded. mod-well Sorted	100%. Rec.
		4				
		4				
20		2				
		5			very Pale orange. Sand. Fine grain. Rounded-Subrounded. mod. well Sorted.	100%. Rec
		5				
		5				
25		6				
		8			Pale yellow Orange. Sand Fine grain. Rounded-subrounded. mod. well sorted	100%.
		9				
		12				
30		11				
32						

Test Boring Log

Boring No.: DCL 01-1

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		11			Pale yellowish orange Sand. Some silt, fine grain, Rounded - sub rounded, mod. sorted	100% Rec
		9				
		7				
35		6				
		4			Pale Greenish yellow sandy silt/clay	100% Rec.
		3				
		4				
40		5				
		9			White Limestone	
		5				
		6				
45		8				
50						

Test Boring Log

Boring No. DCL 01-2

Project: Dade City Landfill	Sheet 1 of
Client: Angelo Iafrate Co.	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Aggregate Exploration	Ground Elev.: 145'
Drilling Method: Drag Bit, wash	Datum: NAD-83
Drill Rig Type: CME 55	Date Started: 1-16-2001
Water Level:	Date Finished: 1-16-2001
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 #		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					mod. Redish Brown sand. Sub rounded - Rounded. mod sorted.	Hand Auger Sample. In case of irrigation lines.
5						
		8			Dark Yellowish orange. Silty sand. Fine grain Rounded - subrounded. med-well sorted.	75% Rec
		9				
		11				
10		13				
14		8			Dark Yellowish orange	

Test Boring Log

Boring No.: DCL01-2

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		8			Sandy silt, w/ rock fragments.	100% Rec
		3				
15		4				
		3			Dark Yellowish orange silty sand. Fine grain. mod-Poorly sorted, Rounded -Subrounded	75% Rec
		4				
		5				
20		5				
		8			Grayish orange, sand, w/ minor silt. Fine grain. Rounded - Sub rounded, well-mod sorted	75% Rec.
		9				
		12				
25		10				
		5			Pale yellowish orange sand, Minor silt. Fine grain, Rounded - sub rounded. Mod sorted.	75% Rec.
		5				
		6				
30		5				
32						

Test Boring Log

Boring No.: DCL 01-2

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		2			White Sandy clay	
		4				
		6				
35		8				
40						
45						
50						

Test Boring Log

Boring No. DCL 01-3

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Aggregate Exploration	Ground Elev.: 150'
Drilling Method: Drag Bit, wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-16-2001
Water Level:	Date Finished: 1-16-2001
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
5					mod. Redish brown sand. Fine grain, Rounded - sub rounded. mod Sorted.	Hand Auger Sample
		1 2 3 4			S.A.A.	50% Rec.
10						
14		5			Dark yellowish orange.	

Test Boring Log

Boring No.: DCL01-3

Sheet 2 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		7			Sand, w/ minor silt, Fine grain, Rounded-Subrounded, mod. well sorted.	100% Rec.
		7				
15		9				
		8			S.A.A.	75% Rec.
		10				
		9				
20		10				
		6			Pale Yellowish Orange, Sand, Fine grain, Rounded-Subrounded, Well sorted	100% Rec.
		5				
		5				
25		5				
		7			Dark Yellowish Orange Sand, Fine grain, Rounded-Sub rounded, mod. well sorted.	75% Rec.
		7				
		11				
30		12				
32						

Test Boring Log

Boring No.: DCL01-3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		2			Dark yellowish orange Silty/Clayey Sand. Fine grain. Rounded-Subrounded.	100% Rec
		5				
		8				
35		8				
		2			Yellowish Grey-White Clay.	
		3				
		3				
40		4				
45						
50						

Test Boring Log

Boring No. DCL 01-4

Project: Dade City Landfill	Sheet 1 of
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Aggregate Exploration	Ground Elev.: 168'
Drilling Method: Drag bit, Wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-16-2001
Water Level:	Date Finished: 1-16-2001
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					mod. Redish Brown, Sand. Fine Grain, Rounded - Subrounded, mod. Sorted	Hand Auger Sample
5						
		1, 4, 6, 4			White & Pale Yellowish Orange clay w/ rock fragments.	
10						
14		1			white & Pale Yellowish orange	

Test Boring Log

Boring No.: DCL01-4

Sheet 2 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		3			Silt, Clay & Rock Frags	
		3				
15		3				
		4			Yellowish Grey & Grayish orange, Sand, Subrounded, mod. well Sorted.	100% Rec.
		6				
		5				
20		6				
		4			Pale Yellowish orange Sand, Fine grain, Rounded-Subrounded, well Sorted.	75% Rec
		5				
		6				
25		6				
		3			White-very Pale orange sandy clay w/ rock Fragments.	100% Rec.
		3				
		3				
30		3				
32						

Test Boring Log

Boring No.: DCL01-4

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		1			White - yellowish Grey ~~Clay~~ Sandy clay.	100% Rec.
		2				
		2				
35		1				
40						
45						
50						

Test Boring Log

Boring No. DCL 01-5

Project: Dade City Landfill	Sheet 1 of 4
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Aggragate Exploration	Ground Elev.: 142'
Drilling Method: Drag bit, wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-17-01
Water Level:	Date Finished: 1-17-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	55		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Dark yellowish orange sand, Fine grain, Round-d- sub rounded, well sorted.	Hand Auger sample.
5						
		2			S.A.A.	
		2				50% Rec
		3				
10		4				
14		3			Light Brown, Sand	

Test Boring Log					Boring No.: DCL01-5	Sheet 2 of 4
Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		3			Fine grain, mod well sorted, Rounded - Sub rounded	50% Rec.
		3				
15		4				
		4			Pale yellowish orange Sand, Fine grain, Rounded - Subrounded, mod well sorted	75% Rec.
		3				
		4				
20		2				
		6			Dark yellowish orange & very Pale Orange silty sand	75% Rec.
		4				
		8				
25		8				
		5			Pale-Dark yellowish Orange Sand, Minor Silt, Fine gr. Rounded - Sub rounded, mod. well sorted	100% Rec.
		8				
		7				
30		10				
32						

Test Boring Log

Boring No.: DCL01-5

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		7			S.A.A.	100% Rec.
		8				
		7				
35		6				
		13			Dark yellowish orange sand. Fine grain. Rounded. well sorted	50% Rec.
		22				
		27				
40		20				
		6			S.A.A.	75% Rec.
		7				
		7				
45		9				
		4			White - very Pale orange sandy clay / silt. very stiff.	100% Rec
		6				
50		8				

Test Boring Log

Boring No.: DCL 01-5

Sheet 4 of 4

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
50		12				
55						
60						
65						
68						

Test Boring Log

Boring No. DCL01-6

Project: Dade City landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 128'
Drilling Method: Drag bit, wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-17-01
Water Level:	Date Finished: 1-17-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Dark Redish Brown sand, Fine grain, Rounded, well sorted.	Hand Auger Sample
5						
		3			Dark yellowish orange Sand. Fine gr. Rounded mod. well sorted.	75% Rec.
		4				
		10				
10		12				
14		7			Dark yellowish orange	

Test Boring Log

Boring No.: DCL 01-6

Sheet 2 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		9			Silty Sand.	
		13				100% Rec.
15		14				
		4			very Pale orange sand. Fine gr. Rounded mod. well Sorted	
		6				75% Rec.
		6				
20		7				
		3			Dark Yellowish orange Silty Sand. Fine grain Rounded- Subrounded. mod. Sorted.	
		4				75% Rec.
		4				
25		6				
		4			Pale yellowish orange sand. Fine gr. Rounded, mod well sorted.	
		4				75% Rec.
		5				
30		4				
32						

Test Boring Log

Boring No.: DCL01-6

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		3			very Pale orange Sandy Clay,	100% Rec.
		4				
		4				
35		6				
40						
45						
50						

Test Boring Log

Boring No. DCL 01-7

Project: Dade city Landfill	Sheet 1 of 5
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 112'
Drilling Method: Drag bit, wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-17-01
Water Level:	Date Finished: 1-17-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
0						
					Dark Redish Brown Sand, Fine gr. Rounded, mod well sorted.	Hand Auger sample
5						
		2			S.A.A.	
		2				50% Rec
		2				
10		3				
14		2			moderate Redish brown	

Test Boring Log

Boring No.: DCL01-7

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		1			Sand. Fine gr. Rounded -Sub rounded, mod Well Sorted	75% Rec.
		1				
15		2				
		3			S.A.A.	75% Rec.
		2				
		3				
20		4				
		3			S.A.A.	50% Rec.
		4				
		3				
25		4				
		4			Dark yellowish orange, Sand. Fine gr. Rounded -Sub rounded, mod Well Sorted	50% Rec.
		4				
		6				
30		8				
32						

Test Boring Log					Boring No.: DCL01-7	Sheet 3 of 5
Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		9 11 15 15			S.A.A.	50% Rec.
35						
		9 11 13 15			Pale yellowish orange, Sand, Fine gr. Rounded - Subrounded, mod well Sorted	50% Rec.
40						
		9 11 13 15			S.A.A.	50% Rec.
45						
		4 5 6			S.A.A., But more of a light brown color.	50% Rec.
50						

Test Boring Log

Boring No.: DCL01-7

Sheet 4 of 5

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
50		7				
		7			Light brown Sand. Fine gr. Rounded - Sub rounded. mod well sorted.	50% Rec.
		9				
		15				
55		15				
		7			S.A.A	70% Rec.
		9				
		13				
60		13				
		9			S.A.A.	50% Rec.
		15				
		13				
65		20				
68						

Test Boring Log

Boring No.: DCL01-7

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
68						
		7 13 20 29			Light Brown Sand. Fine gr. Rounded-Sub Rounded. mod Well sorted	50% Rec.
70						
		10 19 23 30			moderate yellowish brown. Sand. Fine gr. Rounded-Sub rounded. mod sorted	50% Rec.
75						
80						
85						
86						

Test Boring Log

Boring No. DCL01-8

Project: Dade City Landfill	Sheet 1 of 2
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 100'
Drilling Method: Drag bit, wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-17-01
Water Level:	Date Finished: 1-17-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb.		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Light Brown Sand. Fine gr. Rounded-Subrounded. mod Well Sorted,	Hand Auger Sample
5						
		3			Very Pale orange Sandy Clay.	75% Rec,
		4				
		5				
10		5				
14		6			S.A.A.	

Test Boring Log

Boring No.: DCL01-8

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		8			S.A.A. Very Pale orange Sandy Clay.	100% Rec.
		8				
15		9				
		4			S.A.A	75% Rec
		9				
		12				
20		12				
		3			very Pale orange & Dark Yellowish Orange Sandy Clay.	80% Rec
		4				
		5				
25		7				
		1			white gummy clay. (very soft) Probably Just above limestone.	100% Rec.
		2				
30		3				
		5				
32						

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Test Boring Log

Boring No. DCL01-9

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 104'
Drilling Method: Drag bit, wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-18-01
Water Level:	Date Finished: 1-18-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Besley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb.		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Light brown Sand. Fine Gr., Rounded-Sub rounded mod-well Sorted.	Hand Auger sample
5						
		3			Dark Yellowish orange Sand, Fine gr, mod Sorted, Rounded-Sub rounded	75% Rec.
		5				
		7				
10		9				
14		8			S.A.A.	

Test Boring Log

Boring No.: DCL01-9

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		16			S.A.A.	
		10				100% Rec.
15		8				
		5			Dark yellowish orange Sand. Fine gr. Rounded - Subrounded. mod well Sorted.	
		7				75% Rec.
		5				
20		7				
		7			Pale yellowish orange Sand	
		7				
		9				80% Rec.
25		9			very Pale orange Sandy Clay	
		8			Pale yellowish orange Sand. Fine gr. Rounded-Subrounded. mod well Sorted.	
		7				60% Rec.
		6				
30		6				
32						

Test Boring Log					Boring No.: DCL01-9	Sheet 3 of 3
Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		6			Pale yellowish orange sand. mod sorted. Fine gr. Rounded-Sub angular.	60% Rec.
		6				
		7				
35		5				
		3			Dark yellowish orange silty Sand.	100% Rec
		3				
		3				
40		3			white sandy clay	
45						
50						

Test Boring Log

Boring No. DCL01-10

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: ASS. Exploration	Ground Elev.: 99'
Drilling Method: Drag bit, wash	Datum: NAD-83
Drill Rig Type: CME 55	Date Started: 1-18-01
Water Level:	Date Finished: 1-18-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb.		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Light brown Sand. Fine grain, subrounded, mod well sorted.	Hand Auger Sample
5						
		2			Dark yellowish orange Sand. Fine gr. mod well sorted. Subrounded	75% Rec.
		2				
		3				
10		3				
14		7			S.A.A.	

Test Boring Log

Boring No.: DCL01-10

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		9			S.A.A.	60% Rec
		11				
15		9				
		8			Light brown sand. Fine gr. minor silt. mod. sorted.	80% Rec.
		8				
		10				
20		12				
		5			Dark Yellowish orange Sand. Fine gr. mod well sorted. Rounded - sub rounded	80% Rec.
		5				
		6				
25		7				
		6			Light brown sand Fine gr. mod well sorted. Rounded - sub rounded very Pale orange sand	60% Rec
		8				
		11				
30		13				
32						

Test Boring Log

Boring No.: DCL01-10

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		5			Dark yellowish orange Sand. Fine gr. mod well sorted. Rounded-Subrounded	75% Rec
		5				
		4				
35		5				
		8			S.A.A.	
		11				75% Rec.
		13				
40		15				
45						
50						

Test Boring Log

Boring No. DCL 01-11

Project: Dade City landfill	Sheet 1 of 2
Client: Anselo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg Exploration	Ground Elev.: 106'
Drilling Method: Drag bit, wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-18-01
Water Level:	Date Finished: 1-18-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
0						
					Light brown Sand. Fine gr. mod well sorted. Rounded - Subrounded.	Hand Auger Sample
5						
		4			Very Pale orange Sandy Silt/Clay. Some Gravel, very Soft	80% Rec.
		3				
		6				
10		3				
14		4			very Pale orange	

Test Boring Log

Boring No.: DCL 01-11

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		4			Sandy Clay, or Clayey Sand	60% Rec.
		5				
15		5				
		2			very Pale orange Sandy Clay.	100% Rec.
		3				
		3				
20		3				
		2			S.A.A.	100% Rec
		2				
		4				
25		4				
		3			very Pale orange & Pale Yellowish orange Sandy Clay, Phospate specs.	75% Rec.
		4				
		11				
30		8			Limestone	
32						

Test Boring Log

Boring No. DCL 01-12

Project: Dade City landfill	Sheet 1 of 2
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 95'
Drilling Method: Drag Bit wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-18-01
Water Level:	Date Finished: 1-18-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Dark yellowish orange Sand, Fine gr. Rounded - Sub rounded, Mod well sorted	Hand Auger Sample
5						
		4, 5, 4, 6			Cobbles in very Pale orange Sandy clay	5% Rec.
10						
		7, 11, 28			Very Pale orange clay and limestone.	60% Rec
14						

Test Boring Log

Boring No.: DCL 01-12

Sheet 2 of 2

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		11				Put Rock bit on.
15						
		1			very soft ~~Clay of Sand~~ Sandy clay ?	0% Rec.
		1				
		1				
20		2				
		4			very Pale orange Sandy clay.	
		5				
		5				
		6				
25						
30						
32						

Test Boring Log

Boring No. DCL 01-13

Project: Dade City landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg. Exploration	Ground Elev.: 94'
Drilling Method: Drag bit - wash	Datum: NAD 83
Drill Rig Type: CME-55	Date Started: 1-18-01
Water Level:	Date Finished: 1-18-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
0						
					Dark yellowish orange sand, Fine gr. Rounded-Sub rounded mod. well sorted.	Hand Auger sample
5						
		3			very Pale orange sandy clay	80% Rec
		2				
		3				
10		4				
14		4			S.A.A.	

Test Boring Log

Boring No.: DCL01-13

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		5			very Pale orange Sandy clay.	100% Rec.
		6				
15		4				
		2			S.A.A.	100% Rec
		4				
		5				
20		7				
		2			S.A.A. Some Phosphate	100% Rec.
		1				
		1				
25		2				
		1			S.A.A.	
		1				
		1				
30		1			Limestone	
32						

Test Boring Log

Boring No.: DCL01-13

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		0			Lime stone	
		1				
		2				
35		1				
40						
45						
50						

Test Boring Log

Boring No. DCL01-14

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Agg Exploration	Ground Elev.: 89'
Drilling Method: Drag bit wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-19-01
Water Level:	Date Finished: 1-19-01
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lbs		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
0						
					Dark yellowish orange sand, Fine gr. Rounded-Subrounded, mod well sorted.	Hand Auger sample
5						
		9			very Pale orange sand, Fine gr. mod sorted, Rounded-Subrounded. Minor silt.	75% Rec
		10				
		10				
10		10				
14		7			Dark Yellowish orange	

Test Boring Log

Boring No.: DCL01-14

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
14		7			Sand. Fine gr. mod sorted. Rounded - sub rounded.	100% Rec.
		8				
15		10				
		5			Light Brown & very Pale orange sand. mod well sorted. Fine gr. Rounded - Subrounded.	80% Rec.
		6				
		7				
20		8				
		5			Light brown sand. Fine gr. minor silt. mod sorted. Rounded - Subrounded	60% Rec.
		7				
		7				
25		7				
		2			Dark yellowish orange sand. minor silt. Fine gr. mod. sorted. Rounded - Subrounded	80% Rec
		2				
		2				
30		2				
32						

Test Boring Log

Boring No.: DCL01-14

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		3			S.A.A.	
		2				75% Rec.
		2				
35		3				
					contact @ 37.5'	
		2			very Pale orange Sandy Clay.	
		3				100% Rec.
		3				
40		4				
45						
50						

Test Boring Log

Boring No. DCL01-15

Project: Dade City Landfill	Sheet 1 of 3
Client: Angelo Iafrate	Job No.:
Drilling Contractor: Universal	Meas. Pt. Elev.:
Purpose: Ass. Exploration	Ground Elev.: 99'
Drilling Method: Drag Bit wash	Datum: NAD-83
Drill Rig Type: CME-55	Date Started: 1-19-2001
Water Level:	Date Finished: 1-19-2001
Measuring Point:	Driller: Leroy Prince
Date of Measurement:	Inspector: Bill Begley

	SAMPLE	CORE	CASING
TYPE	SS		
DIAM.	2"		
WEIGHT	140 lb.		
FALL	30"		

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
0						
					Light Brown Sand, Fine gr. well sorted, Rounded-sub rounded.	Hand Auger sample
5						
		2, 3, 4, 4			Dark yellowish orange Sand, Fine grain, mod Sorted, Rounded-sub rounded.	75% Rec.
10						
14		12			very Pale orange sandy	

Test Boring Log

Boring No.: DCL01-15

Depth (feet)	Sample Numbers	Blow Counts	Unified Classification	Graphic Log	Geologic Description	Remarks
14		14			Silt, Non Plastic, Dry	100% Rec.
		15				
15		15				
		9			very Pale orange Silty Sand, Fine gr.	50% Rec.
		9				
		11				
20		13				
		5			very Pale orange & Dark Yellowish orange Sand Fine gr, minor Silt	75% Rec.
		5				
		6				
25		6				
		3			Dark yellowish orange & very Pale orange Sandy Clay, Plastic	100% Rec
		5				
		7				
30		8				
32						

Test Boring Log

Boring No.: DCL01-15

Sheet 3 of 3

Depth (feet)	Sample Numbers	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks
32						
		9			very Pale orange Sandy Clay, stiff, Plastic.	60% Rec.
		9				
		11				
35		9				
40						
45						
50						

UNIVERSAL ENGINEERING SCIENCES - DRILLER'S LOGS PIEZOMETERS, P-1A, P-12, P-10, P-11, P-13

UNIVERSAL ENGINEERING SCIENCES
PERMANENT WELL COMPLETION LOG

PROJECT NO.: 80010-002-01
REPORT NO.:
PAGE NO.:

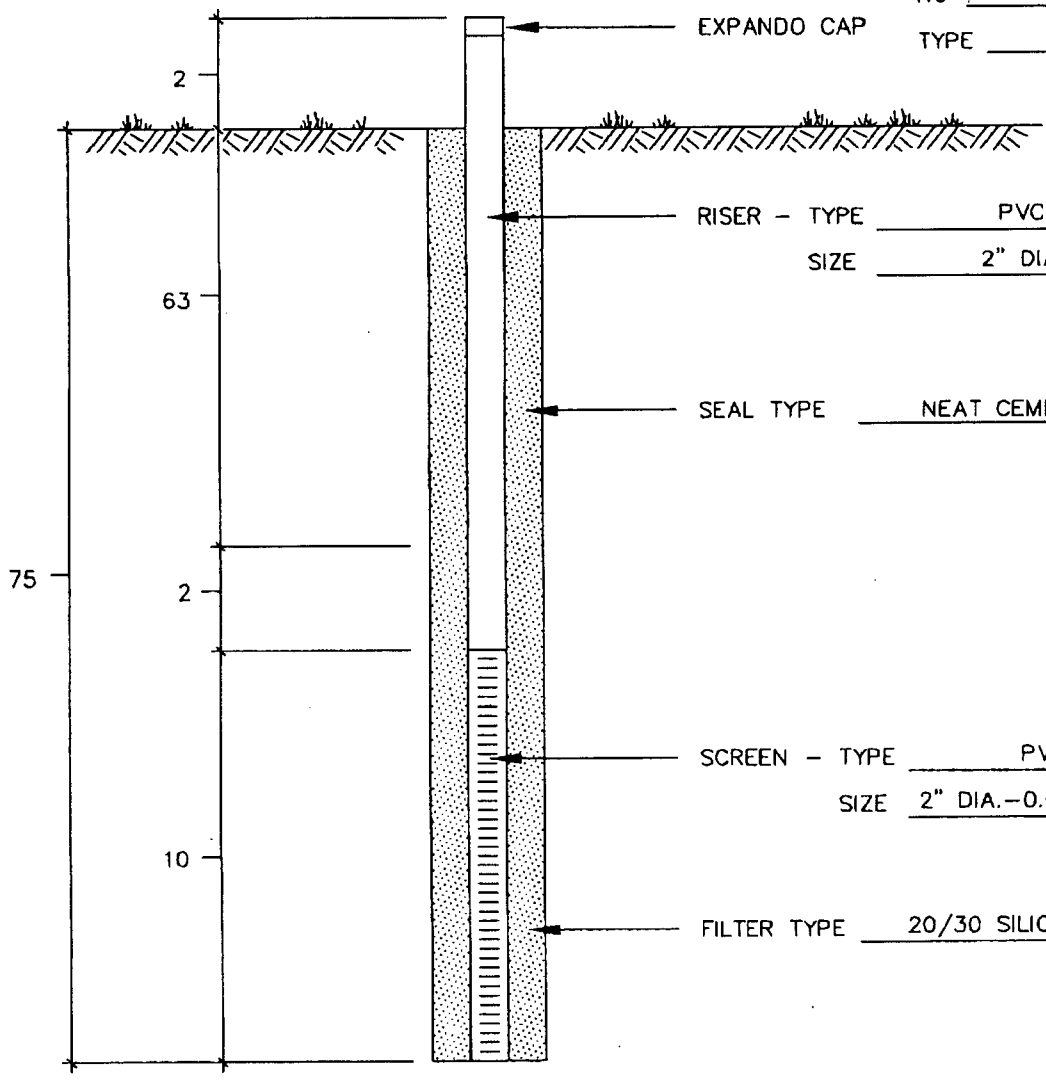
PROJECT: PROPOSED DADE CITY CLASS III LANDFILL

CLIENT: HARTMAN & ASSOCIATES DATE: March 6, 2001

WELL NUMBER: P-10 LOCATION: SEE ATTACHED WELL LOCATION PLAN

INSTALLED BY: U.E.S. DRILLING DEPT. - TAMPA GROUNDWATER DEPTH : 68 FEET

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
PERMANENT WELL COMPLETION LOG

PROJECT NO.: 80010-002-01
REPORT NO.:
PAGE NO.:

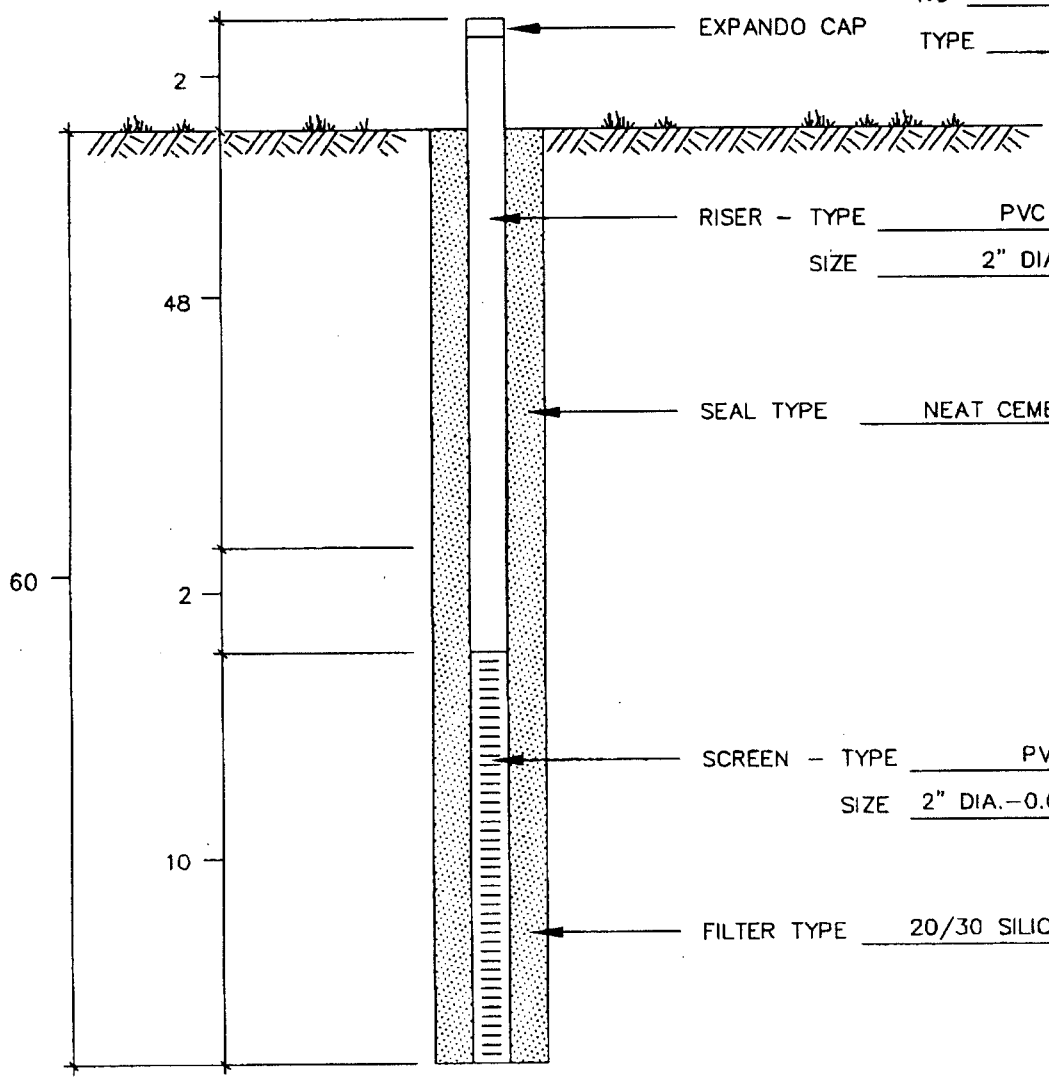
PROJECT: PROPOSED DADE CITY CLASS III LANDFILL

CLIENT: HARTMAN & ASSOCIATES DATE: March 2, 2001

WELL NUMBER: P-11 LOCATION: SEE ATTACHED WELL LOCATION PLAN

INSTALLED BY: U.E.S. DRILLING DEPT. - TAMPA GROUNDWATER DEPTH : 53 FEET

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
PERMANENT WELL COMPLETION LOG

PROJECT NO.: 80010-002-01
REPORT NO.:
PAGE NO.:

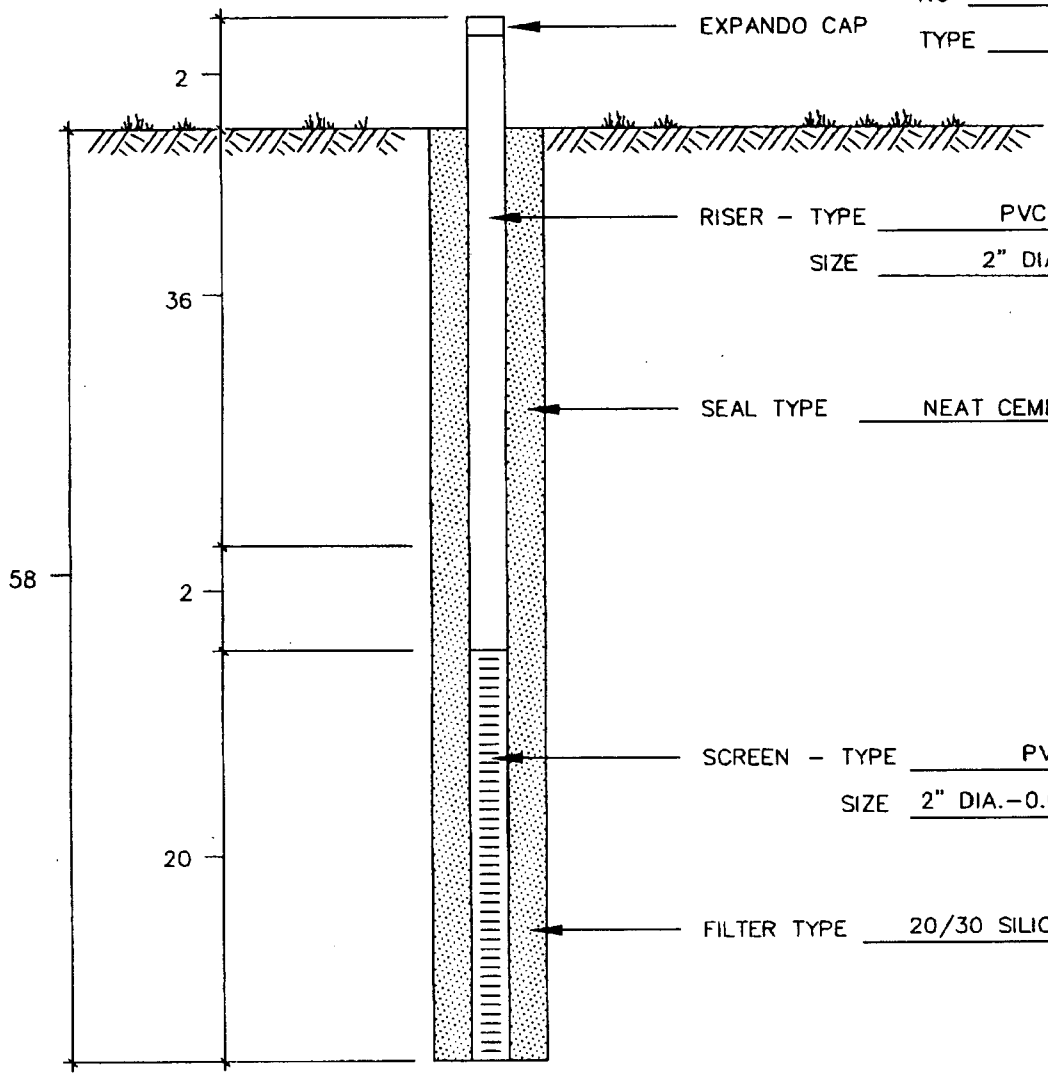
PROJECT: PROPOSED DADE CITY CLASS III LANDFILL

CLIENT: HARTMAN & ASSOCIATES DATE: March 2, 2001

WELL NUMBER: P-~~12~~13 LOCATION: SEE ATTACHED WELL LOCATION PLAN

INSTALLED BY: U.E.S. DRILLING DEPT. – TAMPA GROUNDWATER DEPTH : 48 FEET

WELL DIAGRAM – NOT TO SCALE



PROTECTIVE CASING – YES
NO X
TYPE

EXPANDO CAP

RISER – TYPE PVC
SIZE 2" DIA.

SEAL TYPE NEAT CEMENT

SCREEN – TYPE PVC
SIZE 2" DIA.–0.010" SLOT

FILTER TYPE 20/30 SILICA SAND

UNIVERSAL ENGINEERING SCIENCES
PERMANENT WELL COMPLETION LOG

PROJECT NO.: 80010-002-01
REPORT NO.:
PAGE NO.:

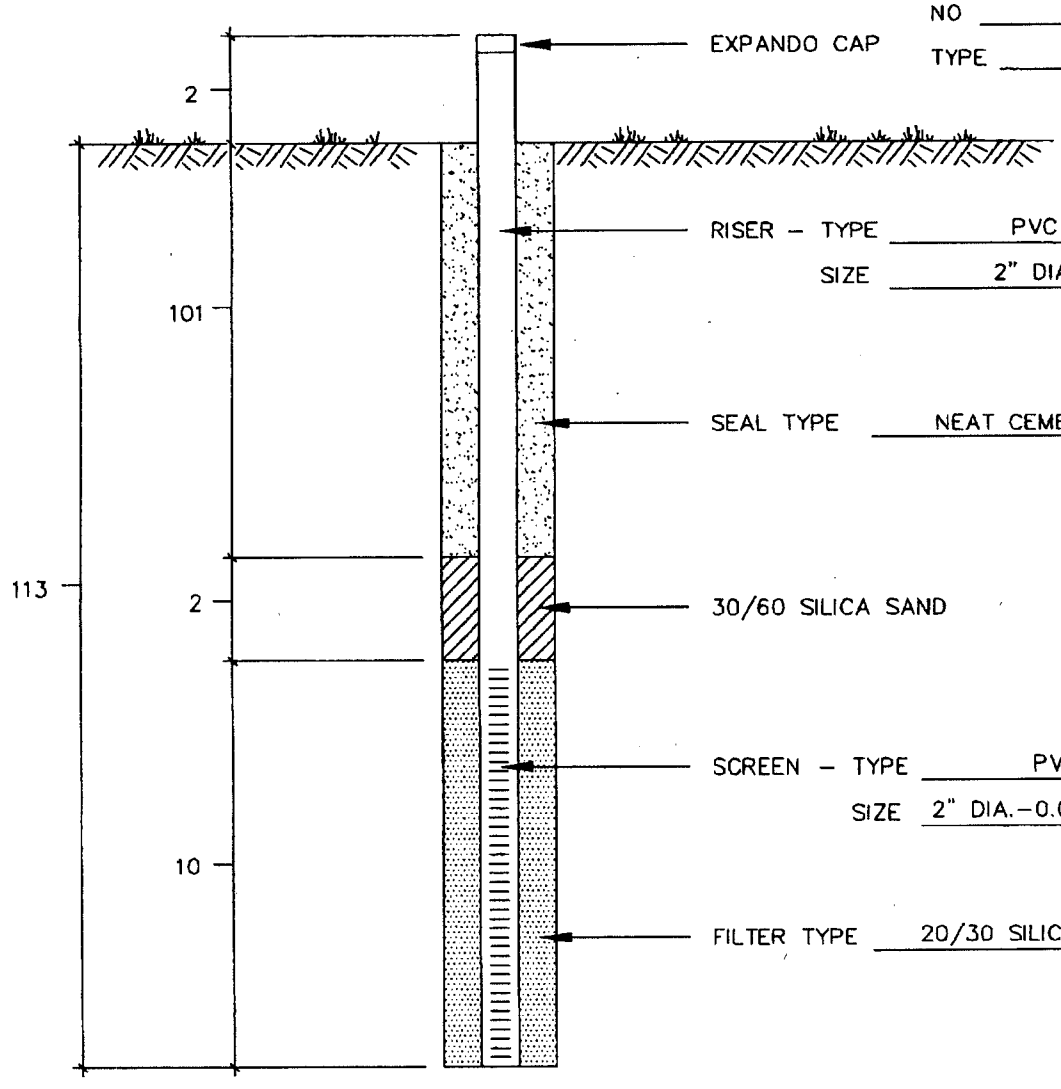
PROJECT: PROPOSED DADE CITY CLASS III LANDFILL

CLIENT: HARTMAN & ASSOCIATES DATE: March 6, 2001

WELL NUMBER: MW-1B (P-1A) LOCATION: SEE ATTACHED WELL LOCATION PLAN

INSTALLED BY: U.E.S. DRILLING DEPT. - TAMPA GROUNDWATER DEPTH : 100 FEET

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
PERMANENT WELL COMPLETION LOG

PROJECT NO.: 80010-002-01
REPORT NO.:
PAGE NO.:

PROJECT: PROPOSED DADE CITY CLASS III LANDFILL

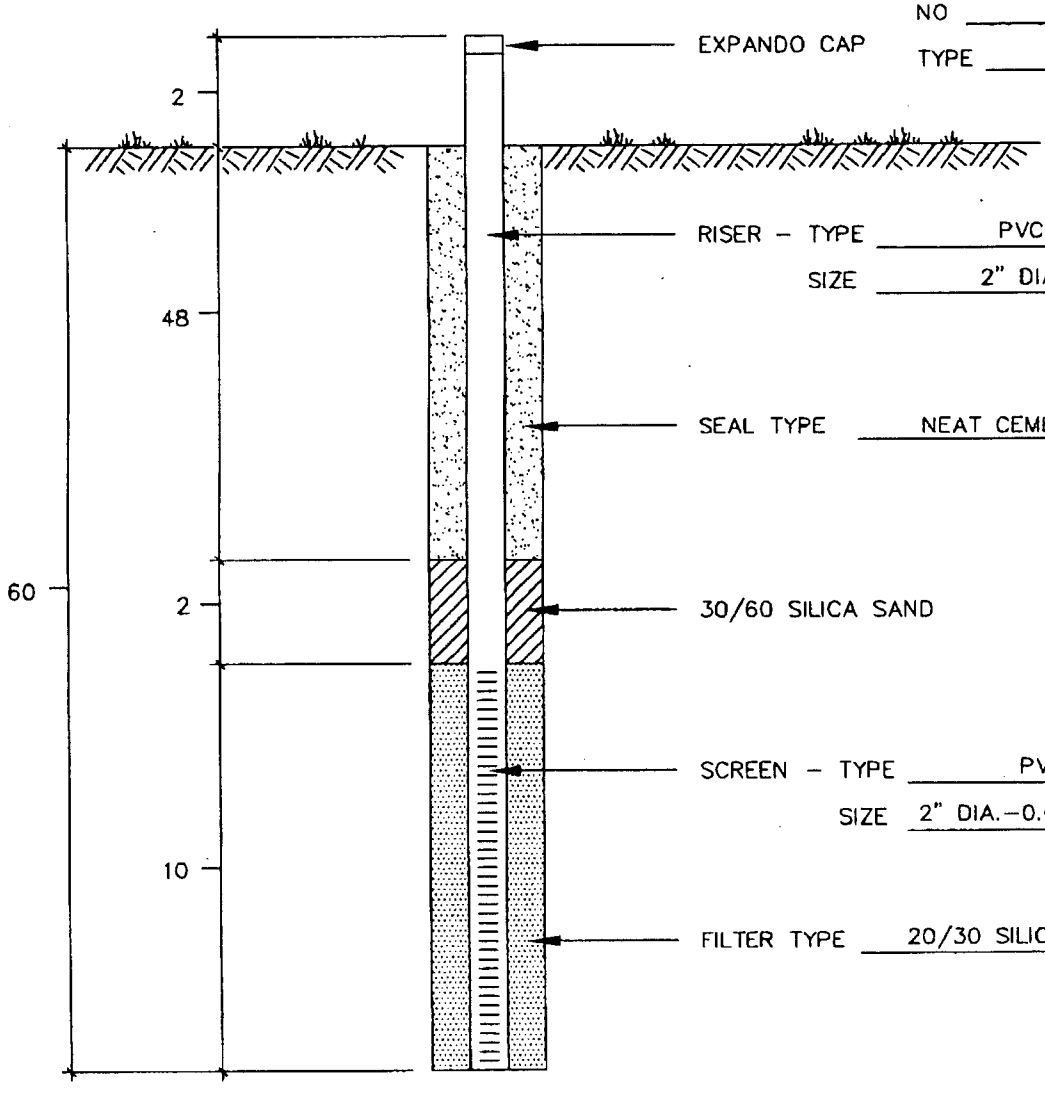
CLIENT: HARTMAN & ASSOCIATES DATE: March 6, 2001

WELL NUMBER: MW-~~8~~7B (P-12) LOCATION: SEE ATTACHED WELL LOCATION PLAN

INSTALLED BY: U.E.S. DRILLING DEPT. - TAMPA GROUNDWATER DEPTH : 100 FEET

WELL DIAGRAM - NOT TO SCALE

PROTECTIVE CASING - YES X
NO
TYPE STEEL



SOIL BORING LOG - 18" DRIVE

UNIVERSAL ENGINEERING SCIENCES, INC.
5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: ONE of 2
Boring #: MW P-12 Total Depth: 60'
Date Started: 3-8-01 Date Finished: 3-9-01
Driller: LPLINCE Rig: CME 45
Boring Type: WASH Elevation: _____
Casing Length: None Type: _____
Water Table Depth: 1st 53± Date: _____
Water Table Depth: 2nd _____ Date: _____

Project Name: Dade City Land Fill
Client Name: _____
Boring Location: Staked by Client
Remarks: Installed MW @ 60' 10' SCREEN!

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.	Soil Description
				Grey sand
				3.0' Yell brn sand
5				
				8.0' yell brn clay sand/sandy cl.
10				
15				
20				
25				
30				

SOIL BORING LOG - 18" DRIVE

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5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: 2 of 2
Boring #: MW P-12 Total Depth: 60'
Date Started: 3-8-01 Date Finished: 3-9-01
Driller: LP Rig: CME 45
Boring Type: WASH Elevation: _____
Casing Length: _____ Type: _____
Water Table Depth: 1st _____ Date: _____
Water Table Depth: 2nd _____ Date: _____

Project Name: Dade City Land Fill
Client Name: _____
Boring Location: _____
Remarks: _____

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.	Soil Description
35				35.0' ±
				LT Grey CLAY SA/SANDY CL.
40				
				48.0' - 48.0' LOSS H_2O
45				
				LT BR CLAY SILT w/LIMEROCK
50				
				SCREEN
55				
				EOB 60.0'
60				

SOIL BORING LOG - 18" DRIVE

UNIVERSAL ENGINEERING SCIENCES, INC.
5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: ONE of 4
Boring #: MW-P1A Total Depth: 115'
Date Started: 3-9-01 Date Finished: 3-11-01
Driller: Prince Rig: CME-45
Boring Type: WASH Elevation: _____
Casing Length: _____ Type: _____
Water Table Depth:1st _____ Date: _____
Water Table Depth:2nd _____ Date: _____

Project Name: DADE City Landfill
Client Name: _____
Boring Location: Located by Client
Remarks: install mw @ 113' w/10' SCREEN

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.	Soil Description
				Grey SAND
				3.0' yell bn SAND
5				
				8.0' yell bn clay SAND / SAND CLAYS
10				
15				
20				
25				
30				

SOIL BORING LOG - 18" DRIVE

UNIVERSAL ENGINEERING SCIENCES, INC.
5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: 3 of 4
Boring #: MW-P1A Total Depth: 115'
Date Started: 3-8-01 Date Finished: 3-11-01
Driller: L Pence Rig: _____
Boring Type: _____ Elevation: _____
Casing Length: _____ Type: _____
Water Table Depth: 1st _____ Date: _____
Water Table Depth: 2nd _____ Date: _____

Project Name: Dade City Land Fill
Client Name: _____
Boring Location: Located by Client
Remarks: _____

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.	Soil Description
65				65.0'
				Lt Bl clayey silt w/ limerock
70				
75				
80				
85				
90				

SOIL BORING LOG - 18" DRIVE

UNIVERSAL ENGINEERING SCIENCES, INC.
5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: 2 of 4
Boring #: MW PIA Total Depth: 115'
Date Started: 3-9-01 Date Finished: 3-11-01
Driller: LPRINCE Rig: CME 45
Boring Type: WASH Elevation: _____
Casing Length: _____ Type: _____
Water Table Depth: 1st _____ Date: _____
Water Table Depth: 2nd _____ Date: _____

Project Name: DADE City LAND FILL
Client Name: _____
Boring Location: Located by Client
Remarks: _____

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.		Soil Description
3 5					
1 0					
4 5					45.0'
					LT BR CLAYEY SAND / SA CLAYS
5 0					
5 5					
6 0					

SOIL BORING LOG - 18" DRIVE

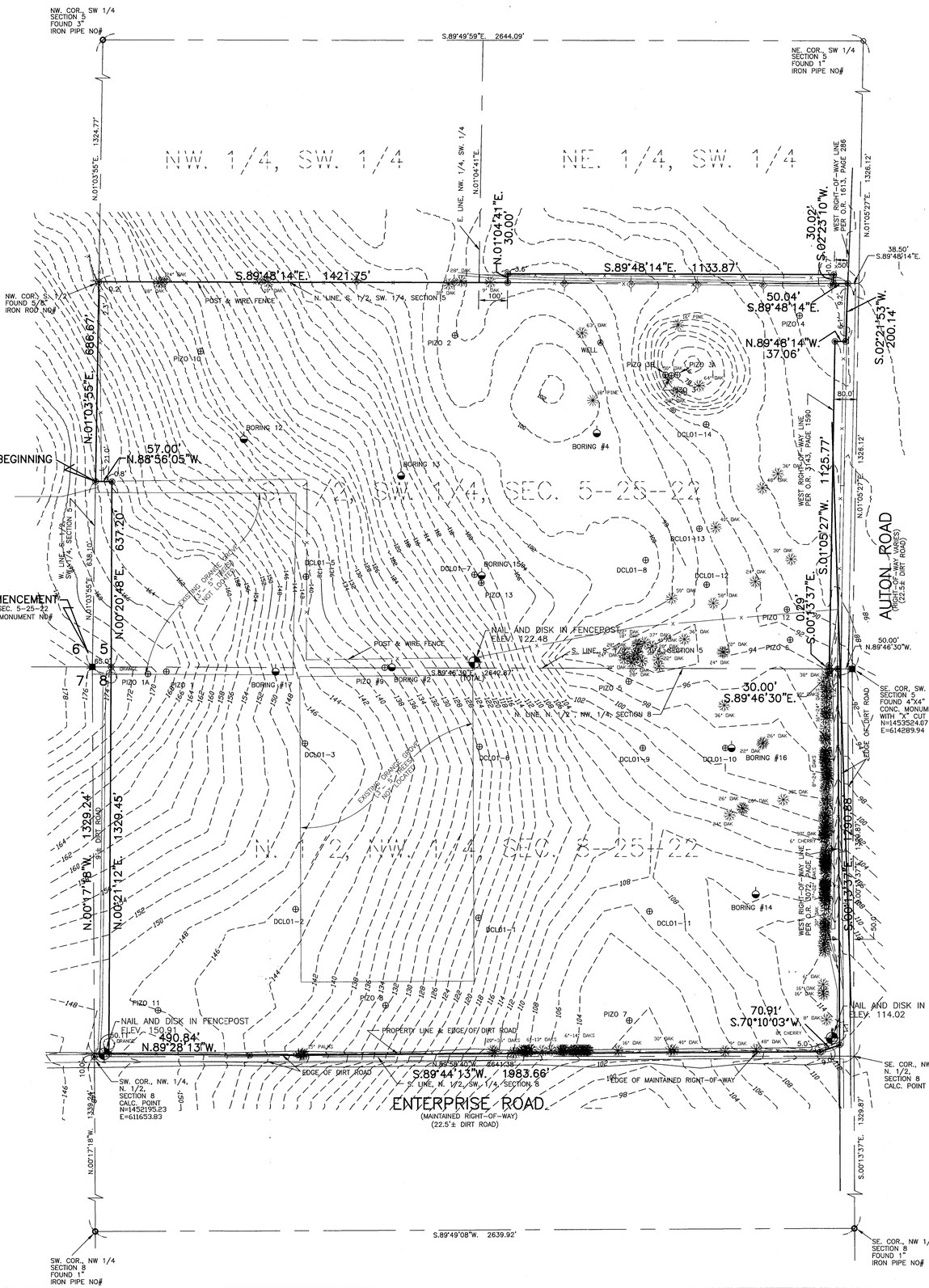
UNIVERSAL ENGINEERING SCIENCES, INC.
5804 Breckenridge Parkway, Suite E
Tampa, Florida 33610
Phn: (813) 740-8506 Fax: (813) 740-8706

File No: _____ Sheet #: 4 of 4
Boring #: MW PIA Total Depth: 115
Date Started: 3-8-01 Date Finished: 3-11-01
Driller: Ulrich Rig: CME 85
Boring Type: WASH Elevation: _____
Casing Length: _____ Type: _____
Water Table Depth: 1st _____ Date: _____
Water Table Depth: 2nd _____ Date: _____

Project Name: DADE City LANDFILL
Client Name: _____
Boring Location: Located by Client
Remarks: _____

Depth (ft.)	Blows per 6" Increment	N value (bpf)	Sample No.		Soil Description
95					95.0' (LOSS H2O)
					SCREEN
100					
115					115.0
0					
5					
0					

1572183 (1)



PIZO #	NORTHING	EASTING	TOP OF PIZO	GROUND
PIZO 1	1453517.8	611903.4	171.73	169.6
PIZO 1A	1453509.9	611839.9	174.48	171.57 (CONC.)
PIZO 2	1454672.8	612910.0	96.83	95.6
PIZO 3	1454533.6	613660.7	78.94	77.8
PIZO 3A	1454535.2	613666.3	78.40	77.7
PIZO 3B	1454535.5	613650.1	79.65	78.5
PIZO 4	1454738.3	614108.6	84.55	83.3
PIZO 5	1453482.0	613510.9	94.56	93.3
PIZO 6	1453624.7	614073.9	94.16	92.9
PIZO 7	1452317.4	613512.3	102.81	101.1
PIZO 8	1452370.4	612666.9	133.94	132.7
PIZO 9	1453531.2	612664.6	140.73	137.3
PIZO 10	1454619.2	612024.7	132.60	129.5
PIZO 11	1452354.2	611874.8	150.76	147.7
PIZO 12	1453729.5	614062.7	93.24	90.67 (CONC.)
PIZO 13	1453832.2	612995.4	112.91	109.8
DCL01-1	1452672.5	612989.3		123.5
DCL01-2	1452703.0	612355.3		145.2
DCL01-3	1453271.0	612387.8		147.7
DCL01-4	——	——	——	——
DCL01-5	1453845.4	612392.2		139.9
DCL01-6	1453258.6	612993.2		127.9
DCL01-7	1453848.8	612988.1		109.0
DCL01-8	1453900.4	613570.2		99.6
DCL01-9	1453453.3	613559.3		102.8
DCL01-10	1453252.9	613848.3		98.9
DCL01-11	1452693.5	613582.3		106.1
DCL01-12	1453815.4	613781.8		94.7
DCL01-13	1454007.9	613756.9		93.6
DCL01-14	1454364.8	613780.7		87.7
BORING-2	1453531.8	612671.3		136.9
BORING-4	1454335.3	613401.4		98.1
BORING-12	1454316.8	612177.0		132.1
BORING-13	1454190.8	612722.2		113.6
BORING-14	1452751.5	613953.7		110.6
BORING-15	1453843.4	612996.6		109.4
BORING-16	1453253.3	613852.1		98.9
BORING-17	1453517.6	612286.3		147.4
WELL	1454646.7	613414.1		

MERIDIAN CONVERGENCE -00°03'49.42"
(CENTER OF PROJECT)

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

DESCRIPTION:

A PORTION OF LAND LYING IN THE SOUTH 1/2 OF THE SOUTHWEST 1/4 AND THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 5 AND A PORTION OF LAND LYING IN THE NORTH 1/2 OF THE NORTHWEST 1/4 OF SECTION 8, ALL IN TOWNSHIP 25 SOUTH, RANGE 22 EAST, PASCO COUNTY, FLORIDA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF SECTION OF 5, TOWNSHIP 25 SOUTH, RANGE 22 EAST; THENCE RUN N.01°03'55"E. ALONG THE WEST LINE OF THE SOUTH 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 5 FOR A DISTANCE OF 638.10 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE N.01°03'55"E., ALONG SAID WEST LINE FOR A DISTANCE OF 686.67 FEET THE NORTHWEST CORNER OF THE SOUTH 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 5; THENCE RUN S.89°48'14"E., ALONG THE NORTH LINE OF SAID SOUTH 1/2 FOR A DISTANCE OF 1421.75 FEET TO A POINT LYING 100.00 EAST OF AND PARALLEL TO THE EAST LINE OF THE NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SAID SECTION 5; THENCE RUN N.01°04'41"E., PARALLEL TO SAID EAST LINE FOR A DISTANCE OF 30.00 FEET; THENCE RUN S.89°48'14"E., PARALLEL TO AFORESAID SOUTH LINE OF THE SOUTH 1/2 FOR A DISTANCE OF 1133.87 FEET TO A POINT ON A LINE LYING 50.0 WEST OF AND PARALLEL TO THE WEST RIGHT-OF-WAY LINE OF AUTON ROAD AS DESCRIBED IN THE OFFICIAL RECORDS BOOK 1613, PAGE 286; THENCE RUN S.02°23'10"W., ALONG SAID LINE FOR A DISTANCE OF 30.02 FEET TO A POINT ON AFORESAID NORTH LINE OF THE SOUTH 1/2; THENCE RUN S.89°48'14"E., ALONG SAID NORTH LINE A DISTANCE OF 50.04 FEET TO A POINT ON THE AFORESAID WEST RIGHT-OF-WAY LINE OF AUTON ROAD; THENCE RUN S.02°21'53"W., ALONG SAID WEST RIGHT-OF-WAY LINE FOR A DISTANCE OF 200.14 FEET; THENCE RUN N.89°48'14"W., FOR A DISTANCE OF 37.06 FEET TO A POINT ON THE WEST RIGHT-OF-WAY LINE OF AUTON ROAD AS DESCRIBED IN THE OFFICIAL RECORDS BOOK 3143, PAGE 1590; THENCE RUN S.01°05'27"W., ALONG SAID WEST RIGHT-OF-WAY LINE FOR A DISTANCE OF 1125.77 FEET; THENCE RUN S.00°13'37"E., A DISTANCE OF 0.29 FEET TO A POINT ON THE NORTH LINE OF THE NORTH 1/2 OF THE NORTHWEST 1/4 OF SECTION 8, TOWNSHIP 25 SOUTH, RANGE 22 EAST; THENCE RUN S.89°46'30"E., ALONG SAID LINE FOR A DISTANCE OF 30.00 FEET TO A POINT ON THE WEST RIGHT-OF-WAY LINE OF AUTON ROAD A DESCRIBED IN THE OFFICIAL RECORDS BOOK 3072, PAGE 71; THENCE RUN S.00°13'37"E., ALONG SAID WEST RIGHT-OF-WAY LINE FOR A DISTANCE OF 1290.88 FEET TO A POINT ON THE NORTH LINE OF THE MAINTAINED RIGHT-OF-WAY OF ENTERPRISE ROAD (NOT DEDICATED); THENCE RUN ALONG SAID MAINTAINED RIGHT-OF-WAY LINE THE FOLLOWING COURSES AND DISTANCES: S.70°10'03"W., FOR A DISTANCE OF 70.91 FEET; THENCE RUN S.89°44'13"W., FOR A DISTANCE OF 1983.66 FEET; THENCE RUN N.89°28'13"W., FOR A DISTANCE OF 490.84 FEET TO A POINT LYING 50.11 FEET EAST OF THE WEST LINE OF AFORESAID NORTH 1/2 OF THE NORTHWEST 1/4; THENCE RUN N.00°21'12"E., FOR A DISTANCE OF 1329.45 FEET TO A POINT ON AFOREMENTIONED NORTH LINE OF THE NORTH 1/2 OF THE NORTHWEST 1/4 OF SECTION 8, SAID POINT BEING S.89°46'30"E AND A DISTANCE OF 65.00 FEET FROM AFOREMENTIONED SOUTHWEST CORNER OF SECTION 5; THENCE RUN N.00°20'48"E., FOR A DISTANCE OF 637.20 FEET; THENCE RUN N.88°56'05"W., FOR A DISTANCE OF 57.00 FEET TO THE POINT OF BEGINNING.

PARCEL CONTAINS 155.1142 ACRES, MORE OR LESS.

NOTES:

1.) THE BEARINGS & COORDINATES SHOWN HEREON ARE BASED ON FLORIDA STATE PLANE GRID, WEST ZONE, NORTH AMERICAN DATUM 1983 COORDINATE SYSTEM.

2.) WELL ELEVATIONS SHOWN HEREON ARE BASED PASCO COUNTY DATUM (NAVD 29).

3.) DIMENSIONS OF DESCRIPTION AND SURVEY WERE ADJUSTED FROM STATE PLANE GRID, HAVING A PROJECT SCALE FACTOR OF 0.999943315.

4.) THERE MAY BE EASEMENTS AND RESTRICTIONS OF RECORDS AND/OR PRIVATE AGREEMENTS NOT FURNISHED TO THIS SURVEYOR THAT MAY AFFECT PROPERTY RIGHTS AND/OR LAND USE RIGHTS OF THE LANDS SHOWN HEREON.

5.) NO UNDERGROUND INSTALLATIONS, FOUNDATION FOOTINGS OR IMPROVEMENTS HAVE BEEN LOCATED EXCEPT AS NOTED.

6.) THIS SURVEY WAS PERFORMED IN ACCORDANCE WITH THE MINIMUM TECHNICAL STANDARDS FOR SURVEYS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS, CHAPTER 61-G17, FLORIDA ADMINISTRATIVE CODE.

7.) TOPO OF THE NORTH 1140' WAS PROVIDED BY SOUTH WEST FLORIDA WATER MANAGEMENT DISTRICT AND WAS NOT FIELD VERIFIED.

BOUNDARY AND TOPOGRAPHIC SURVEY OF THE PASCO COUNTY LAND FILL FOR SID LARKIN & SON, INC.

HARTMAN & ASSOCIATES, INC.
engineers, hydrogeologists, surveyors & management consultants
201 EAST PINE STREET - SUITE 1000 - ORLANDO, FL 32801
TELEPHONE (407) 839-3855 - FAX (407) 839-3760
LICENSED BUSINESS NO. #0814

REVISIONS

Rev.		Date:
Rev.	ADDED PIZO	Date: 3/27/2001
Rev.	ADDED TREES, GROVES	Date: 6/5/2000
Rev.	ADDED PIZO	Date: 3/31/2000

NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

Job No:	99-331.00
Cadd File:	BOUNDARY
Field Date:	11/1/99
Drawn By:	L.E.J
Field By:	DCR
Field Bk/Pg:	

LARRY E. JOHNSON
Certified to be a Professional Surveyor and Mapper
Date 3/30/2001
Florida Registration #5364

N:\SURVEY\DWG\199999-331.00\33100202.dwg Fri Mar 30 16:36:55 2001

APPENDIX 5-B

Project: **LARKIN PROPERTY LANDFILL** Job Number: **LB155** Sheet **1** of **1**

Manager: **WAYNE PANDORF** Client: **UES--TAMPA** Project Description:

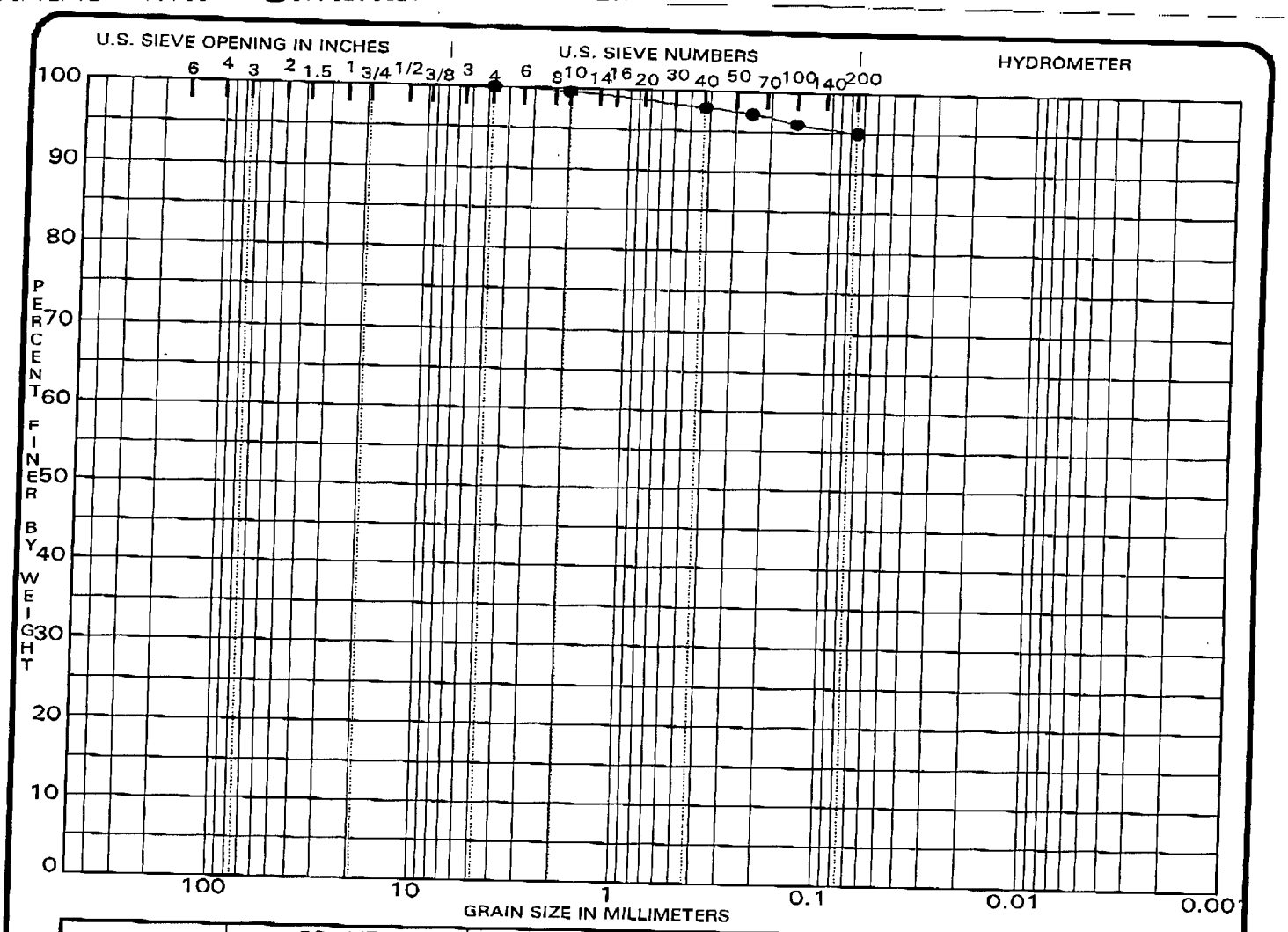
Location: **FL**

Elevation Datum:

Borehole Depth / Elev.	Specimen Description LL	PL	PI	No 200	Water Content	Organic Content	ASTM Class	K ft/day	Sieve Analysis No 4	No 10	No 40	No 60	No 100
B-11 35.5				95.0	44.7				100.0	99.6	97.9	97.2	96.0
B-12 39.5				47.9	26.5				100.0	100.0	99.6	95.7	74.9
B-12 50.5				56.0	31.7				100.0	99.9	99.7	89.2	75.7
B-13 50.5				77.9	57.0				100.0	100.0	99.9	98.7	90.3
B-15 110.5				14.5	22.6				100.0	100.0	96.7	83.0	37.9
B-15 150.5				26.8	15.0			8.41E-04	100.0	100.0	97.5	90.3	51.3
B-15 155.5				47.9	18.2				100.0	99.8	97.3	88.0	56.2
B-16 91.0				18.3	17.3			1.29E-03	100.0	100.0	92.2	70.9	27.9

Attn: Jim Golden

UNIVERSAL ENGINEERING SCIENCES	Summary of Material Properties	Space for logo (!fXXXX)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-11	35.5		45					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-11	35.5	4.75				0.0	5.0	95.0	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

GRADATION CURVES
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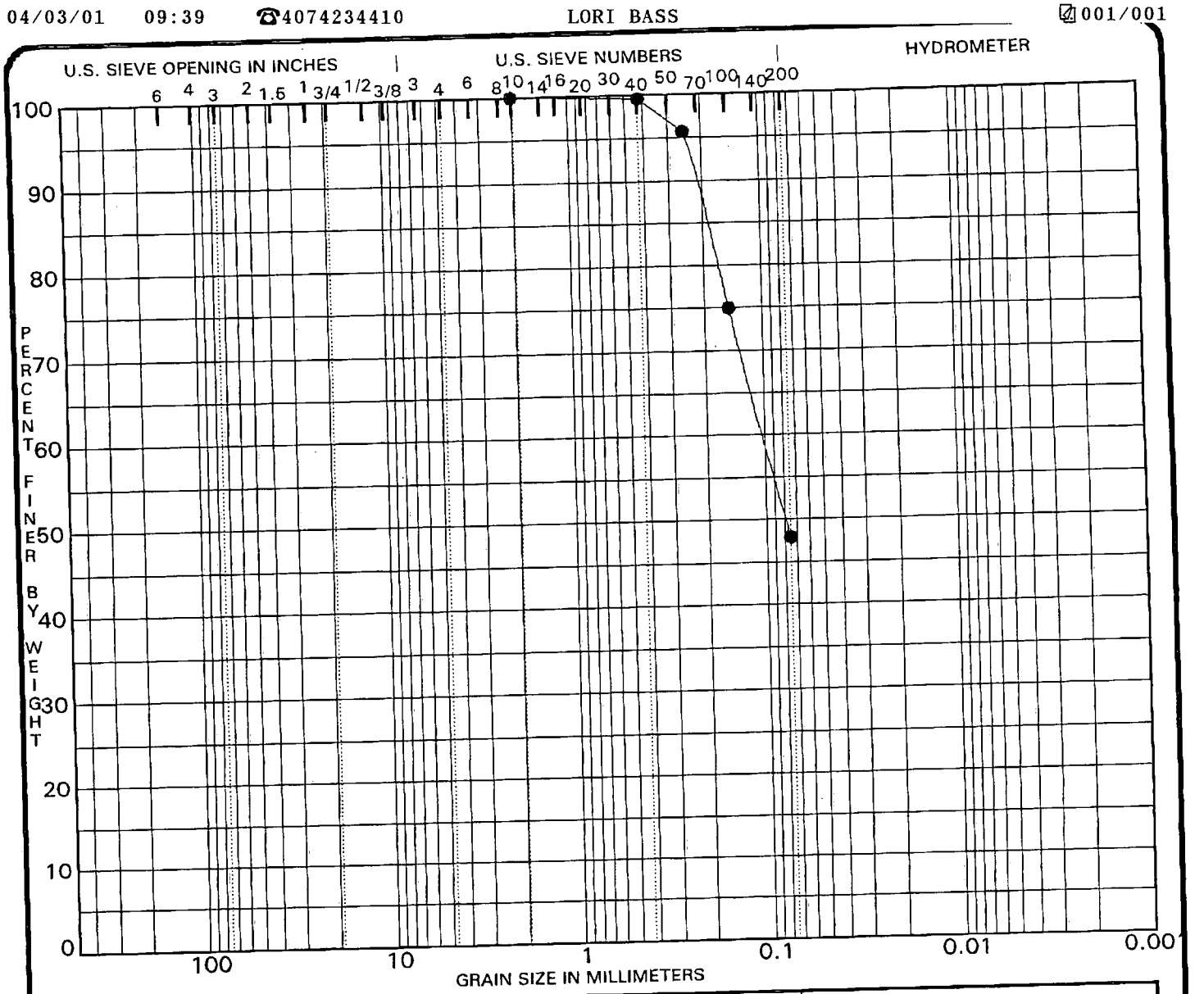
PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

GRADATION CURVES
UNIVERSAL ENGINEERING SCIENCES
ORLANDO, FLORIDA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-12	39.5		26					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-12	39.5	2.00	0.10			0.0	52.1	47.9	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

GRADATION CURVES

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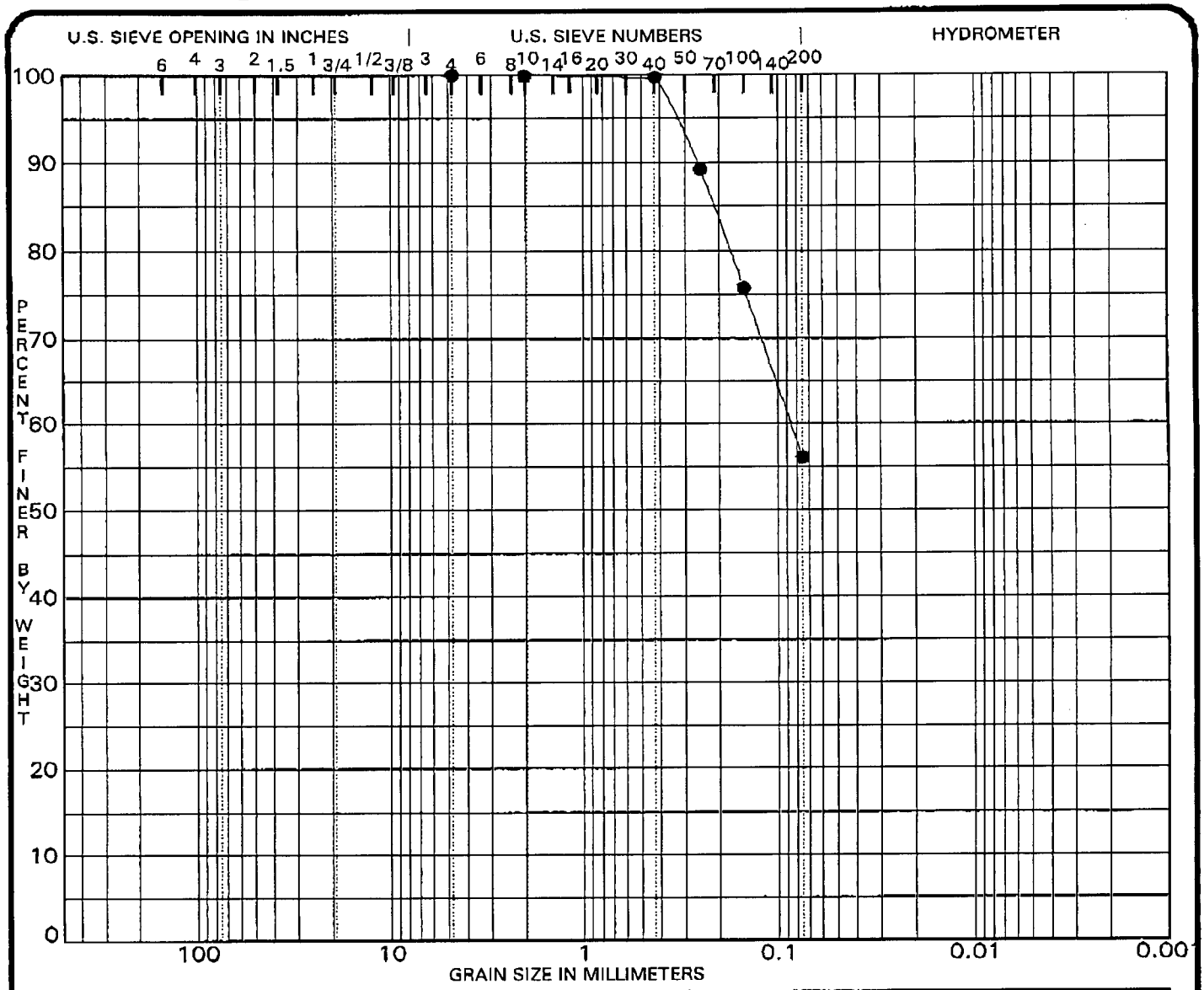
ORLANDO, FLORIDA

Attn. Jim Golden



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-12	50.5		32					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-12	50.5	4.75	0.09			0.0	44.0	56.0	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

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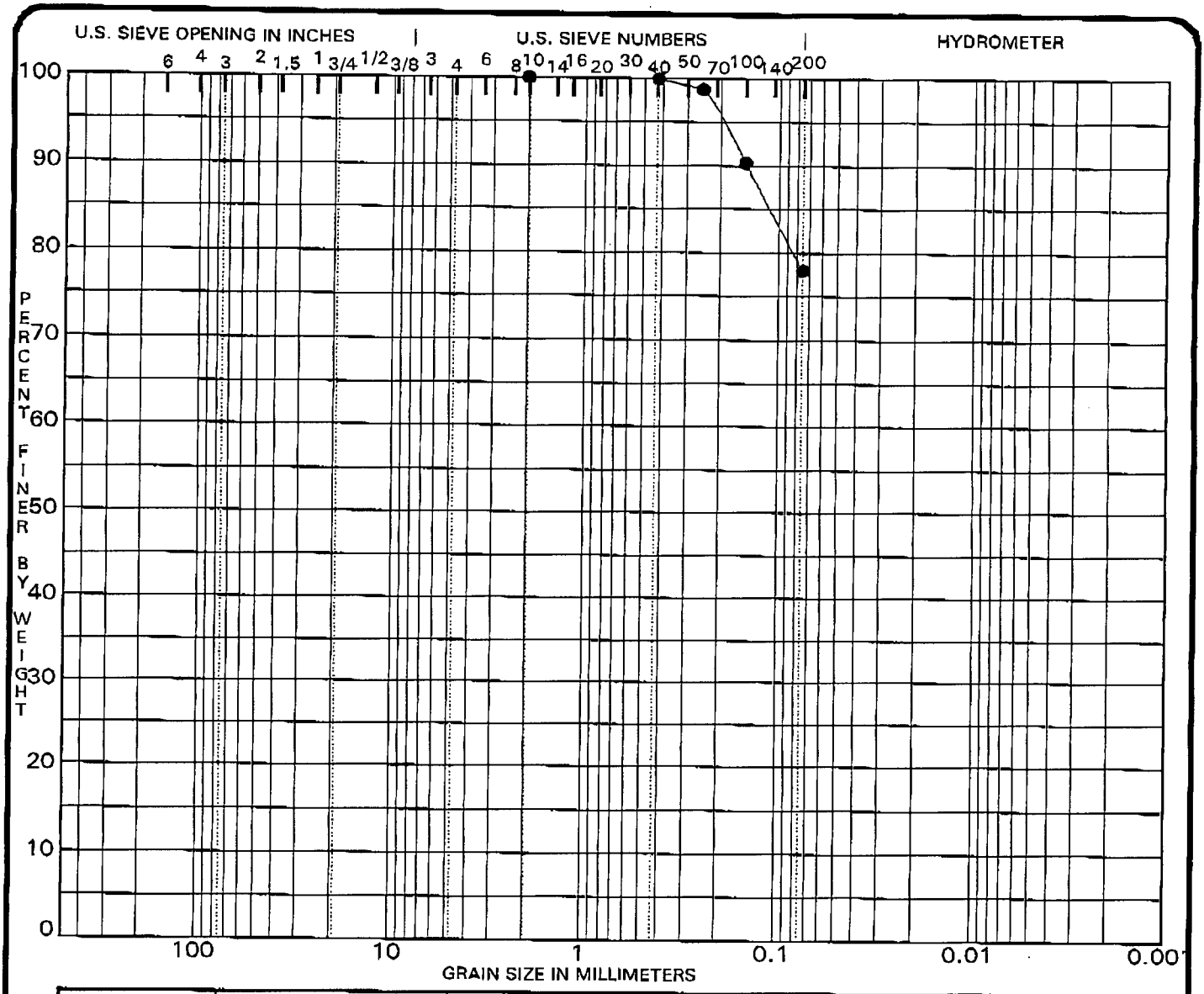

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-13	50.5		57					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-13	50.5	2.00				0.0	22.1	77.9	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
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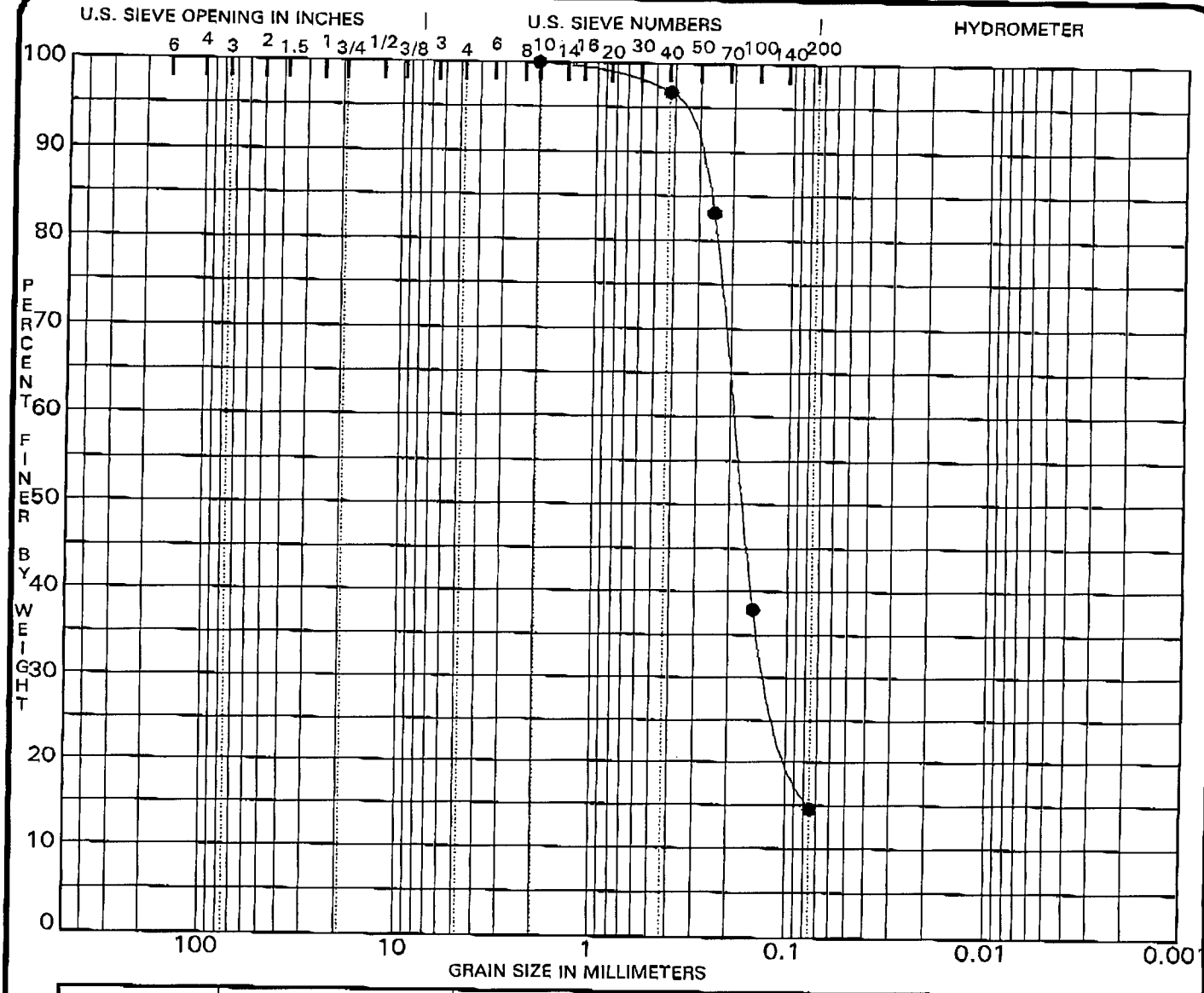

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-15	110.5		23					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	110.5	2.00	0.19	0.119		0.0	85.5	14.5	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

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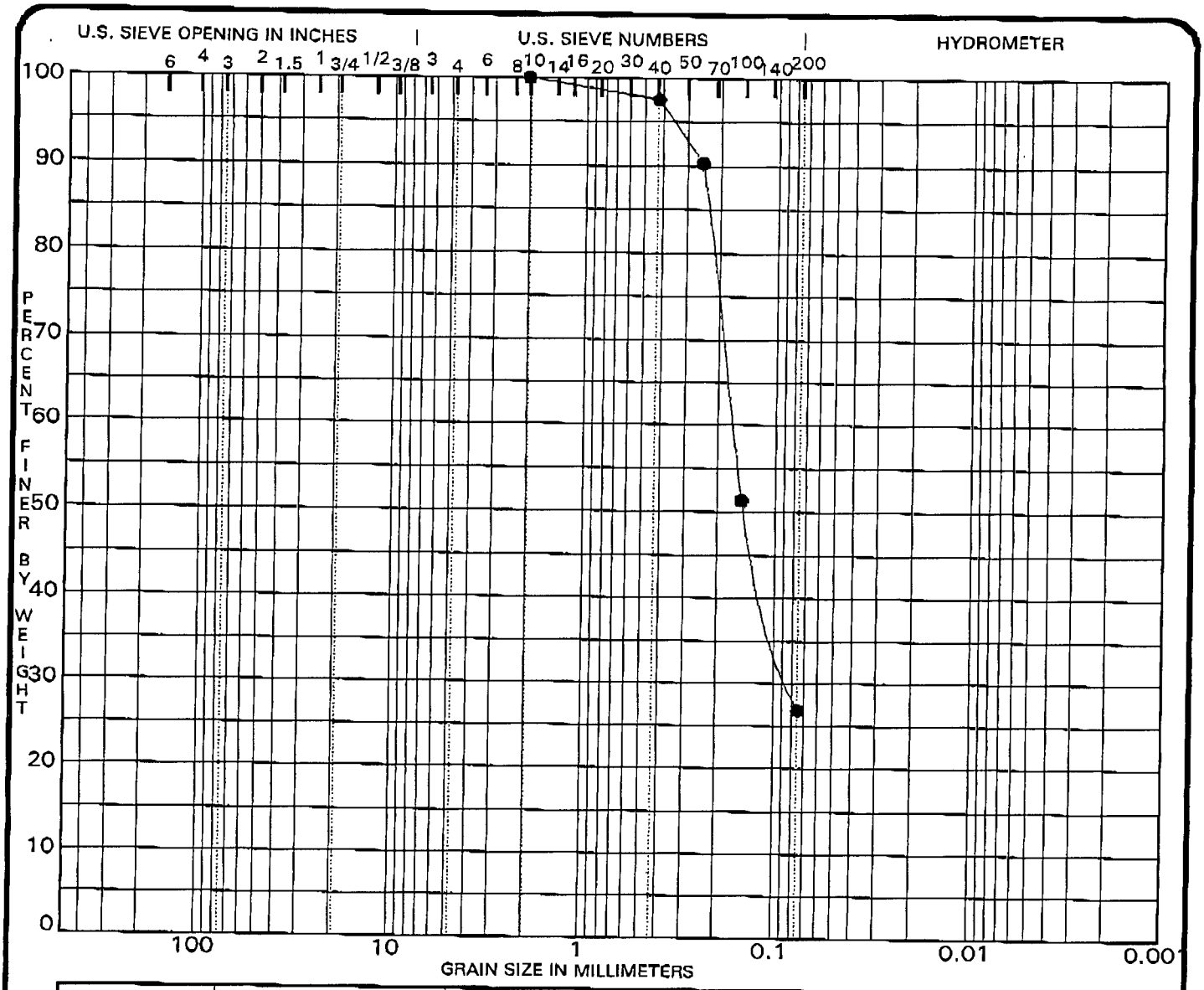
ORLANDO, FLORIDA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-15	150.5		15					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	150.5	2.00	0.17	0.082		0.0	73.2	26.8	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
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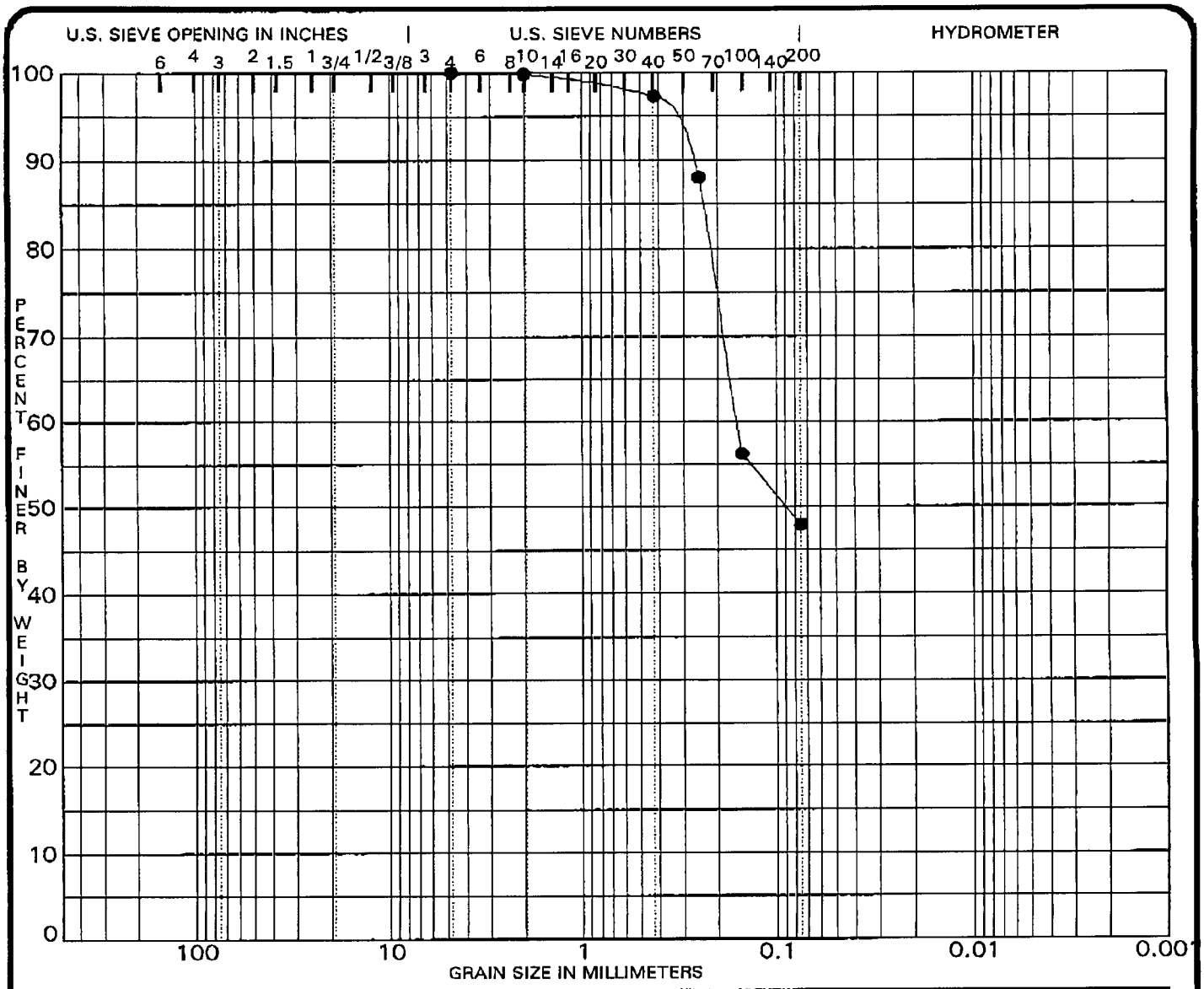

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-15	155.5		18					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	155.5	4.75	0.16			0.0	52.1	47.9	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

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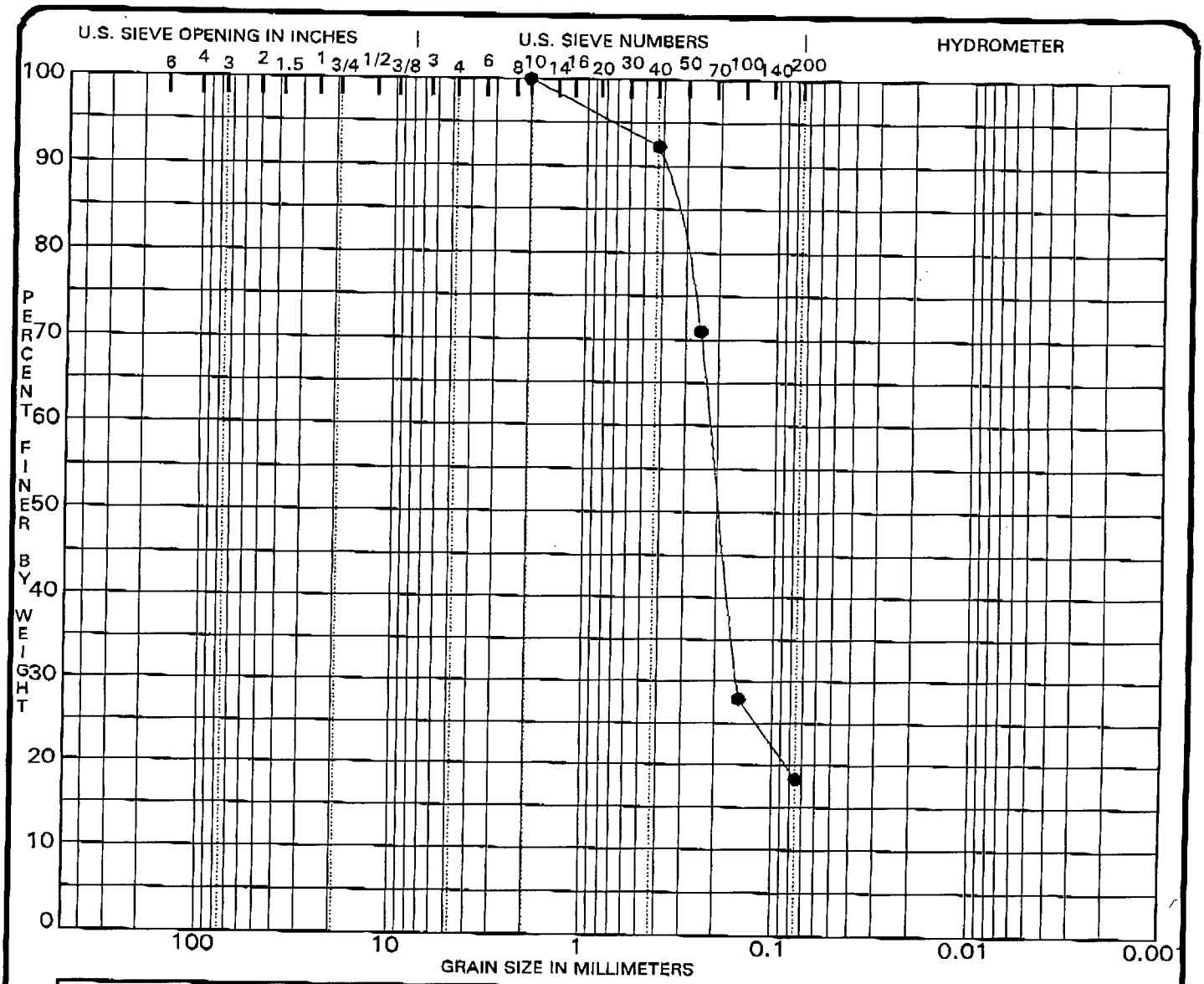
ORLANDO, FLORIDA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
● B-16	91.0		17					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-16	91.0	2.00	0.22	0.154		0.0	81.7	18.3	

PROJECT LARKIN PROPERTY LANDFILL - FL

JOB NO. LB155
DATE 4/2/01

GRADATION CURVES

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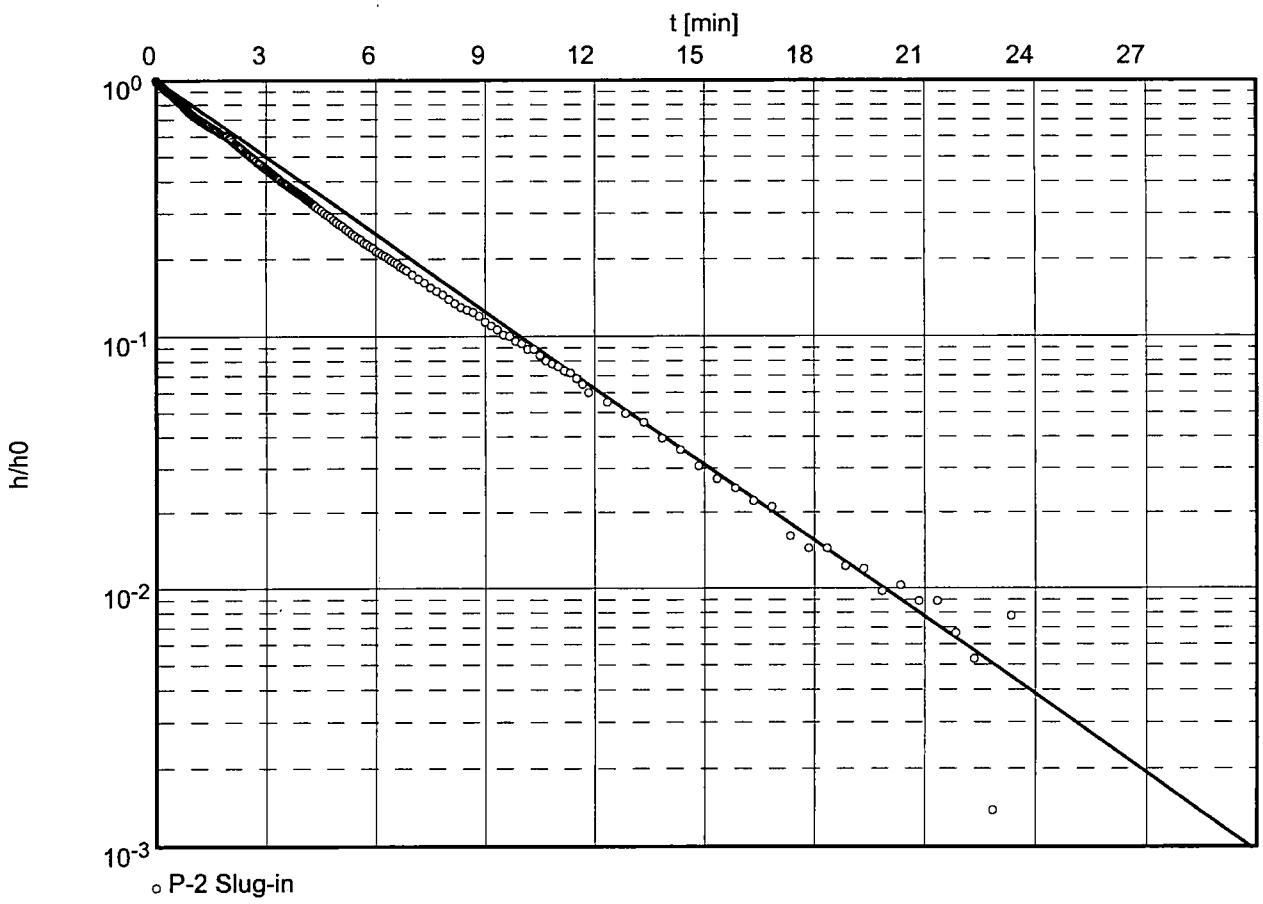
ORLANDO, FLORIDA

APPENDIX 5-C

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 03/31/00	Page 1
		Project: Larkin Property	
		Evaluated by: NCK	

Slug Test No.	Test conducted on: 03/27/00
P-2 Slug-in	

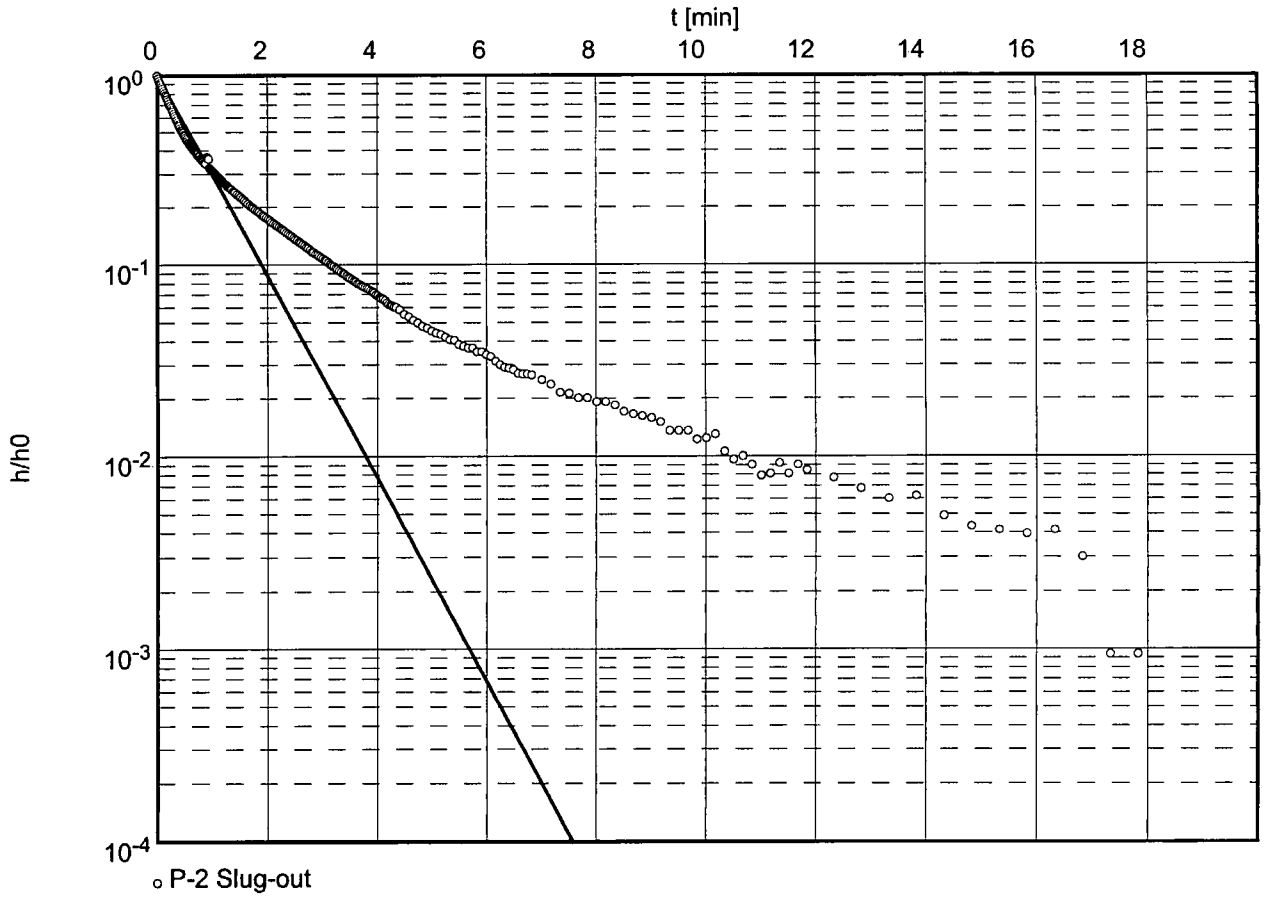


Hydraulic conductivity [ft/min]: 5.54×10^{-4}

0.80 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 2/2/01	Page 1
		Project: Larkin Property	
		Evaluated by: VCD	

Slug Test No.	Test conducted on: 03/27/00
P-2 Slug-out	

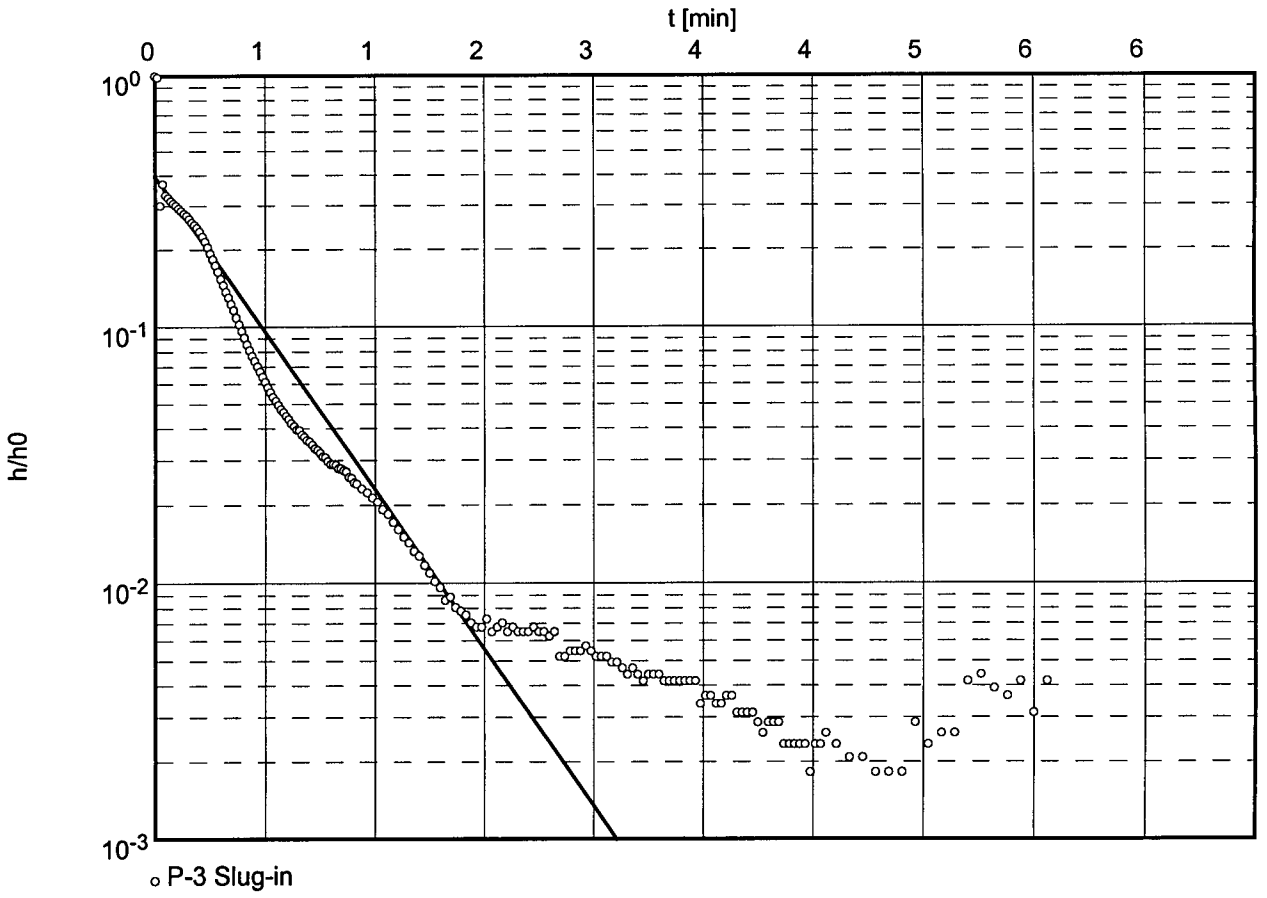


Hydraulic conductivity [ft/min]: 2.91×10^{-3}

4.19 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 2/2/01	Page 1
		Project: Larkin Property	
		Evaluated by: VCD	

Slug Test No.	Test conducted on: 03/27/00
P-3 Slug-in	

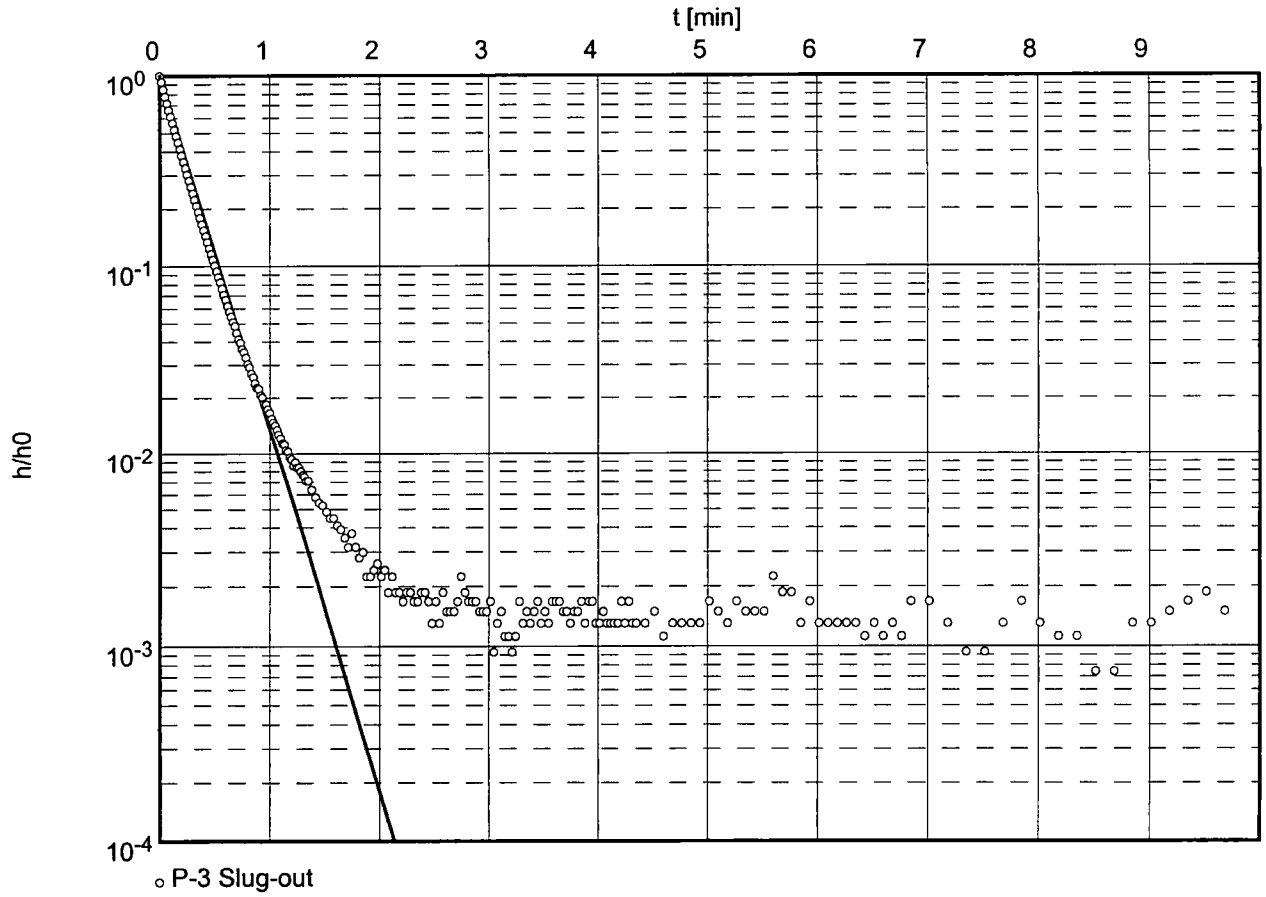


Hydraulic conductivity [ft/min]: 2.45×10^{-3}

3.53 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 2/2/01	Page 1
		Project: Larkin Property	
		Evaluated by: VCD	

Slug Test No.	Test conducted on: 03/27/00
P-3 Slug-out	

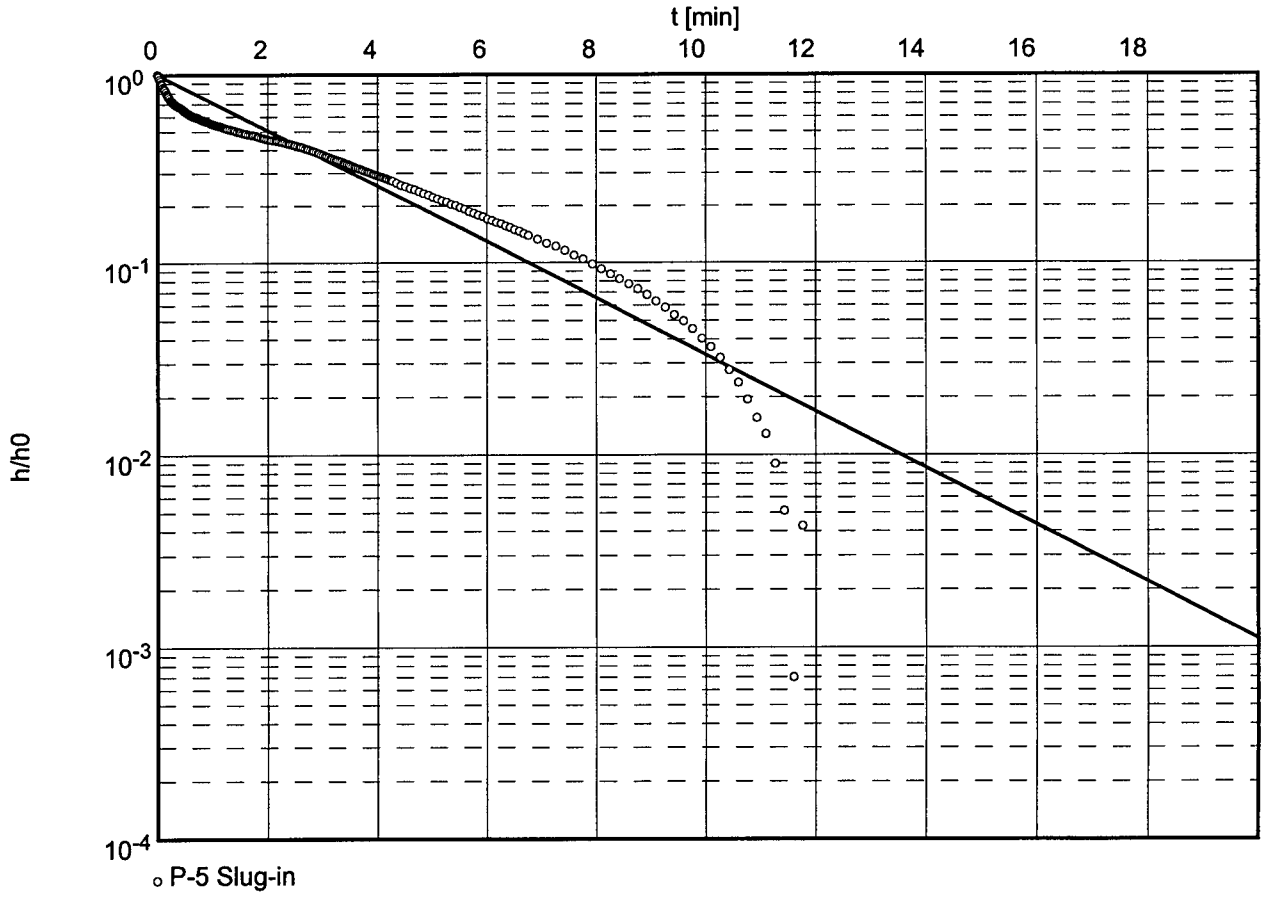


Hydraulic conductivity [ft/min]: 6.14×10^{-3}

8.84 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 3/31/00	Page 1
		Project: Larkin Property	
		Evaluated by: NCK	

Slug Test No.	Test conducted on: 3/27/00
P-5 Slug In	

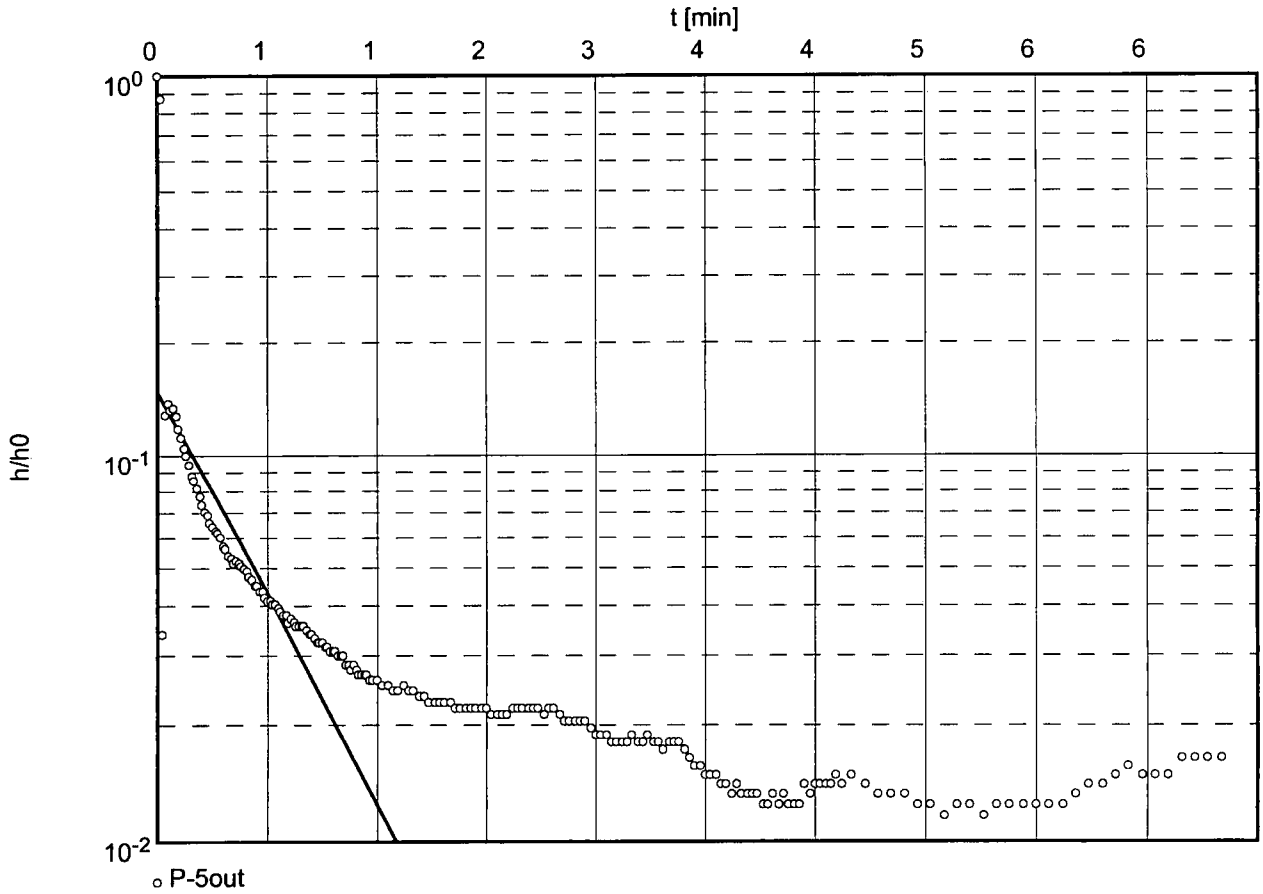


Hydraulic conductivity [ft/min]: 7.79×10^{-4}

1.12 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 2/2/01	Page 1
		Project: Larkin Property	
		Evaluated by: VCD	

Slug Test No.	Test conducted on: 3/27/00
P-5 Slug Out	

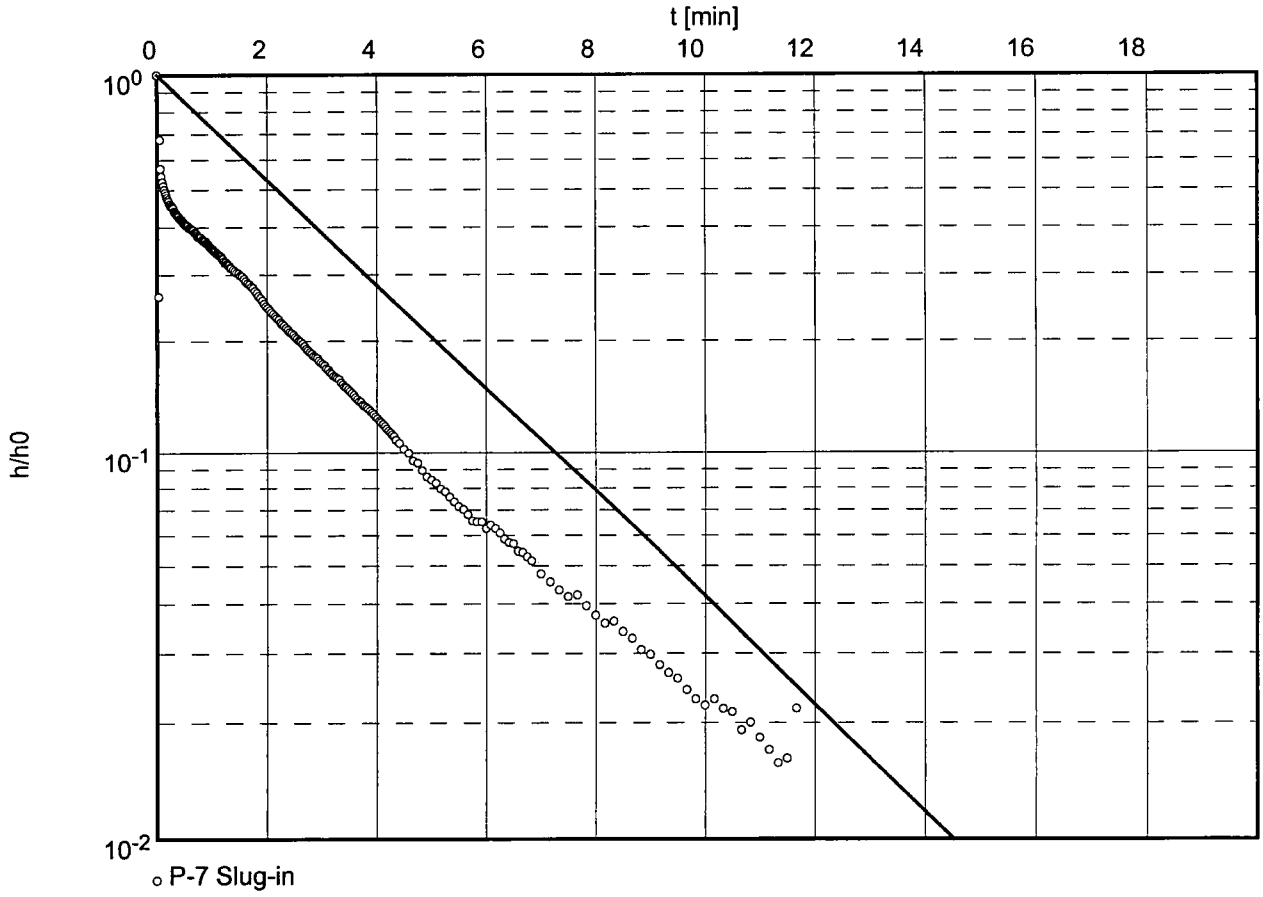


Hydraulic conductivity [ft/min]: 1.56×10^{-3}

2.25 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 3/31/00	Page 1
		Project: Larkin Property	
		Evaluated by: NCK	

Slug Test No.	Test conducted on: 3/27/00
P-7 Slug In	

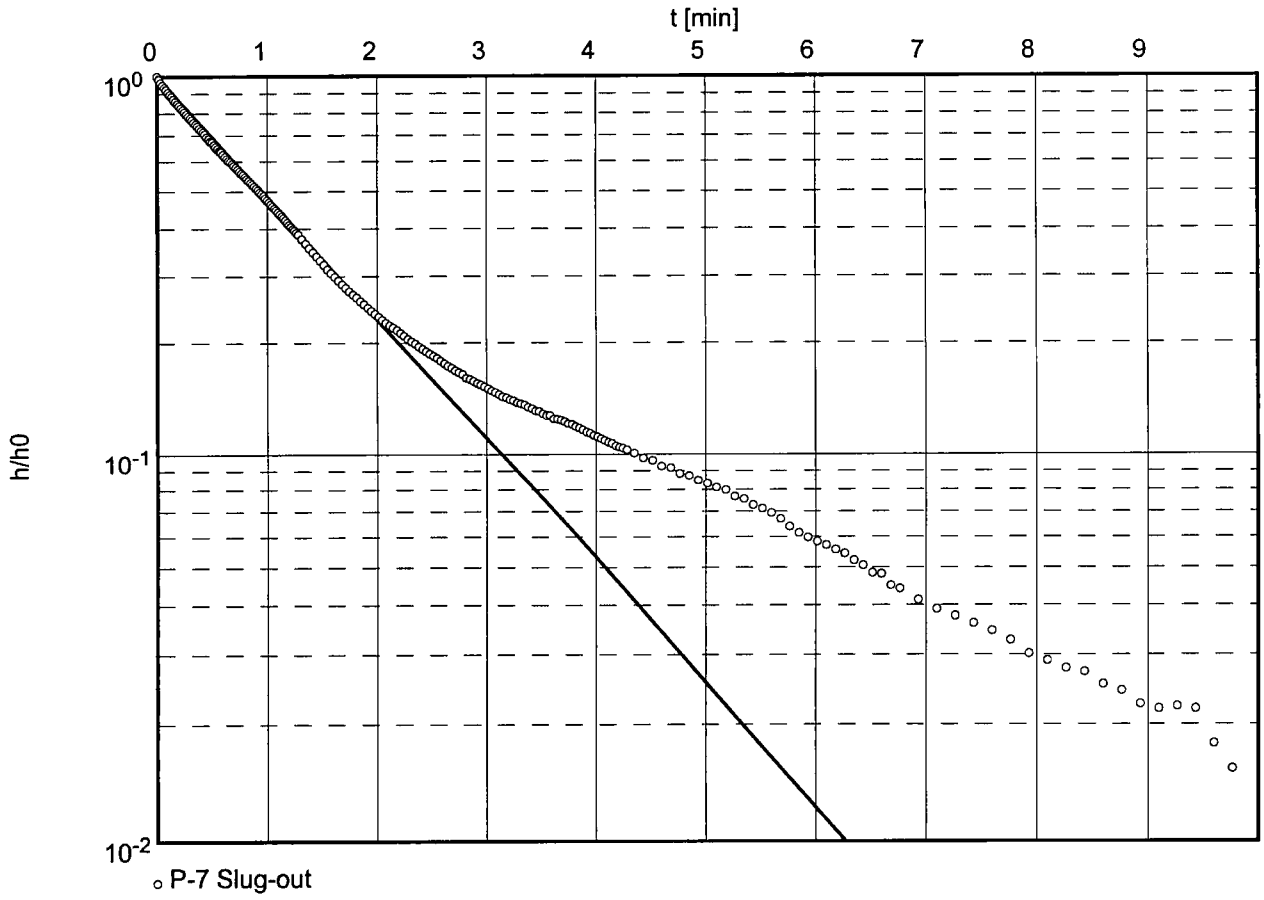


Hydraulic conductivity [ft/min]: 1.10×10^{-3}

1.58 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 2/2/01	Page 1
		Project: Larkin Property	
		Evaluated by: VCD	

Slug Test No.	Test conducted on: 3/27/00
P-7 Slug Out	

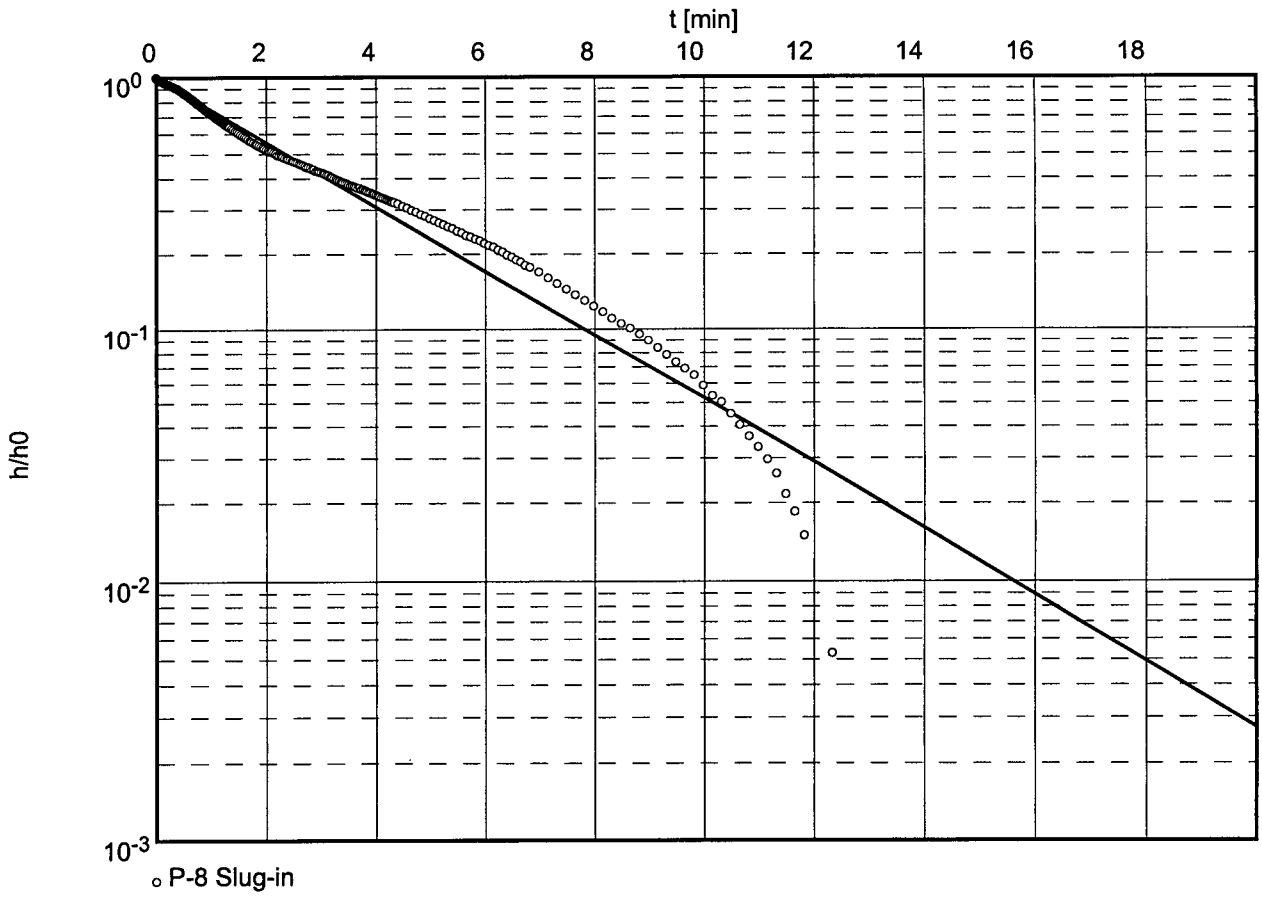


Hydraulic conductivity [ft/min]: 2.56×10^{-3}

3.69 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 3/31/00	Page 1
		Project: Larkin Property	
		Evaluated by: NCK	

Slug Test No.	Test conducted on: 3/27/00
P-8 Slug In	

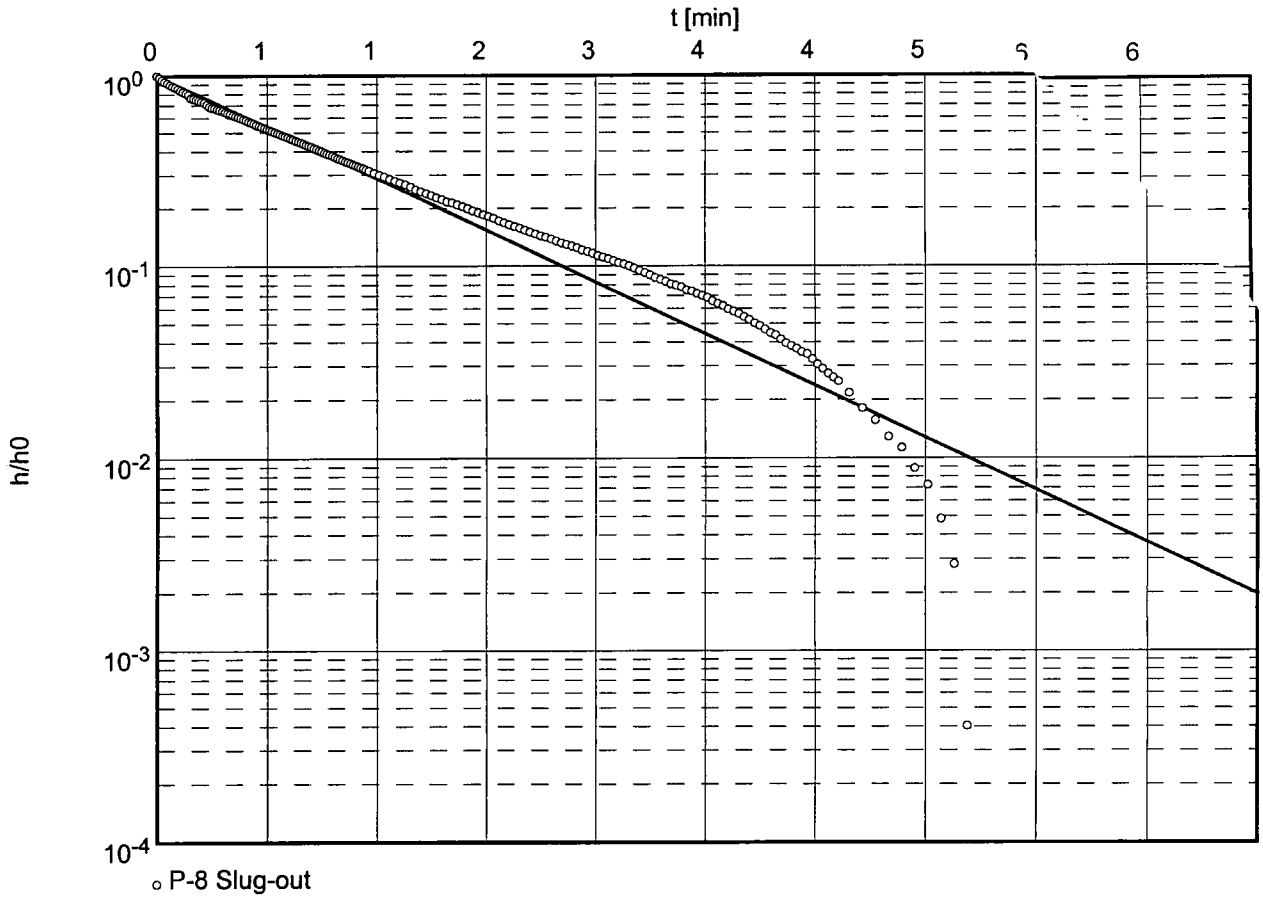


Hydraulic conductivity [ft/min]: 9.01×10^{-4}

1.30 ft/day

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	slug/bail test analysis BOUWER-RICE's method	Date: 3/31/00	Page 1
		Project: Larkin Property	
		Evaluated by: NCK	

Slug Test No.	Test conducted on: 3/27/00
P-8 Slug Out	



Hydraulic conductivity [ft/min]: 2.72×10^{-3}

3.92 ft/day