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27 October 2016

Mr. David Goldman, P.G.
Kimley-Horn and Associates, Inc.
12740 Gran Bay Parkway West, Suite 2350
Jacksonville, FL 32258

Subject: **Geotechnical Investigation Summary Report**
Baker Park Site
50 Riverside Circle
Naples, Collier County, Florida

Dear Mr. Goldman:

In accordance with the Standard Agreement for Professional Services and Individual Project Order Number 02 (jointly referred to as Proposal) to Kimley-Horn and Associates, Inc., dated 21 July 2016 and executed on 25 August 2016, Geosyntec Consultants (Geosyntec) has completed the preliminary geotechnical investigation for Baker Park, at the City of Naples property located in Naples, Florida (Site). This attached Geotechnical Investigation Summary Report (Report) summarizes the investigation, presents the results of the field and laboratory testing of the soil, horticultural debris, and dredge spoil materials encountered in the borings, and provides general considerations for design and construction of potential foundation systems for the proposed development of the Site.

Geosyntec appreciates the opportunity to provide you with this Report. Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Craig R. Browne, P.E.
Senior Project Engineer
Florida P.E. License No. 68613
Expiration 28 February 2017

Kwasi Badu-Tweneboah, Ph.D., P.E.,
Principal
Florida P.E. License No. 42460
Expiration 28 February 2017

Attachments
Copy to: Bill Waddill, Kimley-Horn and Associates, Inc.
Alex Rivera, Geosyntec Consultants

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Prepared for:

Kimley-Horn and Associates, Inc.
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GEOTECHNICAL INVESTIGATION SUMMARY REPORT

Baker Park
50 Riverside Circle
Naples, Florida

Prepared by:

Geosyntec consultants

1200 Riverplace Blvd
Suite 710
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Project Number: FL2851

October 2016

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

In accordance with our Proposal to Kimley-Horn and Associates, Inc. (KHA), dated 21 July 2016, Geosyntec Consultants (Geosyntec) has completed the preliminary geotechnical investigation for the proposed Baker Park, at the City of Naples property located in Naples, Florida (Site). This report summarizes the field geotechnical investigation, presents the results of the field and laboratory testing of the soil, horticultural debris, and dredge spoil material encountered in the borings, and general considerations for design and construction for the proposed development of the Site. The remainder of this report is organized to present: (i) the project background; (ii) a summary of the field geotechnical investigation program; (iii) a description of geotechnical subsurface conditions encountered at the Site; and (iv) preliminary geotechnical considerations related to the proposed Site development plans.

2.0 SITE DESCRIPTION

The Site is an approximately 15-acre property located at 50 Riverside Circle in Naples, Florida. The Site is located in a government and residential area and is bounded by mangroves and wetlands to the north, the Gordon River to the east, mangroves and residential property to the south, and Riverside Circle and the Naples Dog Park to the west. At the time of Geosyntec's investigation the Site was primarily vegetated with grass and accessible from Riverside Circle. Major Site features observed by Geosyntec include a vacant Solid Waste Operations building and scale house at the western end of the property; an area utilized for the temporary staging of palms in the southwest area of the property; two (2) mounds of dredge spoils with a combined footprint of approximately 4.4 acres; an office trailer utilized by the Rowing Association of Naples at the northeast peninsula; a fenced area utilized by the City of Naples for material staging in the northwest part of the property; and a filter marsh along the northern boundary of the Site.

As part of this geotechnical investigation, Geosyntec reviewed historical aerial photos of the Site and received information from the City of Naples that indicated the property was historically utilized to dispose of horticultural (vegetative) debris. By 2004, the Solid Waste Operations building had been constructed and it appears that a dredge dewatering operation was initiated. Aside from the former Solid Waste Operations building and associated paved parking lot, no significant development at the Site was observed on the historical photos from 1962 to present day.

2.1 <u>Physical Setting</u>

The location of the Site and surrounding vicinity, as indicated on the United States Geological Survey's (USGS's) Naples North, Florida 7.5-minute quadrangle map, is depicted in **Figure 1**. As of this report, the most recent topographic information obtained from KHA was a topographic survey prepared by TKW Consulting Engineers (TKW), dated 15 September 2014 (2014

Topographic Survey). Based on the 2014 Topographic Survey, the Site ranges from an approximate elevation of -0.8 feet (ft) (in the filter marsh) to +20.4 ft (in the vicinity of the west dredge spoil mound) relative to the North American Vertical Datum of 1988 (NAVD88). Geosyntec has assumed that a revised topographic survey will be performed by KHA as part of the Site development and updated topographic information may be incorporated by Geosyntec as part of supplemental geotechnical evaluations.

The nearest surface water body to the Site is the Gordon River, which runs adjacent to the east boundary of the Site. Based on the 2014 Topographic Survey, the mean high water line at the Site was reported at elevation +0.5 ft NAVD88 by TKW.

2.2 Regional Geology

The Site is located within the Southern or Distal Physiographic Zone according to the *Geology of Collier County, Florida* (Campbell, 1988). Specifically, the dominant geomorphic feature of the Site is Reticulated Coastal Swamps, consisting of tidally influenced mangrove swamps and coastal marshes. Although a majority of the area has been developed, the Site property remains largely undeveloped with mangrove swamps bordering the site on three (3) sides. The primary unit of interest for the Site is the Tamiami Formation (Pliocene) which consists primarily of moldic limestone, sandy limestone, and occasionally calcareous sandstone containing small amounts of phosphate sand (Campbell, 1988). Overlaying the Tamiami Formation are undifferentiated surficial sands and clays.

3.0 GEOTECHNICAL INVESTIGATION

Geosyntec understands that the City of Naples intends to develop the Site into a public park. Based on a preliminary conceptual Site plan provided to Geosyntec by KHA (Conceptual Site Plan H2, dated 8 February 2016), Geosyntec selected boring locations to evaluate subsurface conditions within the footprint of various proposed structures. Specifically, proposed structural features included a café building, pavilion, kayak launch building, and restroom facilities. It is noted that on 31 August 2016, during Geosyntec's field investigation, KHA provided a revised Site layout plan that altered the location of certain structures and added new structures that were not included on the previous conceptual Site plan. In addition, KHA communicated to Geosyntec that the on-Site dredge spoil material is being considered as a source of fill during Site development and requested an evaluation of the material. Select Site photographs are included in the photographic log presented in **Appendix A**.

Therefore, the primary focus of this preliminary geotechnical investigation is to evaluate subsurface conditions in locations of structures proposed in the Conceptual Site Plan H2 and provide sufficient information for geotechnical characterization of subsurface soil and dredge spoils to facilitate foundation system design calculations. It is understood that Geosyntec may perform a supplemental geotechnical investigation to evaluate subsurface conditions for structures that deviate from the location and geometry depicted in Conceptual Site Plan H2.

Details of the investigation field procedures, findings, and recommendations are presented below.

3.1 Field Activities

The geotechnical field activities included the advancement of 18 hand auger borings by the Geosyntec Field Engineer, Mr. Alex Rivera, P.E. and nine (9) borings with standard penetration tests (SPT) in general accordance with American Society for Testing of Materials (ASTM) Method D1586 "*Standard Method for Penetration Test and Split-Barrel Sampling of Soils*" by a licensed driller using mud rotary drilling techniques. The geotechnical investigation commenced on 29 August 2016 and was completed on 1 September 2016. The geotechnical field activities were supervised and documented by Mr. Rivera. Mr. Craig Browne, P.E., reviewed the soil samples collected from various subsurface locations and selected representative samples for geotechnical laboratory analysis.

Five (5) shallow borings with SPTs (designated as SPT-02 through SPT-06) and four (4) deep borings with SPTs (designated as SPT-07 through SPT-10) were advanced at the locations shown on **Figure 2**. The hand auger locations (identified as HA-01 through HA-03) are also shown on **Figure 2**. The specific elements of the geotechnical investigation are summarized below.

Proposed Café Building and Gardens:

- Four (4) borings with SPTs were advanced to depths ranging from 60 ft below ground surface (bgs) (SPT-07) to 75 ft bgs (SPT-10).

Proposed Pavilion Structure:

- Three (3) borings with SPTs were advanced, to depths ranging from 25 ft bgs (SPT-02 and 03) to 30 ft bgs (SPT-04).

Note, that these boring locations were selected utilizing the Conceptual Site Plan H2, however these locations may not be consistent with the revised Site plan.

Restroom Structure(s):

- Two (2) borings with SPTs were advanced, to depths ranging from 25 ft bgs (SPT-05) to 30 ft bgs (SPT-06) in the northeast area of the Site.

Dredge Spoil Material:

- 18 hand auger borings were advanced along three (3) transect lines to approximately 2-ft bgs at the dredge spoil mounds as noted on **Figure 2**. Six (6) auger borings were composited into one (1) soil sample for a total of three (3) composite samples (HA-01 to HA-03).

As noted previously, a kayak launch building was proposed in the southwest portion of the Site (as shown on Conceptual Site Plan H2) and Geosyntec had proposed one (1) boring, SPT-01, as illustrated on **Figure 2**. Due to restricted access, Geosyntec was unable to complete a soil boring in this general area. Also, **Figure 2** presents two (2) borings (SPT-01A and SPT-01B) that are proposed as part of a supplementary geotechnical investigation and were not included as part of this mobilization.

In accordance with Geosyntec's Site Task Hazard Analysis (THA) document, the air in the breathing zone within the drilling work area and at the borehole from ground surface were monitored utilizing a LANDTEC GEM5000 portable landfill gas analyzer. Field gas measurements including, methane, carbon dioxide, oxygen, carbon monoxide, and hydrogen sulfide, were recorded at the top of each borehole for various depths and are presented in **Table 1**.

3.1.1 Borings with SPTs

The borings with SPT were drilled with a BR2500 truck-mounted rig that collected samples continuously using a 2.0-inch (in) outer diameter split barrel sampler to a depth of 10-ft bgs, and in 5-ft intervals thereafter. Below a depth of approximately 10-ft bgs the borings were advanced by rotary drilling using a 2-in diameter tri-cone roller bit while circulating a bentonite slurry to maintain sidewall stability and remove drill cuttings. All boring drilling locations were advanced without steel casing, except at SPT-10 where 3-in diameter steel casing was advanced to 20-ft bgs to stabilize the borehole wall during drill advancement from 35 ft to 75 ft bgs.

At each 2-ft sampling interval the split-barrel sampler was first seated 6 inches and then driven an additional 18 inches (in.) with blows from a 140 lb hammer and 30-in. drop height. The number of hammer blows (i.e., blow counts) required to drive the sampler through this 24-in. interval is designated the "Penetration Resistance", with the "N-value" representing the total hammer blows to advance the sampler through the middle 12 inches. The N-value, when properly interpreted, is an index of soil strength, relative density (for granular soils), and consistency (for fine-grained soils). Advancing the SPT borings continuously through the upper 10 ft facilitated the identification of horticultural debris and approximate thickness of this layer.

Spoils from the drilling activities were spread on the ground adjacent to each borehole. Upon completion of the drilling, each borehole was tremie grouted from the bottom of the borehole to surface. Representative portions of the soil samples, obtained from the spilt-spoon samplers, were placed in sample bags, marked with the corresponding boring designation and depth interval, and temporarily retained for further examination. Lithologic field logs for each boring were prepared by the Geosyntec Field Engineer at the time of the investigation and representative specimens from the split spoon samples were collected for visual classification and for laboratory testing on select samples.

The logs include a visual description of material encountered for each depth interval (using methods provided in ASTM D2488 "*Standard Practice for the Description and Identification of Soils*") and denote the corresponding blow counts, corresponding N-values, and relevant observations made during the drilling process. The stratification lines and depth designations on the logs represent the approximate boundaries between soil types. The boring logs were then reconciled against the geotechnical laboratory results and modified for consistency. The boring logs are provided in **Appendix B**.

3.1.2 Hand Auger Borings

For the purpose of evaluating the dredge spoil material, borings were advanced by the Field Engineer to a depth of approximately 2-ft bgs, utilizing a hand auger. In order to collect material representative of the dredge spoils, six (6) hand auger locations were completed along an east-west transect line and composited in a 5-gallon bucket. A total of three (3) composite hand auger sample buckets were submitted for laboratory analysis. Material not utilized for the composite sample was placed back into the boring. The approximate location of each hand auger location, and the associated composite sample transect lines are presented in **Figure 2**.

3.2 Laboratory Testing

Geosyntec's Field Engineer collected samples of the subsurface materials at each hand auger and soil boring location. Representative samples were selected by Geosyntec for laboratory analysis. Geosyntec utilized the services of Excel Geotechnical Testing Laboratory, Inc. of Roswell, Georgia to perform the testing required for this investigation. A summary of the laboratory test results is presented in **Table 3** and **Table 4**. The following laboratory geotechnical tests were performed:

- Engineering Classification per ASTM D2487 (13 samples);
- Organic Content per ASTM D2974 (5 samples);
- Atterberg Limits per ASTM D4318 (7 samples); and
- Standard Proctor Compaction per ASTM D698 (2 samples).

As previously mentioned, soil samples collected in the field were visually classified by the Field Engineer in general accordance with the Unified Soil Classification System (USCS per ASTM D2488). Geosyntec's visual soil classification was confirmed through laboratory testing as part of this investigation. Laboratory soil classification (per ASTM D2487) utilizes information from both ASTM D422 (particle size distribution analysis) and ASTM D4318 (Atterberg Limits) tests to provide a soil classification. ASTM D422 measures the particle size distribution for each sample including the relative proportions of sand, gravel, and fine particles [i.e. those finer than the No. 200 sieve (75-µm)] while ASTM D2418 testing characterizes the plasticity of soil samples.

4.0 SUBSURFACE CONDITIONS

The subsurface conditions encountered during the geotechnical investigation at the Site are graphically represented in the lithologic borings presented in **Appendix B.** Laboratory test results for representative material samples are provided in **Appendix C**. The results of the field investigation indicate the subsurface conditions at the Site can be described as follows (note, depths are approximate due to variability and boring logs found in **Appendix B** should be referenced for actual depths at each boring location):

Proposed Café Building:

Generally, the four (4) boring locations (SPT-07 through SPT-10) in the area of the proposed Café Building indicated:

0 to 4-ft bgs – fill material (poorly graded sand and limerock) with an average N-value of approximately 31, indicating a dense sand;
4 to 19-ft bgs – soil/horticultural debris matrix consisting of poorly graded sand with silts and clays and debris consisting of mulch, wood, timber, and textiles, with an average N-value of approximately 17, indicating a medium dense material;
19 to 43-ft bgs – weathered to competent limestone layer with an average N-value of approximately 24;
43 to 50-ft bgs – lean clay with an average N-value of approximately 4, indicating a soft clay; and
50 to 75-ft bgs – weathered limestone layer with an average N-value of 21.

Based on the field observations, generally the upper 4 ft within the proposed café building footprint was free of horticultural debris. Also, a pale yellow to yellowish brown layer up to 4 ft thick, identified on historical boring logs as "sludge," was observed at some boring locations from 2 to 6-ft bgs. A representative sample from this layer was submitted for laboratory analysis and the sample was subsequently classified as sandy silt (ML), as Atterberg Limits tests (per ASTM D4318) indicated a non-plastic material.

Organic content testing (per ASTM D2974) was performed on representative samples from the horticultural debris layer and measured organic contents ranged from approximately 8 percent (SPT-10) to 25 percent (SPT-07). Atterberg Limits tests were also performed on the lean clay (CL) layer (43 to 50-ft bgs) and indicate a plasticity index (PI) of 9 to 10 percent and a liquid limit (LL) of 27 to 28 percent.

The depth to the groundwater in this general location (SPT-07 through SPT-10) was estimated at approximately 4 to 6-ft bgs, based on visual examination of the split barrel samples by the Field Engineer.

Proposed Pavilion Structure:

Generally, the three (3) boring locations (SPT-02 through SPT-05) in the area of the proposed pavilion structure (per the Conceptual Site Plan H2) indicated:

0 to 4-ft bgs – poorly graded sands with clays with an average N-value of approximately 18, indicating a medium dense sand;
4 to 6-ft bgs – silt layer (identified on historical boring logs as "sludge"), variable in thickness, with an average N-value of approximately 21, indicating a very stiff silt;
6 to 18-ft bgs – soil/horticultural debris matrix consisting of poorly graded sand with silts and clays and debris consisting of mulch, wood, timber, and textiles, with an average N-value of approximately 13 indicating a medium dense material; and
18 to 30-ft bgs – weathered to competent limestone layer with an average N-value of approximately 35.

Based on the field observations, generally the upper 2 ft within the proposed pavilion structure footprint was free of horticultural debris. Also, at SPT-03, a layer of silt and clay (CL-ML) was identified from 23 to 25-ft bgs. Organic content testing (per ASTM D2974) was performed on a representative horticultural debris layer sample and indicate an organic content of 16.1 percent at this area.

The depth to the groundwater in this general location (SPT-02 through SPT-04) was estimated at approximately 4-ft bgs, based on visual examination of the split barrel samples by the Field Engineer.

Restroom Structure(s):

Generally, the two (2) boring locations (SPT-05 and SPT-06) in the northeast area of the Site indicated:

0 to 2-ft bgs – poorly graded sands with clays with an average N-value of approximately 24, indicating a medium dense sand;
2 to 6-ft bgs – silt layer (historically identified as sludge), variable in thickness, with an average

N-value of approximately 18, indicating a very stiff silt;
6 to 18-ft bgs – soil/horticultural debris matrix consisting of poorly graded sand with silts and clays and debris consisting of mulch, wood, timber, and textiles, with an average N-value of approximately 25, indicating a medium dense material; and
18 to 30-ft bgs – weathered to competent limestone layer with an average N-value of approximately 32.Based on the field observations, horticultural debris was not identified at SPT-05 and generally the upper 8 ft of SPT-06 was free of horticultural debris. The depth to the groundwater in this general location (SPT-05 and SPT-06) was estimated at approximately 4-ft bgs, based on visual examination of the split barrel samples by the Field Engineer.

Dredge Spoil Material

As previously noted, three (3) composite samples, collected across the dredge spoil mounds, were submitted for laboratory analysis. The results of the hand auger activities, general field observations, and laboratory testing indicate the dredge spoil material can be described as follows:

- The material is classified as clayey sand (SC);
- Organic content testing (per ASTM D2974) was performed on HA-01 and HA-03 and indicate an organic content of 5.3 and 4.4, respectively;
- Atterberg Limits tests (per ASTM D4318) were completed for HA-01 through HA-03 and indicate a PI range of 21 to 23 percent and a LL range of 41 to 45 percent;
- Moisture content ranged from 35.2 to 39.4 percent;
- Fines content ranged from 35.2 to 40.7 percent; and
- Standard Proctor compaction tests (per ASTM D698) were performed on HA-01 and HA-02 and indicate a maximum dry unit weight of 98.9 pounds per cubic foot (pcf) with an optimum moisture content of 20.6 percent and 104.0 pcf with an optimum moisture content of 18.3 percent, respectively.

In general, saturated material was encountered at approximately 6-in. bgs along the HA-01 transect line, 1 to 1.5-ft bgs along the HA-02 transect line, and 1.5 to 2-ft bgs along the HA-3 transect line. Standard Proctor compaction test results are presented in **Table 4** and the geotechnical laboratory reports are included in **Appendix C**.

5.0 GEOTECHNICAL EVALUATION AND CONSIDERATIONS

Based on the field observations during geotechnical boring activities and the geotechnical laboratory test results, geotechnical recommendations and considerations are provided relative to site preparation and earthwork including underground utilities, groundwater and subsurface drainage, and foundation design.

5.1 Relocation/Removal of Horticultural Debris

Based on the thickness and depths of the horticultural debris encountered during geotechnical boring activities, it is anticipated that a challenge facing the development of the Site is to address the existing debris mass to facilitate the construction of proposed park features, utilities, and building foundation system design. Due to the nature of horticultural debris, some degree of long term settlement and subsequent maintenance may be reasonably expected.

In accordance with the Florida Department of Environmental Protection (FDEP) document titled "Guidance for Disturbance and Use of Closed Landfills or Waste Disposal Areas in Florida," Version 2.2, dated 19 August 2015, the City of Naples, as the property owner, may request permission from FDEP to move debris from one area of the Site to another area within the original disposal Site footprint and must be covered outside of building foundations and in non-paved areas with two feet of soil, compacted and revegetated. Appropriate safety precautions (i.e., periodic monitoring for landfill gas) should be taken during Site development activities that disturb the existing debris mass found at the Site. Based on the thickness and depths of this debris layer, large scale excavation and relocation of debris may not be feasible or cost effective.

The excavation, on-Site sorting or recycling, transportation and off-site recycling of vegetative materials may be allowed, with prior written approval by the FDEP. The City of Naples may elect to dispose of any vegetative debris that meets the definition of "yard trash" as contained in Rule 62-701.200(135), Florida Administrative Code (F.A.C.), in a permitted Class III landfill or a permitted C&D facility. Horticultural debris defined as "land clearing debris" may be disposed at a permitted land clearing debris facility. Similar to debris relocation, appropriate safety precautions should be taken when excavation activities are performed in the horticultural waste layer. Again, due to the thickness and depths of this debris layer, large scale excavation of debris may not be feasible or cost effective.

5.2 Dynamic Compaction

The utilization of dynamic compaction of soils within the footprint of proposed park structures may be considered as means of subsurface densification (and corresponding volume reduction) and overall Site leveling in combination with grading activities. Dynamic compaction is a method of compacting solid material within 15 to 30 ft of the surface by dropping a heavy tamper from a specified height using a crane. Weights of 5 to 30 tons dropped from 20 to 75 ft are typical. The height of drop, weight of tamper, number of passes, drop pattern, and number of drops are designed based on the desired improvement and depth and composition of the material to be improved. This method can induce a significant degree of settlement prior to Site grading and can significantly reduce the total and differential settlement of pavement and shallow foundations systems; however, some long-term settlement due to decomposition of the organic waste material will still occur.

Drawbacks to dynamic compaction include the potential to cause noise, vibrations, and release of methane gas upon impact of the weight, and should be evaluated and mitigated as necessary. Geosyntec has prepared and implemented detailed dynamic compaction work plans for similar sites with buried waste within the development footprint. Further evaluation of the technical viability of dynamic compaction as a subsurface improvement technique for the Site is recommended once details of the proposed Site layout and civil engineering requirements become available.

The two primary objectives of a dynamic compaction program for the Site development are to minimize total and differential settlement of both foundation and paved areas and to reduce the overall elevation of the site. A secondary benefit of dynamic compaction is an increase of soil shear strength. Reduction of the Site elevation through dynamic compaction (or volume reduction of the debris layer) may be important for minimizing the cost of site grading and potential quantity of offsite debris disposal and the import of structural fill.

Areas of Site that may undergo dynamic compaction will likely require some degree of regrading to fill in the depressions resulting from the dynamic compaction process. The re-graded areas should then be proof rolled with vibratory rollers prior to placement of subgrade soil and pavement. The dynamic compaction program will reduce but not eliminate settlement of pavements, building foundations or other unsupported elements of the Site infrastructure.

5.3 Pavement

As a preliminary consideration for pavement design, it is recommend that a flexible pavement system, in accordance with the Florida Department of Transportation (FDOT), "*Flexible Pavement Design Manual*", March 2015, be installed at the Site due to subsurface Site conditions. Specifically, pavement design considerations should include accounting for the compressible characteristics of the horticultural debris layer and utilization of appropriate pavement stabilization or reinforcement methods (e.g. mechanically stabilized aggregate layer) to minimize long term settlement and subsequent pavement maintenance.

Depending on final Site design/layout, civil design paver block or other alternate pavement materials can be evaluated for short and long term performance given the subsurface conditions and any subsequent improvements. Final pavement design should be verified by the project civil engineer utilizing the data contained in this report, anticipated traffic conditions and all applicable building codes and requirements.

5.4 Earthwork

5.4.1 Engineered Fill Placement and Compaction

For the purposes of this report, engineered fill refers to fill placed beneath floor slabs and footings and within 1 ft of the subgrade for pavement. Engineered fill material should be a sandy soil that is free from organic matter (generally accepted to be below 3 percent of total weight) or debris, has less than 15 percent fines passing the No. 200 sieve, and no more than 15 percent of particles with a dimension greater than 2 in. The suitability of specific soils as fill material should be based on laboratory classification and compaction test results, and should be approved by the geotechnical engineer prior to delivery to the Site.

Based on the geotechnical laboratory results of the dredge spoil samples (HA-01 through HA-03), the utilization of these soils as engineered fill for rigid structures is not recommended, but may be suitable as general fill in areas outside foundation footprints or pavement systems (e.g., as general cover). Geotechnical laboratory results indicated an organic content ranging from 4.4 to 5.3 percent and fines content ranging from 35.2 to 40.7 percent, which exceeds typically recommended values for engineered fill (3 percent organic content and 20 percent fines, respectively). Furthermore, the water content of the dredge spoil material ranges from 35.2 to 39.4 percent, which may necessitate additional preparation of the material prior to use. Approaches to reduce the water content may include mixing the material with soils containing a lower water content, mixing the material with appropriate amendments, mechanical dewatering, or utilizing a staging area to turn the soil until a suitable water content is achieved. Geosyntec understands that KHA is evaluating the suitability of the dredge spoil materials for use in surficial applications from the standpoint of environmental exposure and ability to support vegetative growth.

Engineered fill should be placed in horizontal lifts not to exceed a loose thickness of 12 in. Each lift should be compacted to at least 95 percent of the modified Proctor (ASTM D1557) maximum dry unit weight with the exception of the upper 1 ft of pavement subgrade, which should be compacted to 98 percent of modified Proctor maximum dry unit weight. Fill placement and compaction operations should continue in lifts with maximum loose thickness of 12 in. until the desired elevation is achieved. If hand-held compaction equipment is used, the maximum loose lift thickness should be reduced to 6 in.

A qualified representative of the Geotechnical Engineer should monitor engineered fill placement and compaction operations. Field moisture and density tests must be performed on each lift to verify that the recommended compaction is achieved. Additional passes and/or over excavation and re-compaction may be required if these minimum density requirements are not achieved. The soil moisture should be adjusted as necessary during compaction to achieve the required density.

5.4.2 Excavations

Excavations should be performed in accordance with OSHA requirements (29 CFR 1926). The contractor shall be responsible for ensuring that cut slopes and excavation depths do not exceed OSHA limits. Provided the excavation depth does not exceed the depth to groundwater (approximately 4 to 6 ft-bgs), minimal amounts of seepage should be anticipated in excavations. Monitoring of excavations for landfill gases, specifically methane, should be conducted as a precautionary measure.

5.4.3 Underground Utilities

Pipe bedding for utilities should consist of relatively clean sand with less than 15 percent of fine-grained particles. Bedding should consist of the material within a zone that extends at least 6 in. below the bottom of the pipe and 12 in. above the top of the pipe. The bedding material should be placed on a firm, unyielding subgrade and compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557. Jetting of pipe bedding should not be permitted unless the material and procedure is approved by a qualified Geotechnical Engineer.

Smooth wall high density polyethylene (HDPE) pipe is recommended for water mains, sewer force mains, and electrical conduit. Corrugated HDPE pipe with watertight joints is recommended for stormwater drain pipes. These types of utilities may be constructed without removing underlying debris. Gravity sewers should be constructed with a concrete footing below the pipe to minimize differential settlement and potential slope reversal. Alternatively, the debris may be removed from the gravity sewer alignment and replaced with engineered fill. Underground vaults (e.g., for stormwater drainage structures, sewer lift station, etc.) should be situated on a minimum 2-ft thick pad of No. 57 aggregate. The debris does not need to be removed below these structures. However, the transition of utilities from rigid pile supported structures to areas underlain by debris should be designed for flexibility, to account for potential differential settlements, using reinforced flexible hose or a configuration of articulating fittings.

5.5 Groundwater and Subsurface Drainage

Percolation tests to evaluate the permeability of the waste materials were not performed as part of this geotechnical investigation. It is recommended that permeability tests be performed to evaluate the permeability of subsurface materials as part of Site development design as it relates to the stormwater management control system.

5.6 Foundation Design

5.4.3 Buildings

Factors to be considered for evaluating different foundation options at the Site include the presence of variably dense and relatively compressible materials prone to long-term degradation and creep induced settlement, and the need for a gas protection system below any proposed buildings that are enclosed. Based on Geosyntec's field observations of SPT N-value data, and field density testing, the horticultural debris layer may not offer suitable support for shallow foundations and slab-on-grade floors for the proposed Site structures. In addition, due to the variability in waste thickness and density, there exists the potential for differential settlement that may adversely impact the proposed structures. Measures to mitigate total and differential settlement impacts and improve subsurface conditions for the use of shallow foundations, such as deep dynamic compaction and soil/waste removal and replacement with engineered fill, should be evaluated. Alternatively, deep foundation systems may be considered if founded on deeper, more competent soils.

A deep foundation system is the traditional option for supporting structures underlain by weak and compressive materials such as the debris layer encountered at the Site. A deep foundation system will transfer the structure loads to the competent limestone layers underlying the waste layer. In addition, when designed properly, deep foundation systems can mitigate potential excessive settlements that may be realized when constructing slab-on-grade systems on weak and compressive layers. Various deep foundation system options should be considered, such as driven piles, vibro-placed concrete columns (VCCs), and auger cast piles. At a minimum, deep foundation options should be evaluated based on the following criteria: (i) differential settlement between various foundation types, if used; (ii) how the utilities could be installed; (iii) the ability to modify under-slab utilities; and (iv) effect on the relative constructability and reliability of the gas protection system. Geosyntec has prepared detailed analysis of deep foundation systems for similar landfill sites. Further evaluation of the technical viability of supported foundation systems for the Site is recommended once further details of the proposed building layout and civil engineering requirements become available.

5.4.3 Knoll

The most recent conceptual Site plan shows a grassy knoll in the central portion of the Site with a top elevation of approximately 34 feet. Based on the conceptual geometry of this feature and assumptions made regarding the subsurface conditions below it, including an assumed 8-ft thick layer of dredged spoils that is in place on top of the horticultural debris (no borings were advanced within the footprint as part of this geotechnical investigation), settlement on the order of 1.1 feet may result within the first year of construction. Thereafter, settlement is anticipated to continue, but at a much lower rate, on the order of 1 to 2 inches over the next fifty years due to ongoing biological decomposition and creep of the underlying horticultural debris. One approach that can be considered to mitigate the impact of settlement on the grassy knoll design is to apply additional preload to the area to induce settlement prior to construction of surface features such as stairs and walkways. Preloading would involve the construction of the knoll feature to design grades, instrumenting with settlement plates, and monitoring settlement over the course of six to twelve months to evaluate when primary settlement has concluded. At that point, additional soil can be brought in to return elevations to design grades followed by construction of surface features.

5.7 Landfill Gas Control

Based on the landfill gas screening performed during drilling advancement of soil borings, concentrations of methane are variable, but at sufficient levels to indicate active gas generation is ongoing and warrant active gas mitigation for all enclosed buildings. The active gas mitigation system designs will be progressed concurrently with the development of the foundation system and structural design of each building.

6.0 GEOTECHNICAL SERVICES DURING DESIGN AND CONSTRUCTION

Geosyntec should be contacted during the design phase of the project if deviations from the recommendations of this report are proposed. Geosyntec should also be contacted to assist in the evaluation of foundation alternatives that may be suggested during the structural design phase or if significant modifications are proposed for the location of structures, type of construction, or loading conditions.

A regular program of in-situ density testing and associated laboratory work should be carried out for all engineered fill materials. All concrete should be tested to confirm conformance with specifications. Full-time monitoring by a representative of the Geotechnical Engineer should be performed during all of the following activities:

- Excavation activities of horticultural debris and replacement with granular fill;

- dynamic compaction;
- foundation construction (e.g., pile installation);
- subgrade proof rolling; and
- gas mitigation system installation.

Periodic inspections by the Geotechnical Engineer should be made for all other earthwork and foundation construction activities.

7.0 QUALITY CONTROL/ASSURANCE

Relating to these geotechnical engineering recommendations, Geosyntec also recommends the owner establish a comprehensive construction quality control/quality assurance (CQA/QC) program to verify that all Site preparation, foundation and pavement construction is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by a qualified geotechnical engineering firm.

Should the removal and replacement of unsuitable soils or waste material be undertaken, the Geotechnical Engineer or designated representative should observe the removal of deleterious soils to assure unsuitable materials have been removed. The replacement and compaction of engineered fill or the installation of deep foundation systems should also be monitored by a qualified geotechnical representative. In-situ density tests should be conducted during backfilling activities and below all footings and floor slabs to verify that the required densities have been achieved. In-situ density values should be compared to laboratory Proctor compaction moisture-density results for each of the soils encountered. Excavation for footings should be inspected and approved by the geotechnical engineer or his/her designated representative.

Finally, Geosyntec recommends monitoring and testing the construction materials for pavements, building pad foundations and other structural components by a qualified licensed engineering firm and accredited geotechnical and materials testing laboratory.

8.0 LIMITATIONS

The professional services, findings and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering principles and practices. Geosyntec Consultants is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

This geotechnical investigation is limited in that the engineering recommendations were developed from information obtained from the test borings that only depict subsurface conditions at the specific locations, date and depths documented in this report. Soil conditions at other locations on this Site may differ from those encountered in the test borings.

If the proposed Site development characteristics are changed from those described in this report, the project information contained in this report is inaccurate or as additional information becomes available, Geosyntec reserves the right to review this new information and modify the recommendations presented herein if necessary.

TABLES

Table 1
FIELD SOIL GAS MONITORING RESULTS
Baker Park
50 Riverside Circle
Naples, Florida

Boring	Depth (ft)	CH_4 (ppm)	CO_2 (ppm)	O_2 (%)	CO (ppm)	H_2S (ppm)
SPT-02	0-2	0	0.1	19.1	0	0
	2-4	12.7	8.3	16.2	1	0
	6-8	53.9	39.9	4.2	2	0
	13-15	1.2	1.1	18.9	0	0
	23-25	0.1	0.1	19.7	0	0
SPT-03	0-2	0	0	19.8	0	0
	4-6	49.8	38.4	5.1	2	10
	6-8	13.2	9.3	15.9	1	1
	13-15	5.4	2.5	18	4	0
	23-25	0.3	0.3	19.9	2	0
SPT-04	0-2	0	0.1	19.1	0	0
	4-6	28.8	15.6	10.9	2	76
	13-15	0.2	0.1	19.4	0	0
	18-20	0	0.1	19.6	0	0
	23-25	0	0.1	19.6	0	0
	28-30	16.7	10.9	16.8	0	4
SPT-05	0-2	0	0.1	18.4	0	0
	2-4	0.5	0.3	18.9	0	0
	6-8	6.5	0	17.1	1	0
	13-15	0	0.1	19.4	0	0
	23-25	1.2	0.8	18.3	1	0
SPT-06	0-2	0	0	19.7	0	0
	2-4	6.4	5.8	16.9	5	0
	6-8	2.5	2.2	18.4	4	0
	8-10	1.5	1.5	19.1	2	0
	13-15	0	0	19.7	0	0
SPT-07	0-2	0	0.1	19.2	0	0
	4-6	0.1	0.1	18.6	0	0
	8-10	1.6	0.9	18.5	0	0
	18-20	0.4	0.3	19.2	1	0
SPT-08	0-2	0	0.1	19.2	0	0
	2-4	1	0.5	18.7	0	0
	4-6	0	0.1	18.9	0	0
	8-10	0.9	0.6	18.8	0	0
	13-15	0.1	1.3	18.8	5	0
	18-20	2.4	1.4	18.7	2	0
SPT-09	0-2	0	0.1	19	0	0
	4-6	21.3	14.8	14.5	0	42
	6-8	4.4	3.1	17.2	0	11
	8-10	2.2	1.5	18	0	2
	13-15	0	0	19	0	0
	33-35	0.2	0.1	19.4	0	0
SPT-10	0-2	0	0.1	19.3	0	0
	2-4	0.2	0.1	19.1	0	0
	8-10	6	3	18.7	0	0
	38-40	0	0.1	19	0	0
	43-45	0	0.1	18.9	0	0
	48-50	0	0.1	19.1	0	0
	58-60	0	0.1	19.3	1	0

Table 2
SUMMARY OF SPT FIELD RESULTS
Baker Park
50 Riverside Circle
Naples, Florida

Depth Interval (ft BLS)	Field N-Value (N)[1]								
	SPT-02	SPT-03	SPT-04	SPT-05	SPT-06	SPT-07	SPT-08	SPT-09	SPT-10
0.0-2.0	22	17	14	33	17	16	86	26	6
2.0-4.0	8	18	10	22	26	22	49	12	34
4.0-6.0	11	7	35	24	12	10	29	8	9
6.0-8.0	11	7	10	10	10	5	7	2	18
8.0-10.0	32	14	9	7	12	12	16	49	9
13.0-15.0	9	13	8	33	28	11	17	9	36
18.0-20.0	50	21	6	50	30	50	20	10	13
23.0-25.0	50	50	71	50	17	20	50	50	50
28.0-30.0			11		10	8	12	33	14
33.0-35.0						19	5	14	8
38.0-40.0						4	30	30	30
43.0-45.0						3	5	3	3
48.0-50.0						4	4	2	5
53.0-55.0						7	4	6	6
58.0-60.0							5	4	8
63.0-65.0							23	26	22
68.0-70.0								95	50
73.0-75.0									14

Table 3
SUMMARY OF GEOTECHNICAL LABORATORY TEST RESULTS
Baker Park
50 Riverside Circle
Naples, Florida

Sample ID[1]	Laboratory ID	Moisture Content (%)[2]	Fines Content	Liquid Limit (%)[3]	Plastic Limit (%)[3]	Plasticity Index, PI (%)[3]	Classification[4]
SPT-02 (0-2)	16I011	16.8	39.5	-	-	-	
SPT-07 (0-2), (2-4)	16I012	13.2	13.2	-	-	-	
SPT-10 (0-2)	16I013	34.2	14.8	-	-	-	
SPT-10 (4-6), (6-8)	16I014	18.0	11.3	NP	NP	NP	Poorly graded sand with silt (SP-SM)
SPT-08 (8-10) SPT-09 (8-10)	16I015	20.2	63.7	NP	NP	NP	Sandy silt (ML)
SPT-02 (6-8),(8-10), (13-15)	16I016	72.7	24.0	-	-	-	
SPT-07 (4-6), (6-8)	16I017	52.0	21.5	-	-	-	
SPT-10 (8-10), (13-15)	16I018	38.5	10.9	-	-	-	
SPT-07 (43-45), (48-50)	16I019	31.5	51.9	28	18	10	Sandy lean clay (CL)
SPT-09 (43-45), (48-50)	16I020	31.8	50.4	27	18	9	Sandy lean clay (CL)
HA-01	16I021	39.4	40.7	45	22	23	Clayey sand (SC)
HA-02	16I022	31.6	35.2	43	22	21	Clayey sand (SC)
HA-03	16I023	36.2	38.3	41	20	21	Clayey sand (SC)

Notes:
1. Sample ID consists of the boring ID (see Figure 2) and sample interval in feet below ground surface (ft-bgs).
2. Moisture and organic content per ASTM ASTM D 2974.
3. Atterburg limits per ASTM D 4318.
4. Unified Soil Classification System classification per ASTM D 2487.

Table 4

SUMMARY OF STANDARD PROCTOR COMPACTION TEST RESULTS[1]

Baker Park

50 Riverside Circle

Naples, Florida

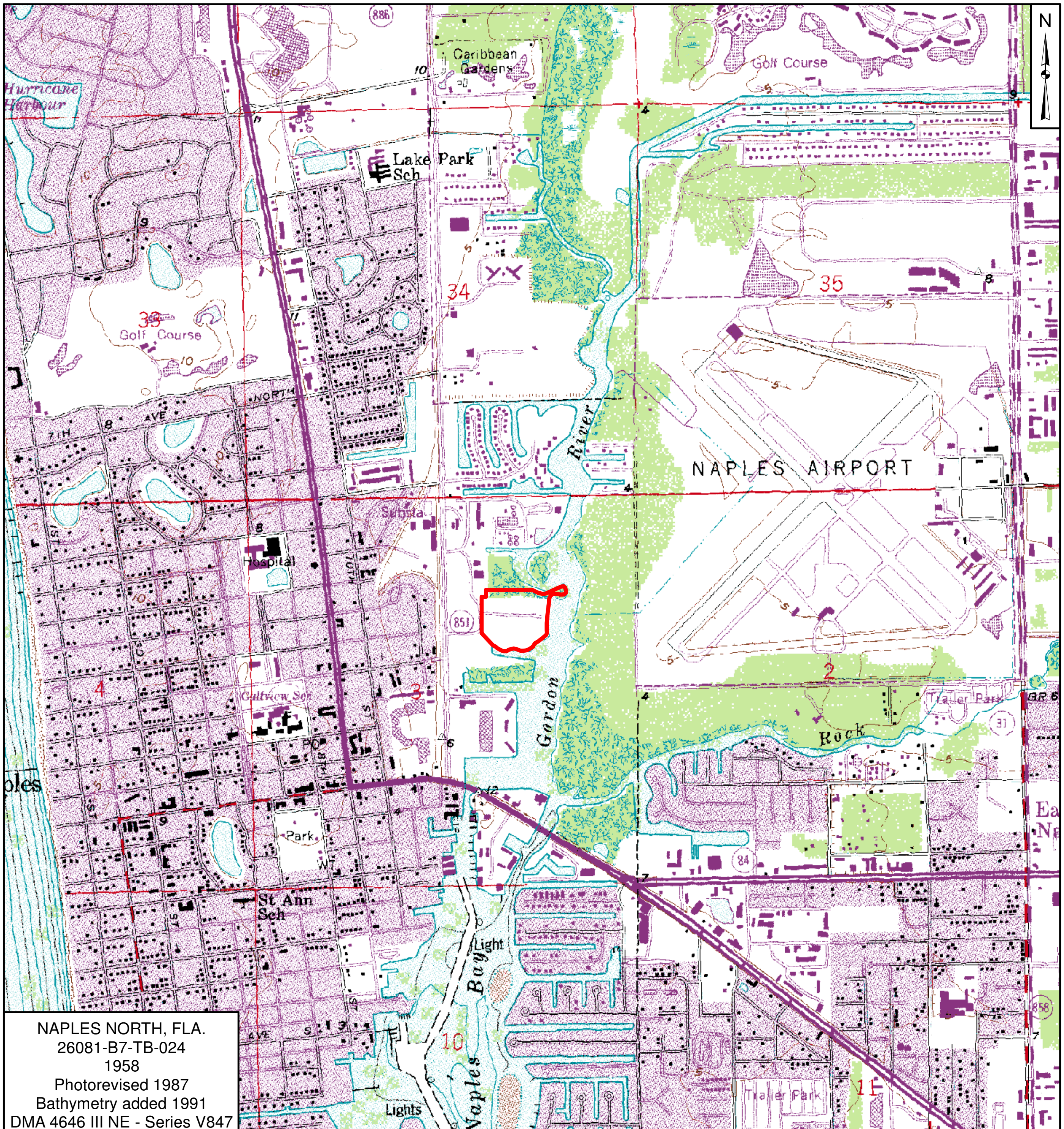
Sample ID	Maximum Dry Unit Weight (pcf)	Optimum Moisture Content (%)	Calculated Total Unit Weight (pcf)	USCS Classification[2]
HA-01	98.9	20.6	119.3	SC
HA-02	104.0	18.3	123.0	SC

Notes:

(1) Standard proctor per ASTM D 698.

(2) USCS - Unified Soil Classification System (by ASTM D2487).

FIGURES



2,000 1,000 0 2,000 Feet

Legend

Approximate Site Boundary

Approximate Site Location

USGS Site Topographic Map

Jay and Patty Baker Park
50 Riverside Circle
Naples, Florida

Notes:
1. Section 3, Township 50 South, and Range 25 East.
2. Source of Naples North, FL USGS 7.5 Minute Quadrange: Florida Department of Environmental Protection, Land Boundary Information System (LABINS).

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Tampa, FL | September 2016

Figure 1

Path: [Titusville-01\DATA] T:\GIS\FL2851_Baker_Park\MXDs\Topo.mxd 20 September 2016 JRB

LEGEND

- HISTORICAL CDM SPT BORINGS
- HISTORICAL CDM CPT BORINGS
- HISTORICAL MACTEC TEST PITS
- GEOSYNTEC SPT BORINGS
- DREDGE SPOIL MOUND
- TRANSECT
- APP. HAND AUGER LOCATION

BAKER PARK
NAPLES, FLORIDA

N

0 80' 160'
SCALE IN FEET

Geosyntec consultants

TAMPA, FL

DATE:	SEPTEMBER 2016	FILE NO.	FL2851.01F02
PROJECT NO.	FL2851	FIGURE NO.	2

I:_CADD (PROJECTS)\B\BAKER PARK (CITY OF NAPLES)\FIGURES\FL2851.01F02.DWG (23 September 2016) cbrowne

APPENDIX A

PHOTOGRAPHIC LOG

GEOSYNTEC CONSULTANTS Photographic Record	
Client: Kimley-Horn and Associates, Inc.	Project Number: FL2851
Subject Site: Baker Park 50 Riverside Circle, Naples, FL	

Photograph 1	
Date: 27 July 2016	
Direction: South	
Comments: View of west dredge spoil mound. The mound is heavily vegetated with grass and small shrubs. The mound is encircled by a silt fence.	

Photograph 2	
Date: 27 July 2016	
Direction: East	
Comments: View along top of east dredge spoil mound. Rill erosion due to a lack of vegetation is visible along the surface of the mound.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Client: Kimley-Horn and Associates, Inc. Project Number: FL2851

Subject Site: Baker Park
50 Riverside Circle, Naples, FL

Photograph 3

Date:

27 July 2016

Direction:

East

Comments: View of office trailer for the Rowing Association of Naples, located on the northeast peninsula.

Photograph 4

Date:

27 July 2016

Direction:

South

Comments: View of temporary palm staging area. At the foreground, low lying saturated areas are visible due to recent rain events.

<table>
<tr><td colspan="2">GEOSYNTEC CONSULTANTS
Photographic Record</td></tr>
<tr><td colspan="2">Client: Kimley-Horn and Associates, Inc. Project Number: FL2851</td></tr>
<tr><td colspan="2">Subject Site: Baker Park
50 Riverside Circle, Naples, FL</td></tr>
<tr><td>Photograph 5

Date:

27 July 2016

Direction:

East

Comments: View of pavement in the parking area of former Solid Waste Operations building. The pavement appears distressed.</td><td></td></tr>
<tr><td>Photograph 6

Date:

1 September 2016

Direction:

East

Comments: View of SPT drilling activities at SPT-08. In the background is a stockpile of concrete.</td><td></td></tr>
</table>

GEOSYNTEC CONSULTANTS
Photographic Record

Client:	Kimley-Horn and Associates, Inc.	Project Number: FL2851
Subject Site:	Baker Park 50 Riverside Circle, Naples, FL	

Photograph 7	
Date: 30 August 2016	
Direction: East	
Comments: View of SPT drilling activities at SPT-10. The boring was located near the existing parking area of the former Solid Waste Operations building.	
Photograph 8	
Date: 29 August 2016	
Direction: West	
Comments: View of SPT drilling activities at SPT-03. The temporary palm staging area is visible in the background.	

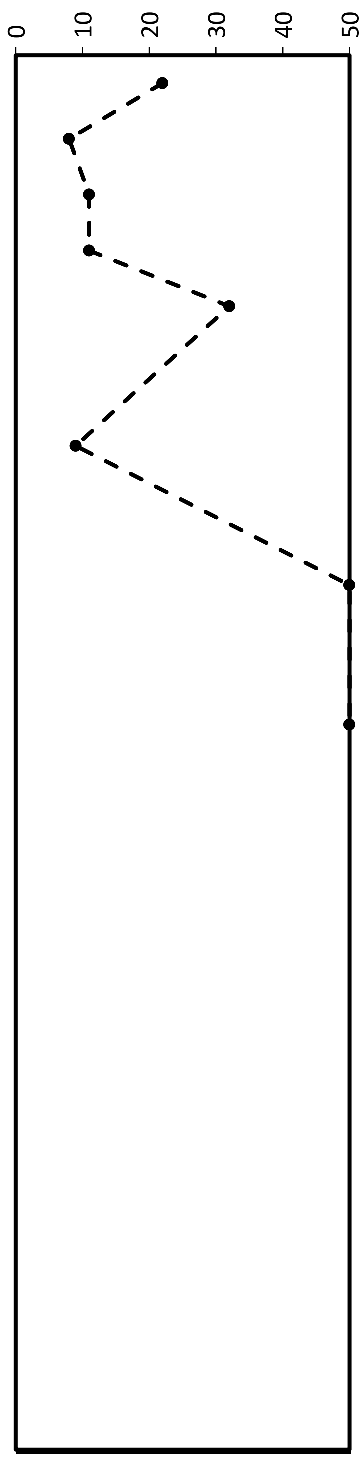
APPENDIX B

SPT BORINGS

SPT BORING LOG: SPT-02

BORING NO.:	**SPT-02**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**25 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14771633**	EASTING:	**-81.78796931**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		20	4	6	16	5	22	SP	Poorly graded sand (SP). Dark brown to gray, fine sand, medium dense with few organics and fine gravel.
		18	3	3	5	7	8	SP-SM	From 2 - 2.5 ft: Silt (ML), yellowish brown, loose, dry. From 2.5 - 4 ft: Poorly graded sand (SP) and debris (mulch and wood). Dark brown. Moist and medium dense.
5		6	8	5	6	6	11	SP-SM	Same as above from 2.5-4 ft but wet.
		16	3	4	7	10	11		Debris (wood and plastic) with clayey fine sand, wet.
		16	28	18	14	16	32		Same as above.
10									Remainder of borehole advanced with drilling mud.
		18	4	5	4	7	9		Debris (wood and mulch), dark brown, some lenses of clayey sand, stiff, wet.
15									
		---	12	50/5			50		Weathered limestone, pale gray, hard, silty.
20									
		---	50/0				50		No recovery.
25									Boring terminated at 25 ft bgs.
30									
35									
40									
45									
50									

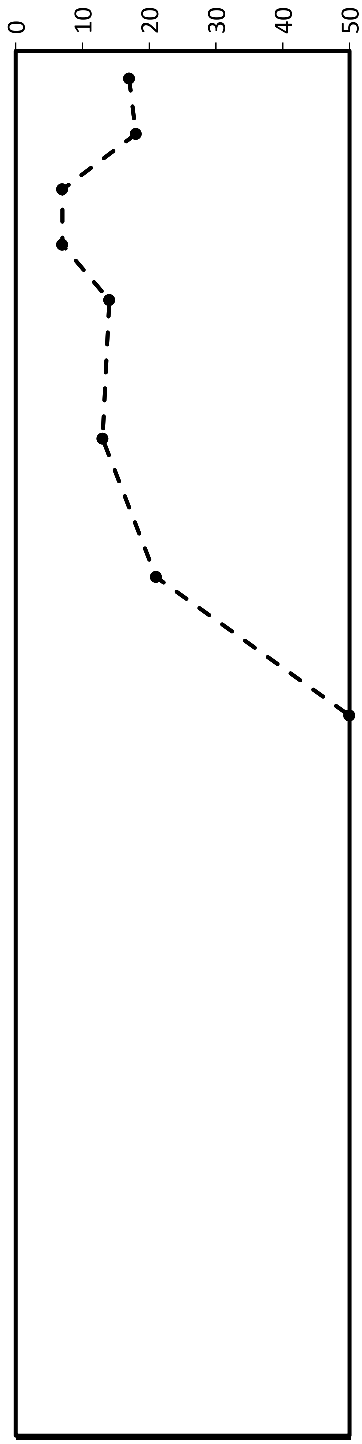
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/30/2016	PAGE:	**1 of 1**

SPT BORING LOG: SPT-03

BORING NO.:	**SPT-03**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**25 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14778226**	EASTING:	**-81.78783805**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		20	4	8	9	15	17	SP	Poorly graded sand (SP), dark brown, few organics, trace lenses of clayey sand, medium dense.
		16	16	10	8	6	18	ML	Silt (ML), yellowish brown, dry, very stiff, trace organics.
5		12	6	4	3	6	7		Debris (mulch) with clayey fine sand, dark brown.
		6	11	4	3	3	7	SC	Clayey sand (SC), dark grayish brown, fine sand, loose, wet, few organics.
		18	6	5	9	5	14	SC	Clayey sand (SC) and debris (wood).
10									Remainder of borehole advanced with drilling mud.
		18	7	6	7	9	13	SC	Clayey sand (SC), dark gray, trace debris (mulch), medium dense.
15									
		16	8	5	16	16	21		Weathered limestone, pale gray, very stiff, sandy, wet.
20									
		4	18	50/4			50	CL-ML	Silt and clay (ML-CL) with sand, olive gray, some organics, very hard.
25									Boring terminated at 25 ft BLS
30									
35									
40									
45									
50									

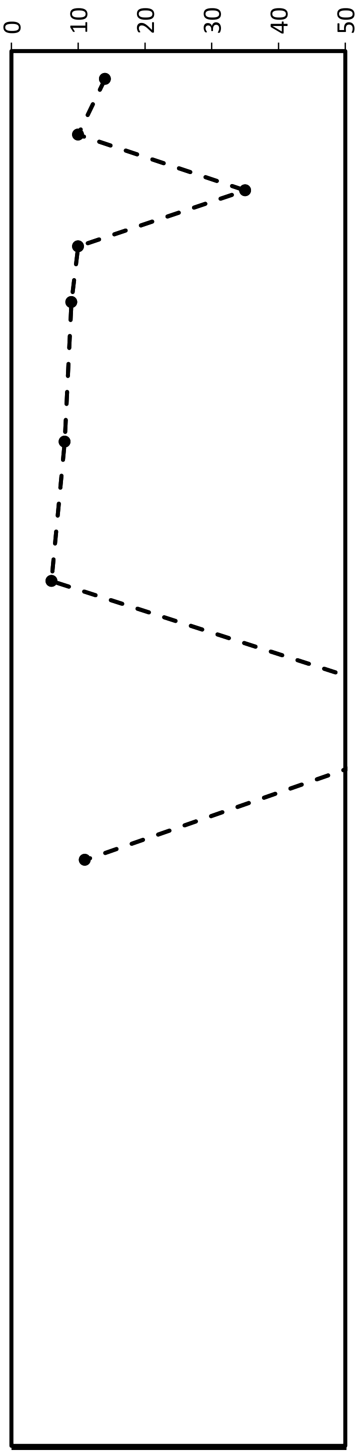
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/30/2016	PAGE:	**1 of 1**

SPT BORING LOG: SPT-04

BORING NO.:	**SPT-04**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/29/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**30 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14770985**	EASTING:	**-81.78767496**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		18	5	11	3	16	14	SP-SC	From 0 - 1.8 ft: Poorly graded sand with clay (SP-SC), brown, few organics, medium dense, moist.
		16	10	6	4	9	10	ML	From 1.8 - 4 ft: Silt (ML), olive gray, dry, stiff.
5		18	17	18	17	10	35	ML	From 4 - 6.5 ft: Same as above with few lenses of organics, dense.
		20	6	5	5	6	10	SP-SC	From 6.5 - 8 ft: Poor graded sand with clay (SP-SC), dark brown, fine sand, few debris (mulch and plastic) and lenses of organics, loose.
		16	5	5	4	4	9		Same as above.
10									Remainder of borehole advanced with drilling mud.
		8	3	6	2	2	8		Debris (mulch, synthetic materials) with clayey sand, dark brown to black, moist.
15									
		20	6	3	3	9	6		Weathered limestone, sandy, pale light prown, trace organics, firm.
20									
		6	5	21	50/2		71		Same as above.
25									
		4	16	8	3	3	11		Weathered limestone, fine gravel, gray, stiff.
30									Boring terminated at 30 ft BLS
35									
40									
45									
50									

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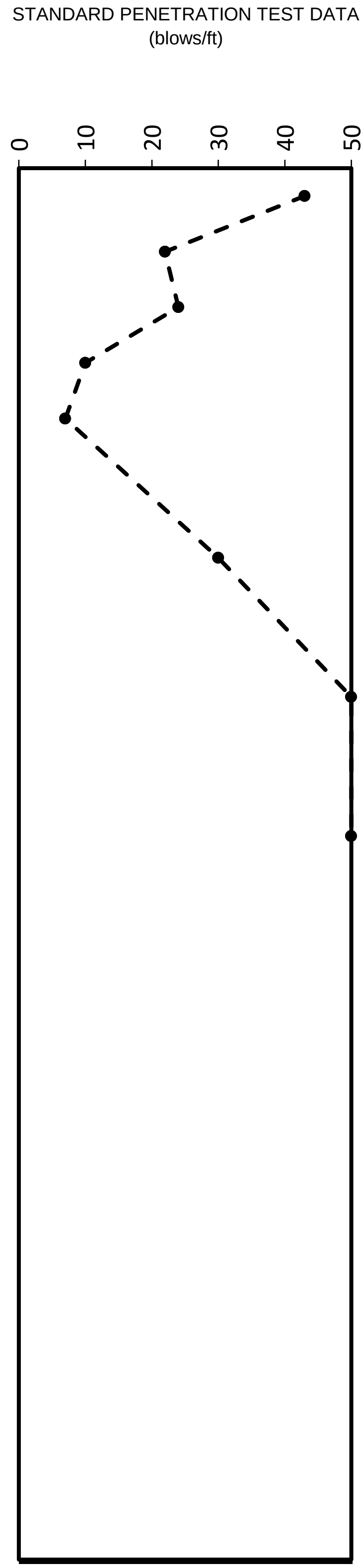
LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/29/2016	PAGE:	**1 of 1**

SPT BORING LOG: SPT-05

BORING NO.:	**SPT-05**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**25 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14881505**	EASTING:	**-81.78663562**
LOGGER:	**A. Rivera**	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		24	10	24	19	23	43	SP-SC	From 0 - 0.25 ft: Poorly graded sand (SP), fine sand, gray, moist, dense. From 0.25 - 1.75 ft: Clayey sand (SC), yellowish brown, dense.
		22	10	6	16	15	22	SP	Poorly graded sand (SP), dark gray, fine sand, medium dense, trace fine gravel, trace lenses of silts.
5		22	13	11	13	11	24	ML	Silt (ML), light gray, fine sand, wet, very stiff.
		28	7	7	3	4	10	ML	Same as above with lenses of very dark brown, moist, stiff.
		18	3	4	3	3	7	SC	Clayey sand (SC), light gray, fine sand, wet, loose.
10									Remainder of borehole advanced with drilling mud.
		18	3	10	20	20	30	SC	Same as above, some organics, trace fine gravel.
15									
		4	50/ 2				50		Weathered limestone, gray, very hard. Heavy rig chatter during advance.
20									
		2	50/ 1				50		Same as above.
25									Boring terminated at 25 ft bgs.
30									
35									
40									
45									
50									



Geosyntec consultants

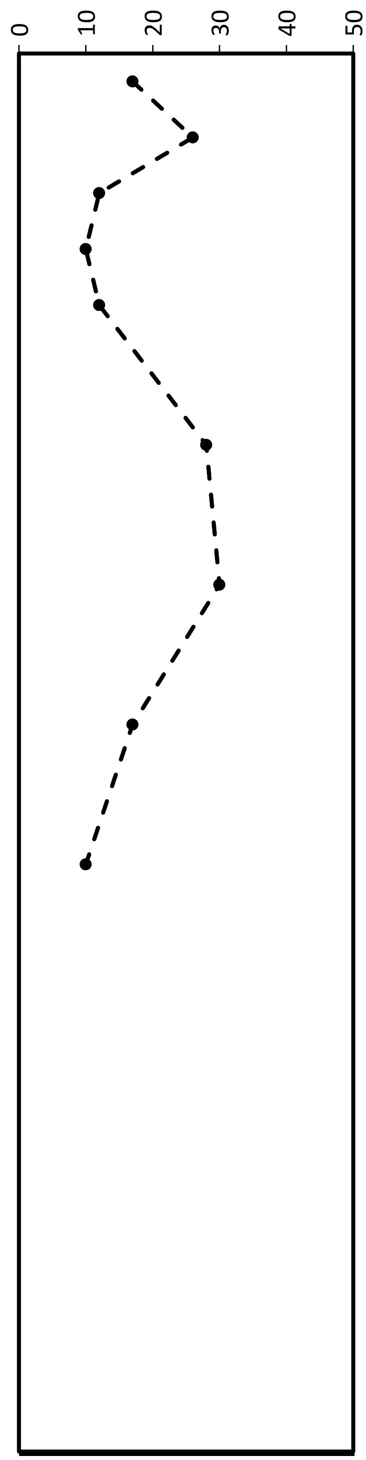
LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/30/2016	PAGE:	**1 of 1**

SPT BORING LOG: SPT-06

BORING NO.:	**SPT-06**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**30 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14899617**	EASTING:	**-81.78680159**
LOGGER:	**A. Rivera**	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USCS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		20	11	9	8	9	17	SP-SC	From 0 - 1.8 ft: Poorly graded sand (SP), dark brown, fine sand, trace fine gravel, medium dense. From 1.8 - 2 ft: Clayey sand (SC), pale yellow, dry, medium dense.
		20	7	13	13	9	26	ML	Silt (ML), dark olive gray, fine sand. few lenses of pale yellow silts, very stiff.
5		16	10	5	7	5	12	ML	Same as above, stiff. At 5.5 ft: Few lenses of fine sand.
		8	5	3	7	5	10	SP	Poorly graded sand (SP), very dark brown, few clays, trace organics, moist, loose.
		4	10	5	7	8	12	SP	Same as above with few debris (mulch).
10									Remainder of borehole advanced with drilling mud.
		9	4	16	12	1	28		Debris (mulch and plastic), very dark brown, shelley.
15									
		10	17	21	9	9	30		Debris (timber), trace fine shell fragments and gravel.
20									
		20	6	8	9	11	17	SP	Poorly graded sand (SP), light gray, fine sand, wet, medium dense.
25									
		---	9	6	4	2	10		Weathered limestone, pale gray, wet, stiff.
30									Boring terminated at 30 ft bgs.
35									
40									
45									
50									

STANDARD PENETRATION TEST DATA (blows/ft)



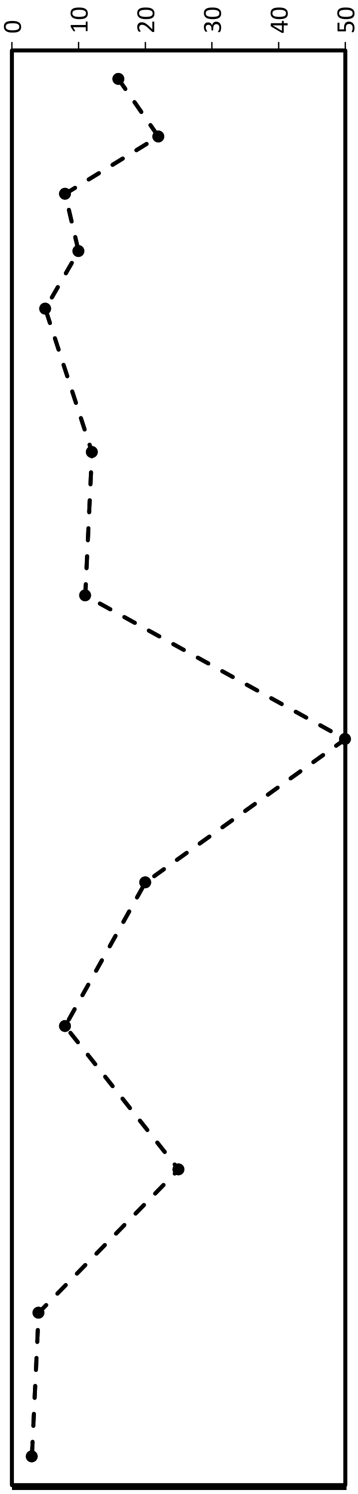
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/30/2016	PAGE:	**1 of 1**

SPT BORING LOG: SPT-07

BORING NO.:	SPT-07	PROJECT NO.:	FL2851
SITE:	Baker Park	DATE:	09/01/16
METHOD:	SPT / Mud Rotary	BIT DIA.:	2 in
TOTAL DEPTH:	60 ft bls	GROUND EL.:	N/A
DRILLING CO.:	Amdrill	G.W. DEPTH:	N/A
NORTHING:	26.14879413	EASTING:	-81.78847093
LOGGER:	A. Rivera	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		16	8	7	9	9	16	SP	Poorly graded sand (SP) and limerock (fill), pale brown, fine gravel, fine sand, medium dense.
		18	8	11	11	10	22	SP	From 2 - 3 ft: Same as above. From 3 - 4 ft: Poorly graded sand (SP), dark gray, fine sand, some debris (mulch and wood), medium dense.
5		12	7	4	4	4	8		Debris (mulch, trace plastic), very dark brown.
		8	2	6	4	3	10		Same as above.
		8	3	2	3	3	5		Same as above to 9.8 ft. From 9.8 - 13 ft: Silt (ML), olive green, moist.
10								ML	Remainder of borehole advanced with drilling mud.
		18	10	7	5	6	12	SC	From 13 - 14 ft: Clayey sand (SC), dark grayish brown, medium dense.
15								Pt	From 14 - 18 ft: Peat, very dark brown, with debris (mulch).
20		16	6	5	6	10	11	SC	From 18 - 19 ft: Clayey sand (SC), dark drayish brown, fine sand, medium dense. From 19-23 ft: Same as above, with limestone gravel and shell fragments.
25		1	50/0				50		Weathered limestone, pale brown, very hard. Heavy rig chatter during advance.
30		14	16	11	9	10	20		Same as above, light gray, very stiff.
35		10	12	5	3	3	8		Same as above, silty, firm.
40		12	21	17	8	11	25		Weathered limestone, light gray, very stiff.
45		10	1	2	2	2	4	CL	Clay (CL), sandy, lean, pale brown, trace limestone gravel, soft.
50		18	2	1	2	1	3	CL	Same as above.

Geosyntec consultants

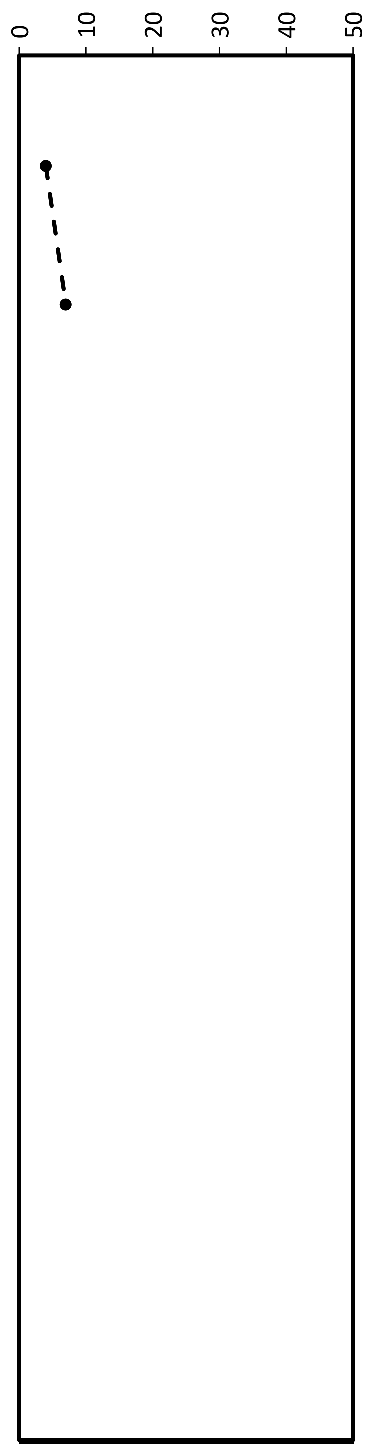
LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	1 of 2

SPT BORING LOG: SPT-07

BORING NO.:	SPT-07	PROJECT NO.:	FL2851
SITE:	Baker Park	DATE:	09/01/16
METHOD:	SPT / Mud Rotary	BIT DIA.:	2 in
TOTAL DEPTH:	60 ft bls	GROUND EL.:	N/A
DRILLING CO.:	Amdrill	G.W. DEPTH:	N/A
NORTHING:	26.14879413	EASTING:	-81.78847093
LOGGER:	A. Rivera	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
55		18	3	1	3	6	4		Weathered limestone, pale brown, wet, fine gravel, soft.
60		16	11	3	4	4	7		Same as above, firm.
									Boring terminated at 60 ft bgs.
65									
70									
75									
80									
85									
90									
95									
50									

STANDARD PENETRATION TEST DATA (blows/ft)



Geosyntec consultants

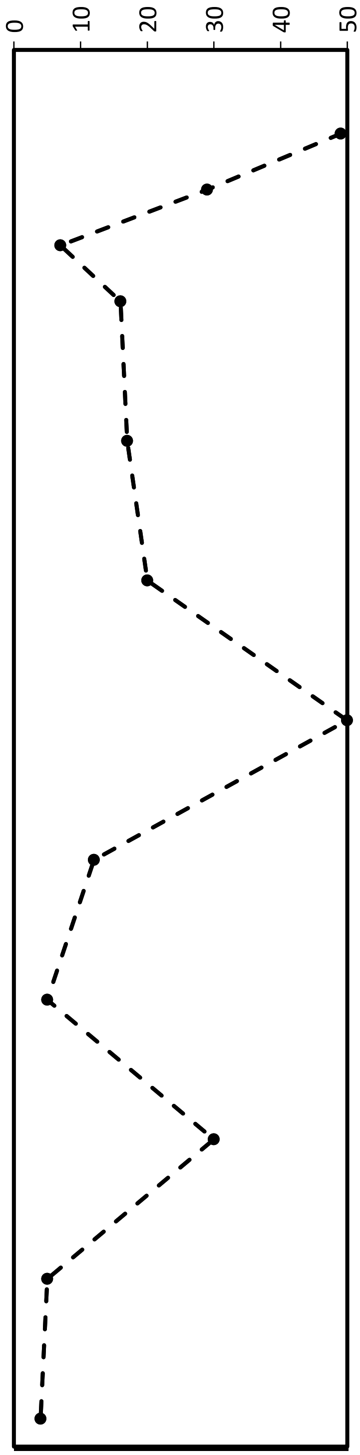
LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	**2 of 2**

SPT BORING LOG: SPT-08

BORING NO.:	**SPT-08**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**09/01/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**65 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14895876**	EASTING:	**-81.78849119**
LOGGER:	**A. Rivera**	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		18	40	47	39	27	86	SP	Poorly graded sand and limerock (fill), light brown, fine to medium sand, fine gravel, very dense.
		14	21	20	29	12	49	SP-SC	Poorly graded sand with clay (SP-SC), fine, light gray, some fine gravel, dense.
5		---	16	20	9	6	29		No recovery.
		12	6	4	3	2	7		Debris (mulch), very dark brown, wet.
		12	2	5	11	16	16	ML	Sandy silt (ML), olive gray, medium dense, wet.
10									Remainder of borehole advanced with drilling mud.
		16	8	9	8	6	17	ML	Same as above, with lenses of peat, dark gray, few fine gravel, trace debris (wood), medium dense.
15									
		---	10	8	12	14	20	SC	Same as above. From 19 - 23 ft: Clayey sand with fine shell and limestone fragments.
20									
		---	50/0				50		No recovery. Heavy rig chatter during advance.
25									
		10	7	6	6	6	12		Limestone, silty, light gray, wet, fine gravel, stiff.
30									
		14	5	3	2	2	5		Same as above, light brown.
35									
		16	14	15	15	12	30		Same as above, light gray.
40									
		24	2	2	3	3	5	CL	Clay (CL), lean, light brown, wet, firm.
45									
		6	3	2	2	2	4	CL	Same as above, few limestone fragments.
50									

STANDARD PENETRATION TEST DATA (blows/ft)



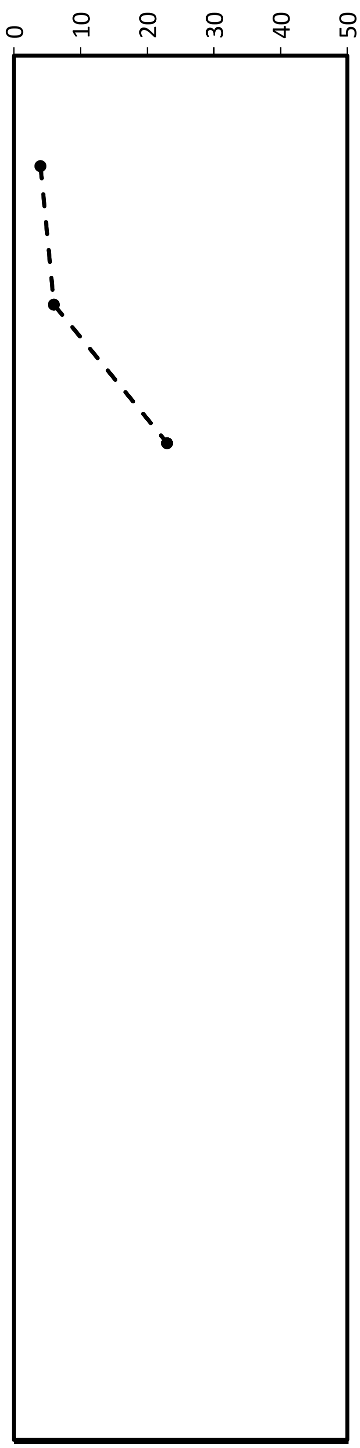
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	8/30/2016	PAGE:	**1 of 2**

SPT BORING LOG: SPT-08

BORING NO.:	**SPT-08**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**09/01/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**65 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14895876**	EASTING:	**-81.78849119**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
55		¦	3	2	2	5	4		Weathered limestone, clayey, pale brown, fine gravel, soft.
60		¦	6	4	2	3	6		Same as above, firm.
65		¦	10	11	12	16	23		Limestone, light gray, shelly.
									Boring terminated at 65 ft bgs.
70									
75									
80									
85									
90									
95									
50									

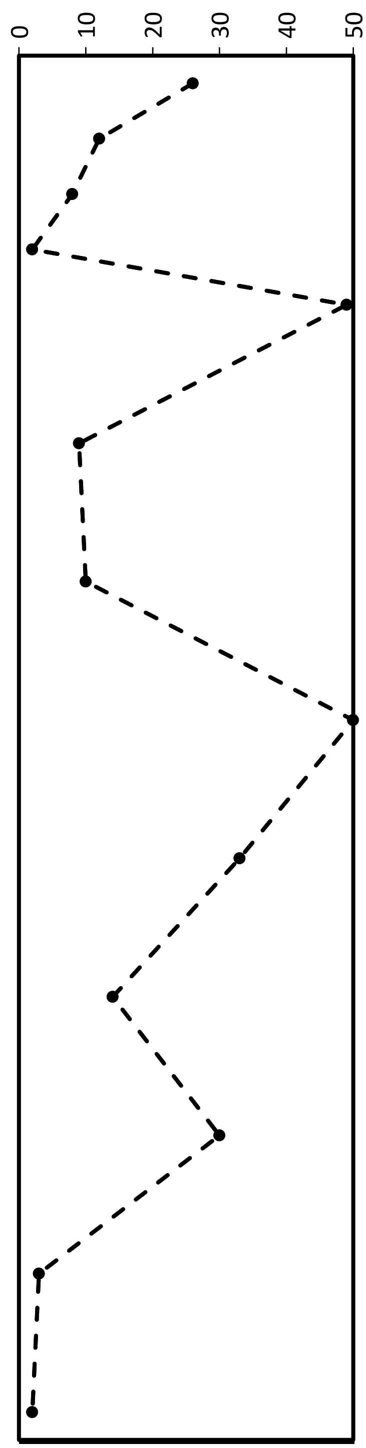
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	**2 of 2**

SPT BORING LOG: SPT-09

BORING NO.:	**SPT-09**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/31/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**69.5 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14892307**	EASTING:	**-81.78862942**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		16	16	13	13	16	26	SP	Poorly graded sand and limerock (fill), light brown, trace ashpalt fragments, fine gravel, medium dense.
		10	11	8	4	6	12	SP-SC	Poorly graded sand with clay (SP-SC), grayish brown, medium dense.
5		6	5	5	3	3	8		Debris (mulch) and organics, very dark brown, wet.
		12	4	1	1	4	2		Same as above with some lenses of peat.
		18	12	21	28	18	49	ML	Sandy silt (ML), yellowish brown, hard, moist.
10									Remainder of borehole advanced with drilling mud.
		16	8	5	4	5	9	Pt	Peat, very dark brown, few lenses of fine sand.
15									
		---	6	5	5	4	10	SC	Poorly graded clayey sand (SC), some fine limestone gravel, loose.
20									
		---	50/0				50		No recovery. Heavy rig chatter during rig advance.
25									
		16	20	16	17	31	33		Weathered limestone, light gray, fine gravel, hard.
30									
		16	12	9	5	4	14		Same as above.
35									
		16	18	16	14	11	30		Same as above.
40									
		20	1	1	2	3	3	CL	Clay, pale brown, wet, trace fine limestone gravel, soft.
45									
50		24	3	1	1	3	2	CL	Same as above.

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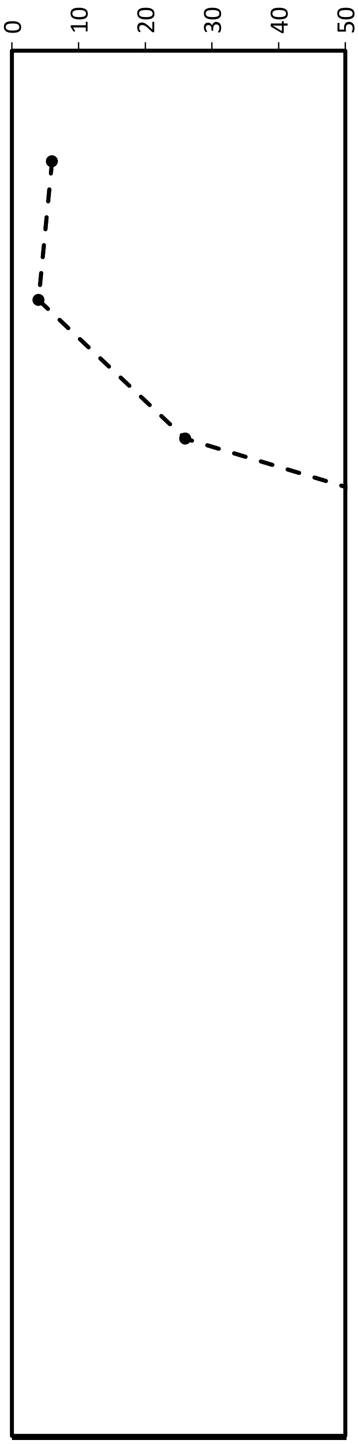
LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	**1 of 2**

SPT BORING LOG: SPT-09

BORING NO.:	SPT-09	PROJECT NO.:	FL2851
SITE:	Baker Park	DATE:	09/01/16
METHOD:	SPT / Mud Rotary	BIT DIA.:	2 in
TOTAL DEPTH:	69.5 ft bls	GROUND EL.:	N/A
DRILLING CO.:	Amdrill	G.W. DEPTH:	N/A
NORTHING:	26.14892307	EASTING:	-81.78862942
LOGGER:	A. Rivera	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
55		24	2	3	3	4	6		Limestone, weathered, clayey, light brown, firm.
60		24	4	2	2	6	4		Weathered limestone, light brown, soft.
65		16	9	12	14	12	26		Limestone, gray, very stiff.
70		16	20	45	50/ 6		95		Same as above, very hard.
									Boring terminated at 69.5 ft bgs.
75									
80									
85									
90									
95									
50									

STANDARD PENETRATION TEST DATA (blows/ft)



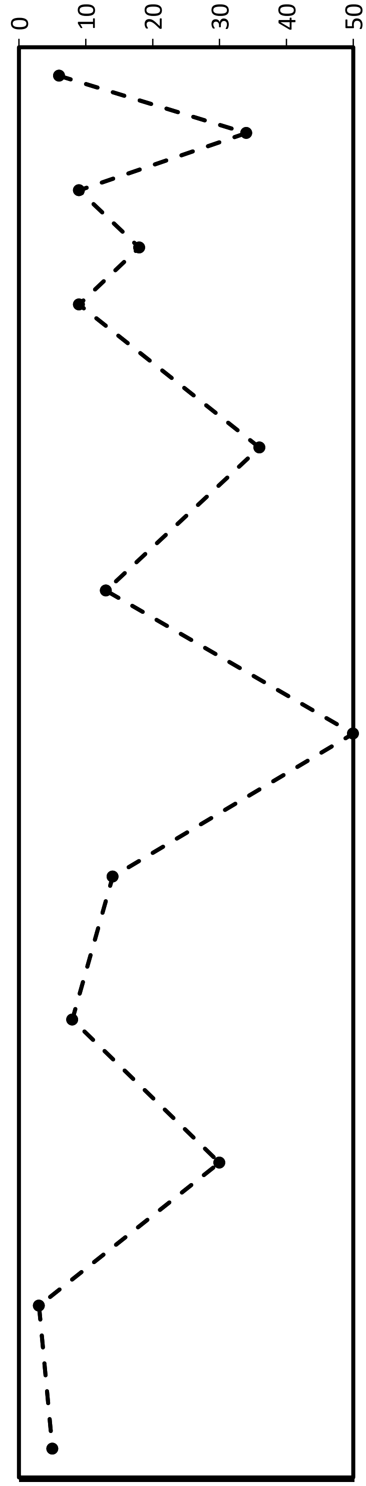
Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	**2 of 2**

SPT BORING LOG: SPT-10

BORING NO.:	**SPT-10**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**75 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14879528**	EASTING:	**-81.78865445**
LOGGER:	**A. Rivera**	REVIEWER:	

STANDARD PENETRATION TEST DATA (blows/ft)



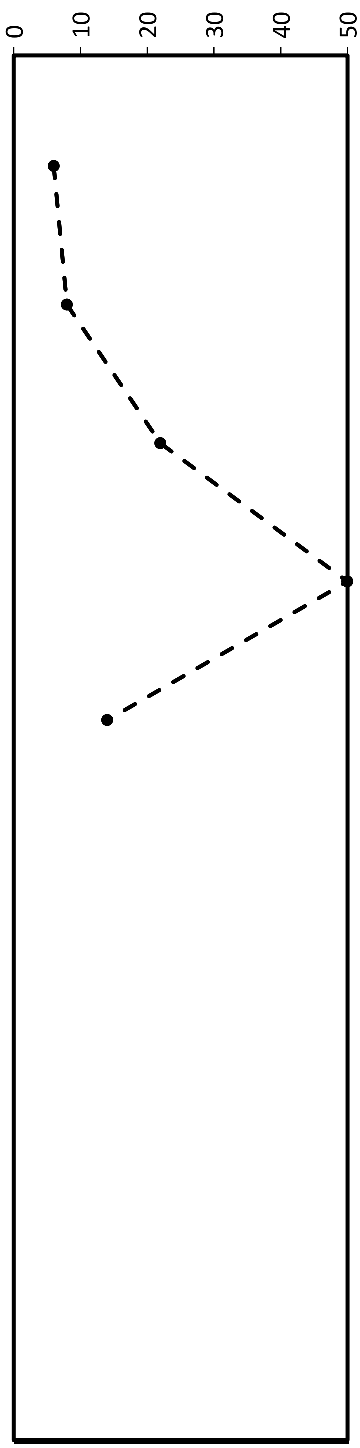
DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
		22	2	2	4	10	6	SP	Poorly graded sand (SP) with silts and organics, dark brown to gray, moist. loose.
		20	17	14	20	25	34	SP	Same as above, some fines.
5		14	3	4	5	5	9	SP-SM	Poorly graded sand with silt (SP-SM), dark gray, fine sand, trace fine gravel, wet, loose.
		10	7	11	7	4	18	SP-SM	Same as above.
		6	4	5	4	3	9		Debris (mulch), very dark brown, wet.
10									Remainder of borehole advanced with drilling mud.
		12	10	17	19	19	36		Same as above.
15									
20		16	6	4	9	27	13	SC	Clayey sand (SC) with debris (mulch, wood, plastics), grayish brown, medium dense, wet. From 19.5 to 23 ft: Gray, fine shell fragments. Moderate rig chatter at 20ft bgs.
		2	50/ 1				50	SP-SC	Poorly graded sand with clay (SP-SC), grayish brown, some limestone fragments.
25									Rig chatter ceases at approximately 28 ft bgs.
30		24	5	8	6	6	14	SP	Poorly graded sand (SP), grayish brown, fine sand, some fine limestone fragments. From 29.5 to 33 ft: Limestone, weathered, fine gravel.
		14	6	5	3	3	8		Weathered limestone, pale brown, silty.
35									3-in diameter steel casing was installed to 20 ft bgs, prior to advancement from 35 ft bgs to termination of borehole.
		16	17	17	13	10	30		Same as above.
40									
		10	3	2	1	2	3	CL	Clay (CL), lean, pale brown, soft, wet.
45									
50		16	2	2	3	3	5		Same as above.

SPT BORING LOG: SPT-10

BORING NO.:	**SPT-10**	PROJECT NO.:	**FL2851**
SITE:	**Baker Park**	DATE:	**08/30/16**
METHOD:	**SPT / Mud Rotary**	BIT DIA.:	**2 in**
TOTAL DEPTH:	**75 ft bls**	GROUND EL.:	**N/A**
DRILLING CO.:	**Amdrill**	G.W. DEPTH:	**N/A**
NORTHING:	**26.14879528**	EASTING:	**-81.78865445**
LOGGER:	**A. Rivera**	REVIEWER:	

DEPTH (FEET)	SHELBY TUBE	RUN / 24"	BLOWS / 6" DEPTH				SPT "N", (BLOWS / FT)	USGS CLASSIFICATION	FIELD DESCRIPTION/COMMENTS
55		22	2	3	3	8	6		Limestone, light brown, fine gravel, wet, firm.
60		18	2	3	5	5	8		Same as above.
65		16	13	11	11	16	22		Weathered limestone, light gray, very stiff.
70		20	27	31	19	50/3	50		Same as above, very hard.
75		18	13	6	8	8	14		Same as above, stiff.
									Boring terminated at 75 ft bgs.
80									
85									
90									
95									
50									

STANDARD PENETRATION TEST DATA (blows/ft)



Geosyntec consultants

LOCATION:	Baker Park, Naples, FL		
PROJECT NO.:	FL2851	PHASE/TASK:	
DATE:	9/1/2016	PAGE:	**2 of 2**

APPENDIX C

LABORATORY TEST REPORTS

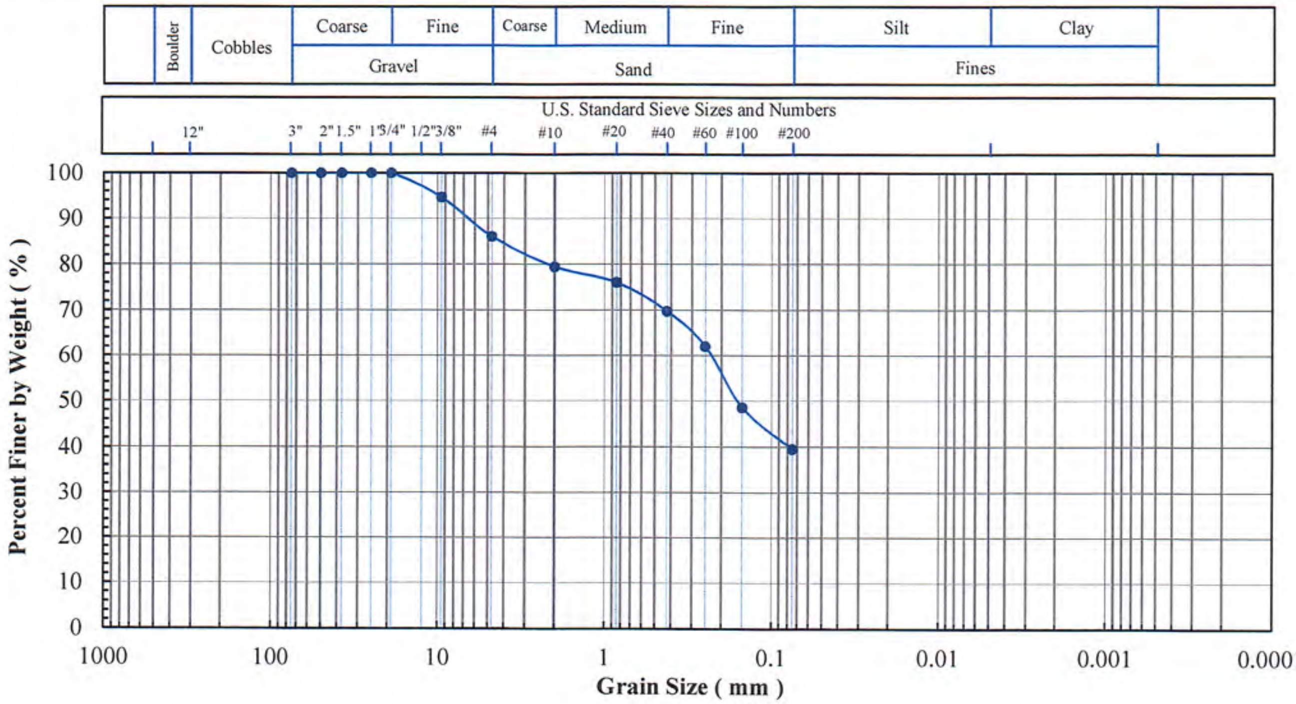
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537 Fax: (770) 910 7538

Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-02 (0-2')
Lab Sample No:	16I011

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



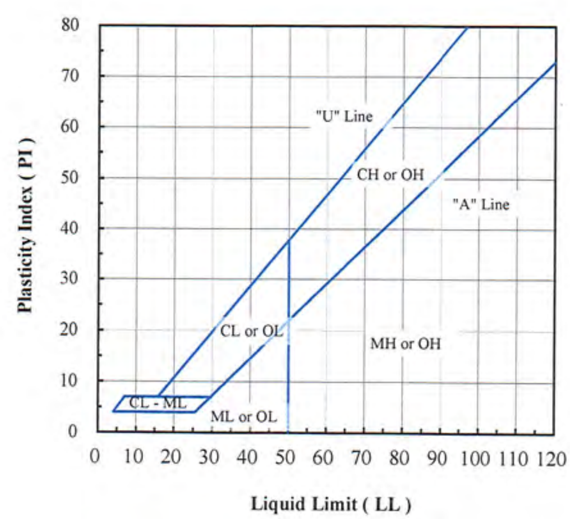
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	94.6
#4	4.75	86.0
#10	2.00	79.4
#20	0.850	76.0
#40	0.425	69.7
#60	0.250	62.0
#100	0.150	48.5
#200	0.075	39.5

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	14.0
Sand (%):	46.5
Fines (%):	39.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-02 (0-2')	16I011	16.8	39.5				

Note(s):

9-15-2016
JW, NSR

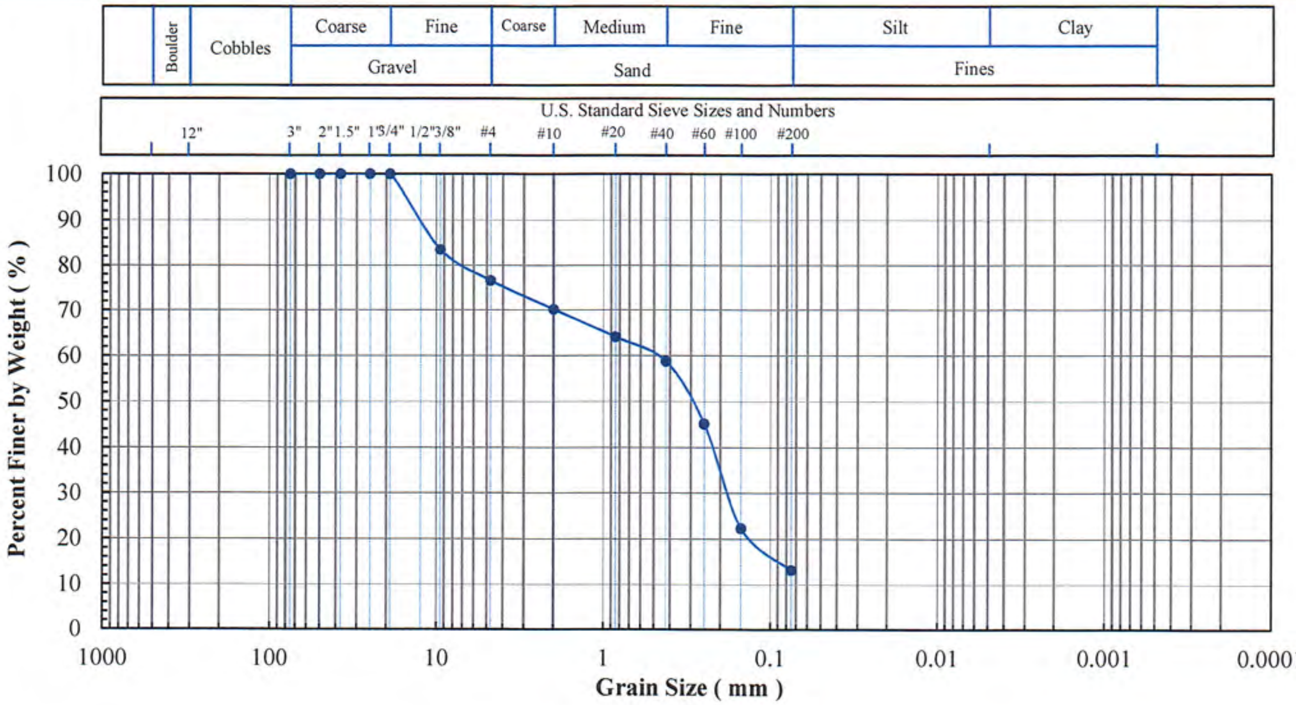
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537 Fax: (770) 910 7538

Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-07 (0-2'), (2-4')
Lab Sample No:	16I012

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



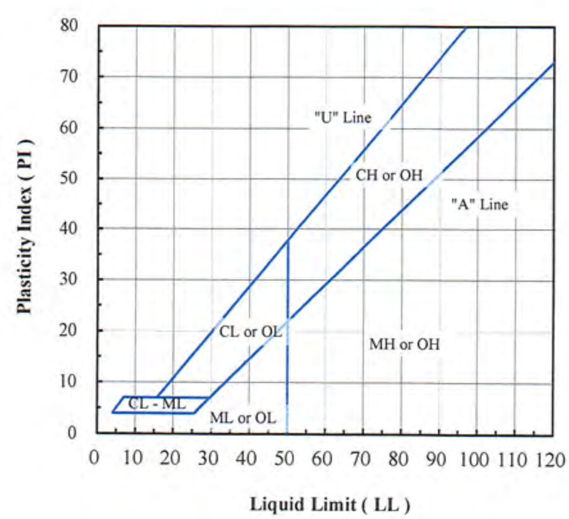
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	83.5
#4	4.75	76.6
#10	2.00	70.1
#20	0.850	64.0
#40	0.425	58.7
#60	0.250	45.1
#100	0.150	22.3
#200	0.075	13.2

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	23.4
Sand (%):	63.4
Fines (%):	13.2
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-07 (0-2'), (2-4')	16I012	13.2	13.2				

Note(s):

9-15-2016
JW, NSR

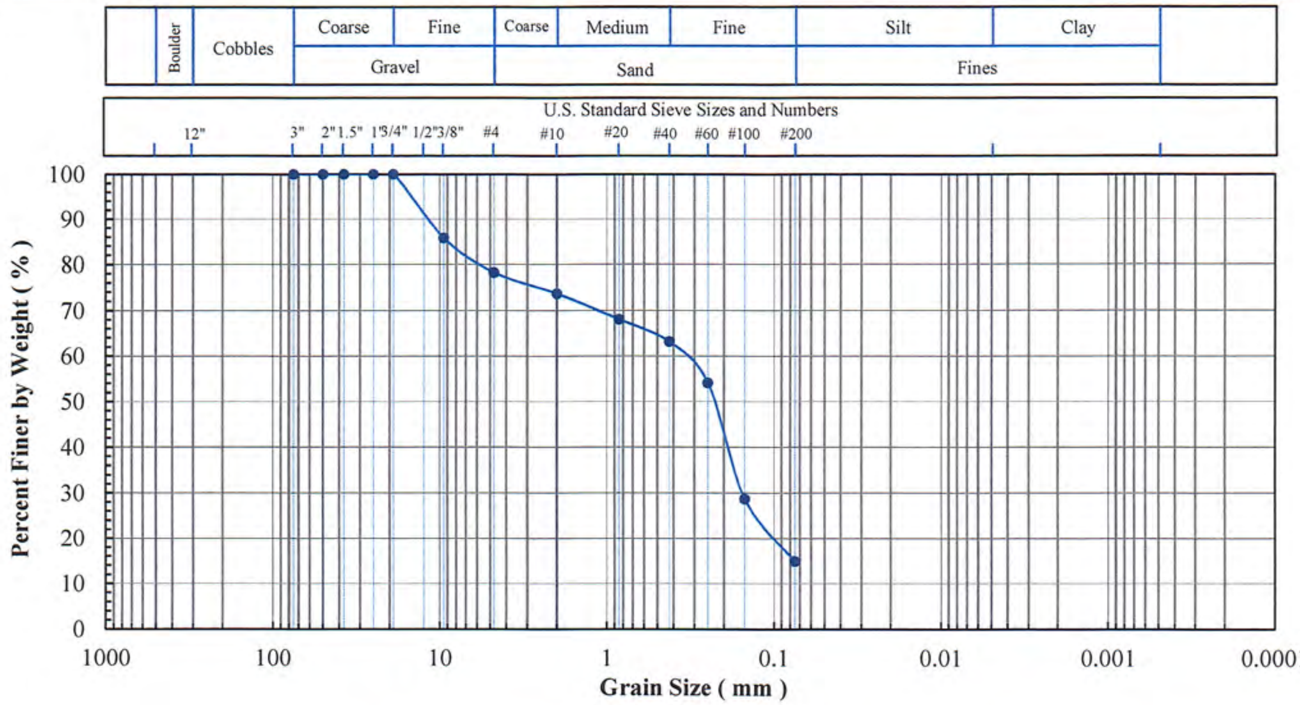
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537 Fax: (770) 910 7538

Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-10 (0-2')
Lab Sample No:	16I013

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



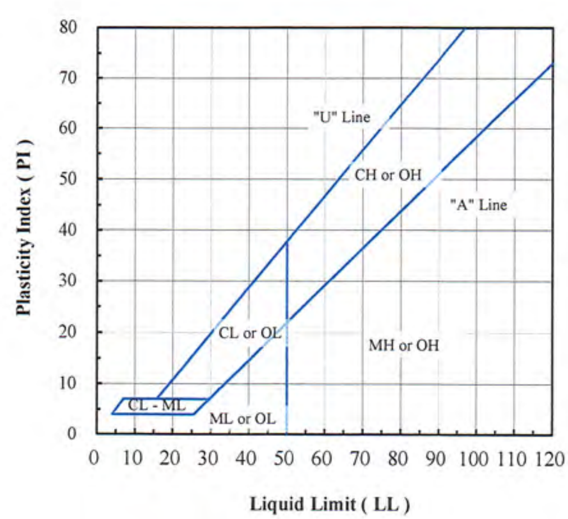
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	85.8
#4	4.75	78.2
#10	2.00	73.6
#20	0.850	68.0
#40	0.425	63.1
#60	0.250	54.1
#100	0.150	28.7
#200	0.075	14.8

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	21.8
Sand (%):	63.4
Fines (%):	14.8
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
SPT-10 (0-2')	16I013	34.2	14.8				

Note(s):

9-15-2016
JW, NSR

Excel Geotechnical Testing, Inc.
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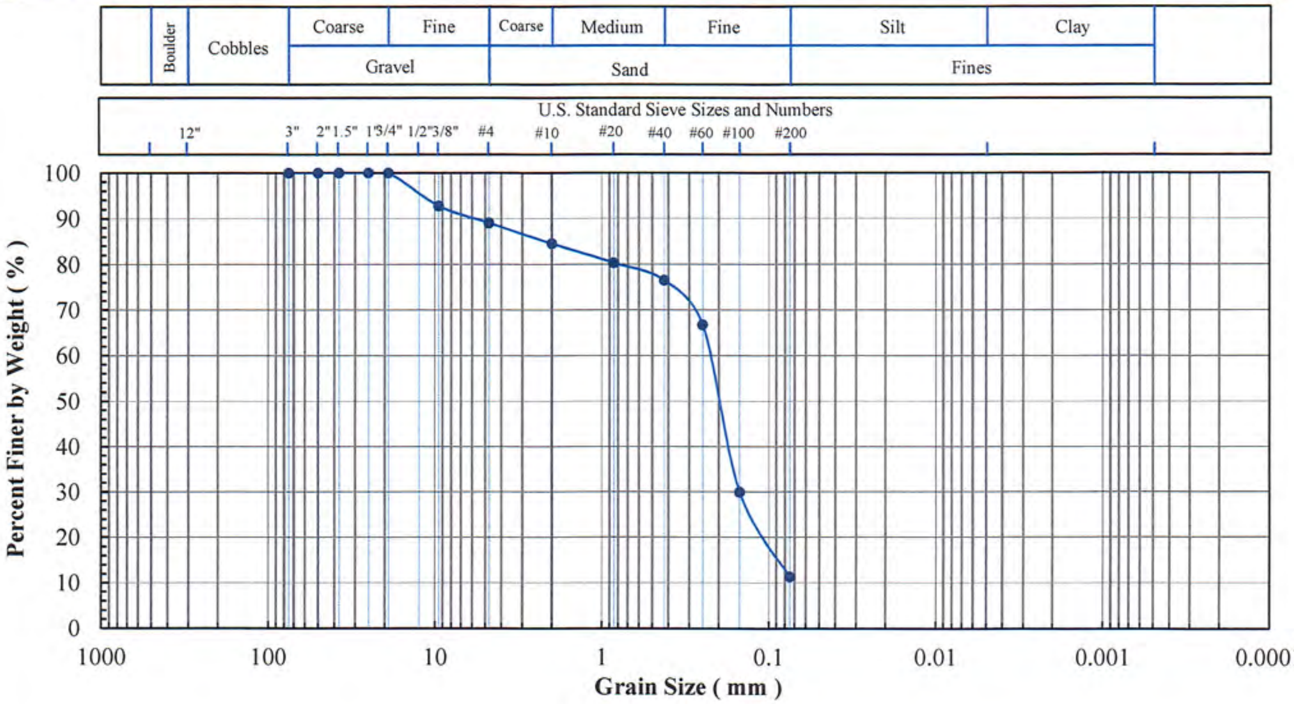
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537 Fax: (770) 910 7538

Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-10 (4-6'), (6-8')
Lab Sample No:	16I014

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



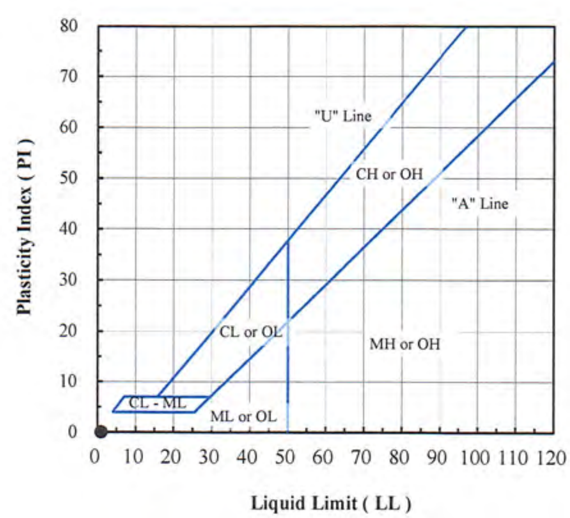
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	92.7
#4	4.75	89.0
#10	2.00	84.5
#20	0.850	80.3
#40	0.425	76.5
#60	0.250	66.7
#100	0.150	29.9
#200	0.075	11.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	11.0
Sand (%):	77.7
Fines (%):	11.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	3.3
Coeff. Curv. (Cc):	1.4



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-10 (4-6'), (6-8')	16I014	18.0	11.3	NP	NP	NP	SP-SM - Poorly graded sand with silt

Note(s):

9-15-2016
JW, NSR

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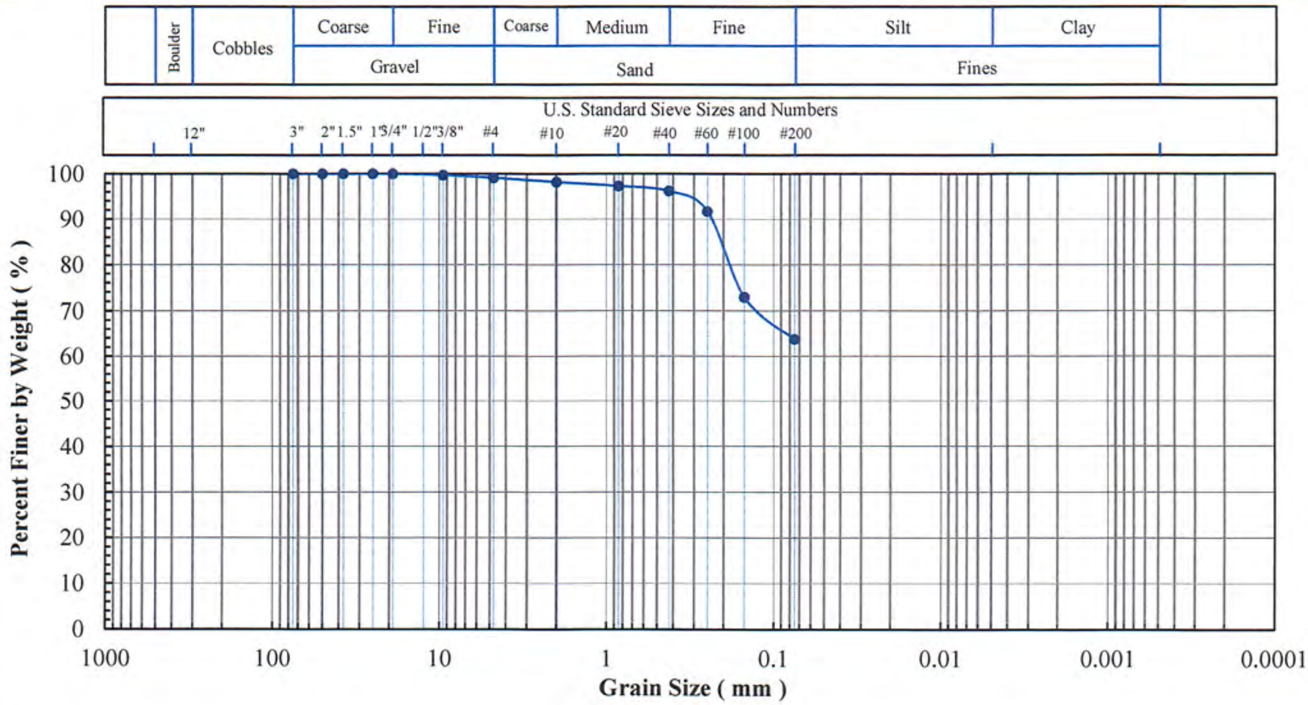
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-08/09 (8-10')
Lab Sample No:	16I015

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



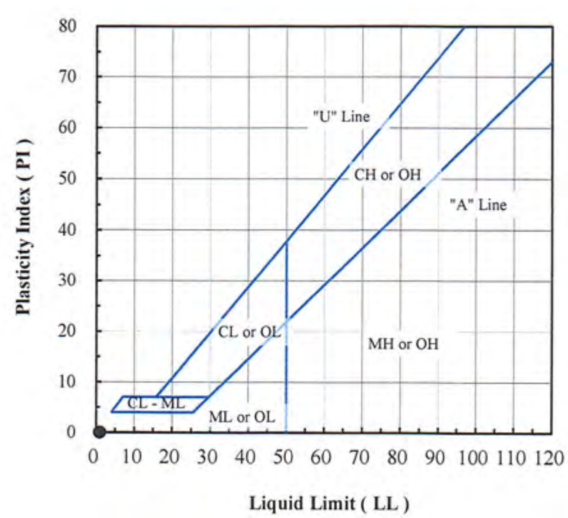
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	99.7
#4	4.75	99.1
#10	2.00	98.2
#20	0.850	97.3
#40	0.425	96.2
#60	0.250	91.7
#100	0.150	72.9
#200	0.075	63.7

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.9
Sand (%):	35.4
Fines (%):	63.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-08/09 (8-10')	16I015	20.2	63.7	NP	NP	NP	ML - Sandy silt

Note(s):

9-15-2016
JW, NSR

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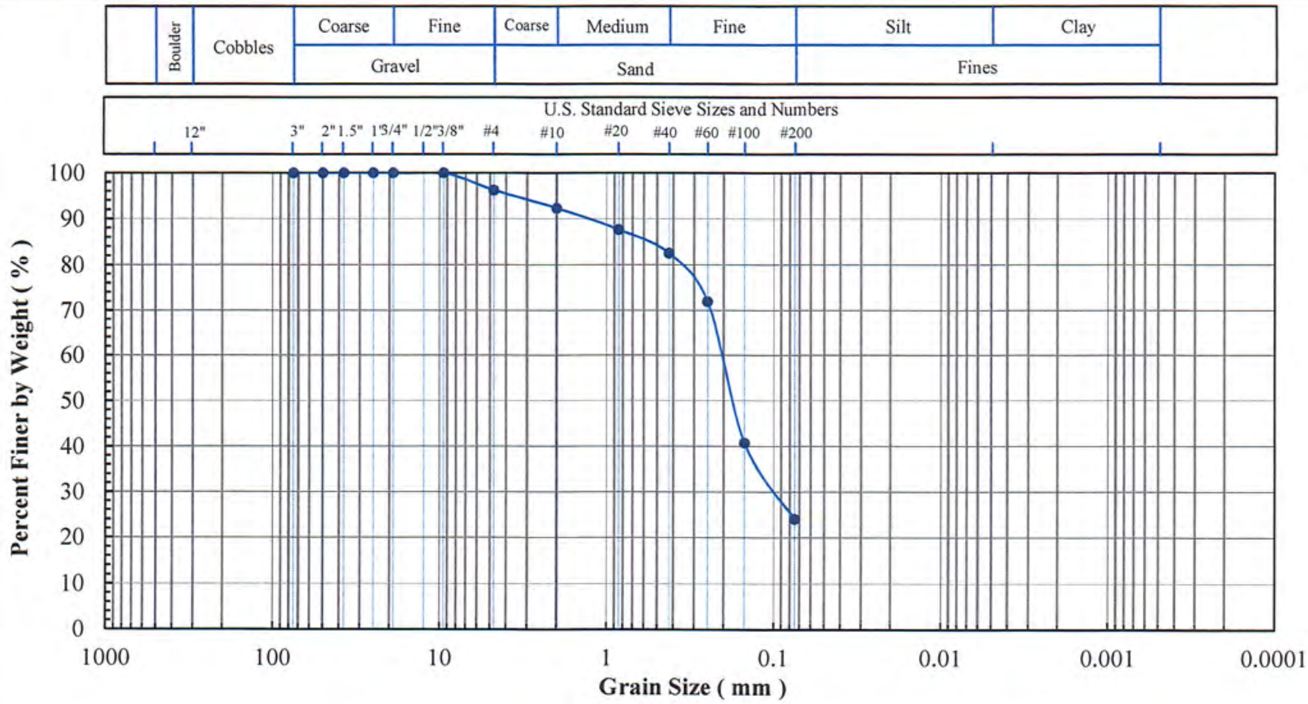
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-02 (6-8'), (8-10'), (13-15')
Lab Sample No:	16I016

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



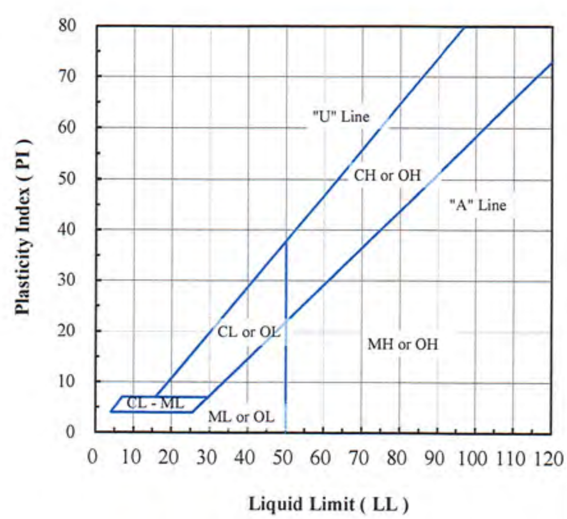
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	96.2
#10	2.00	92.3
#20	0.850	87.6
#40	0.425	82.5
#60	0.250	71.9
#100	0.150	40.7
#200	0.075	24.0

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.8
Sand (%):	72.2
Fines (%):	24.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-02 (6-8'), (8-10'), (13-15')	16I016	72.7	24.0				

Note(s): **Organic Content (ASTM D 2974): 16.1%**

Test material contains organic matters, which may affect Atterberg and sieve analysis, as well as soil classification.

9-15-2016
JW, JSA

Excel Geotechnical Testing, Inc.
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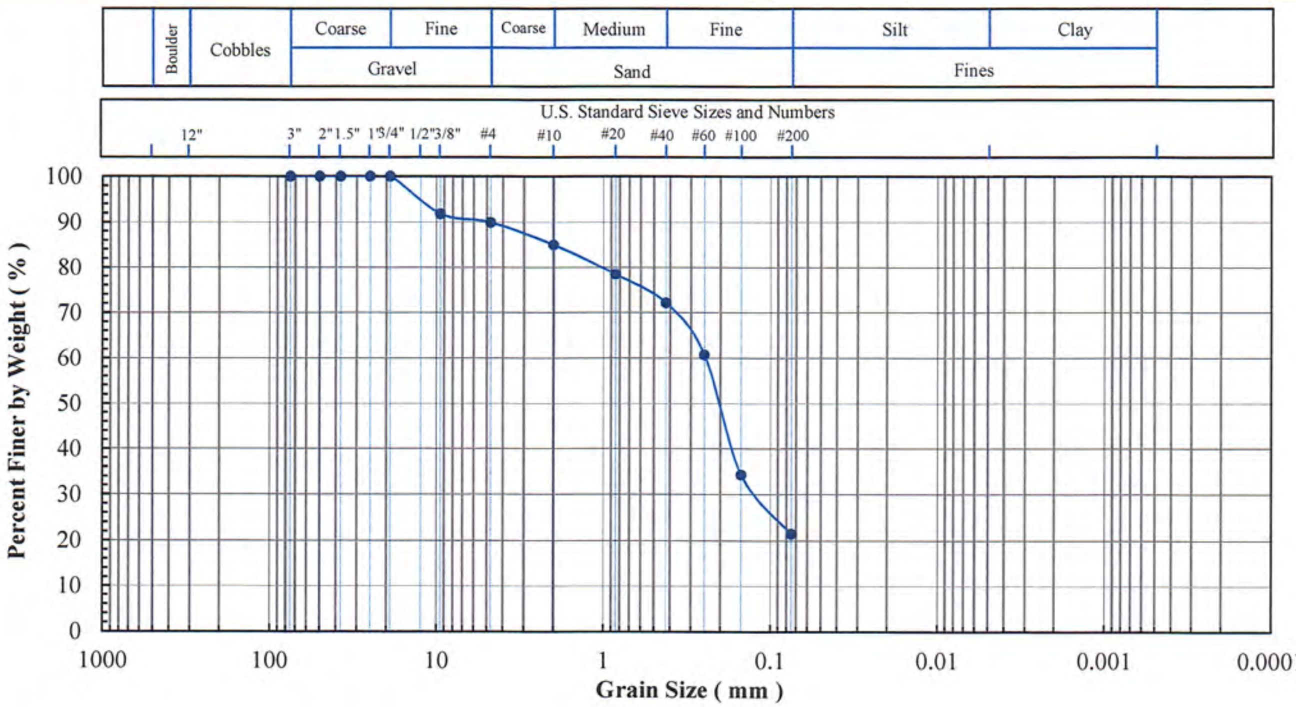
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-07 (4-6'), (6-8')
Lab Sample No:	16I017

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



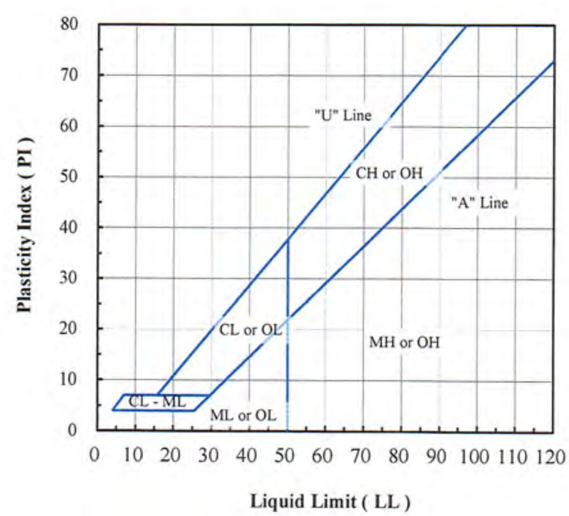
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	91.8
#4	4.75	89.9
#10	2.00	85.0
#20	0.850	78.4
#40	0.425	72.1
#60	0.250	60.7
#100	0.150	34.3
#200	0.075	21.5

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	10.1
Sand (%):	68.4
Fines (%):	21.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-07 (4-6'), (6-8')	16I017	52.0	21.5				

Note(s): **Organic Content (ASTM D 2974): 25.0%**

Test material contains organic matters, which may affect Atterberg and sieve analysis, as well as soil classification.

9-15-2016
JW, NSR

Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-10 (8-10'), (13-15')
Lab Sample No:	16I018

Excel Geotechnical Testing, Inc.
"Excellence in Testing"
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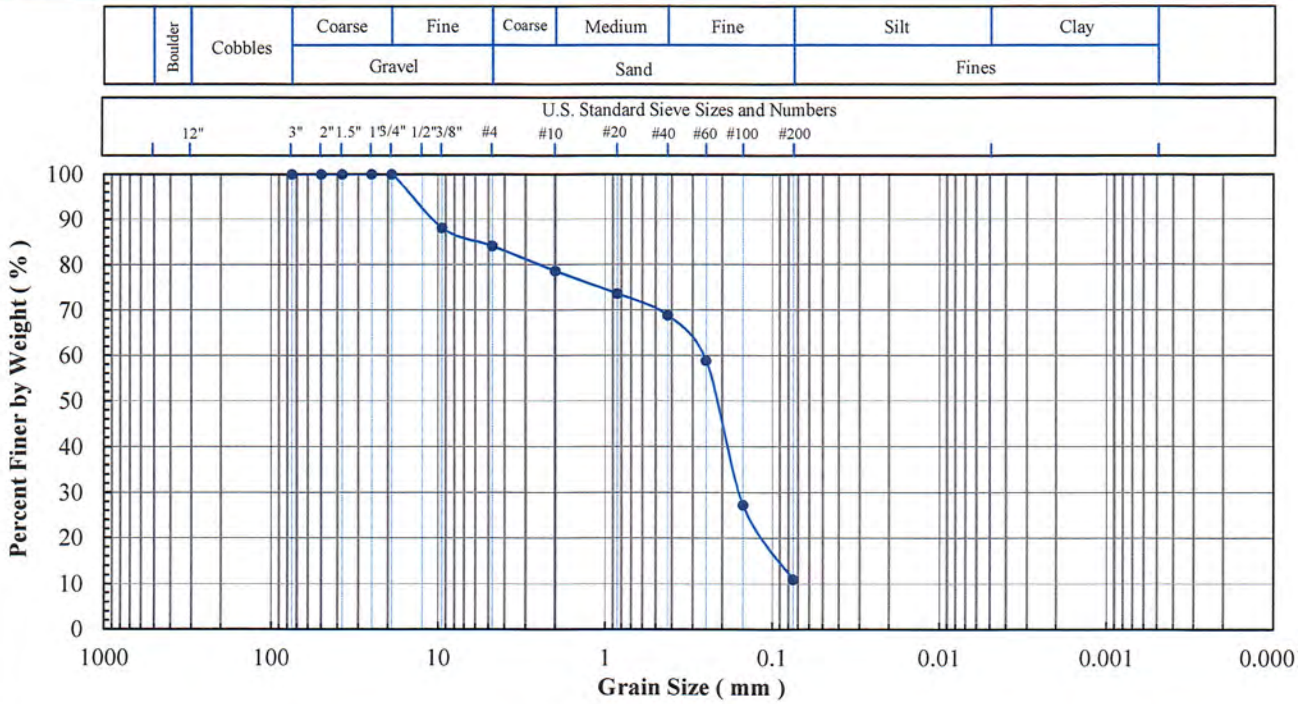
ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



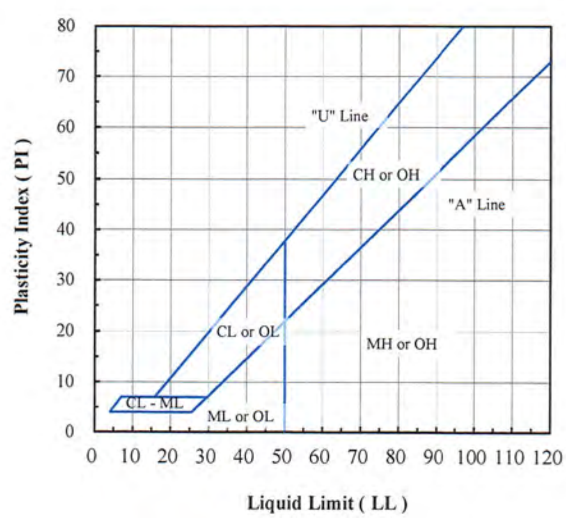
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	88.0
#4	4.75	84.0
#10	2.00	78.6
#20	0.850	73.6
#40	0.425	68.8
#60	0.250	58.8
#100	0.150	27.2
#200	0.075	10.9

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	16.0
Sand (%):	73.1
Fines (%):	10.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-10 (8-10'), (13-15')	16I018	38.5	10.9				

Note(s): **Organic Content (ASTM D 2974): 8.0%**

Test material contains organic matters, which may affect Atterberg and sieve analysis, as well as soil classification.

9-15-2016
JW, NSR

Excel Geotechnical Testing, Inc.

"Excellence in Testing"

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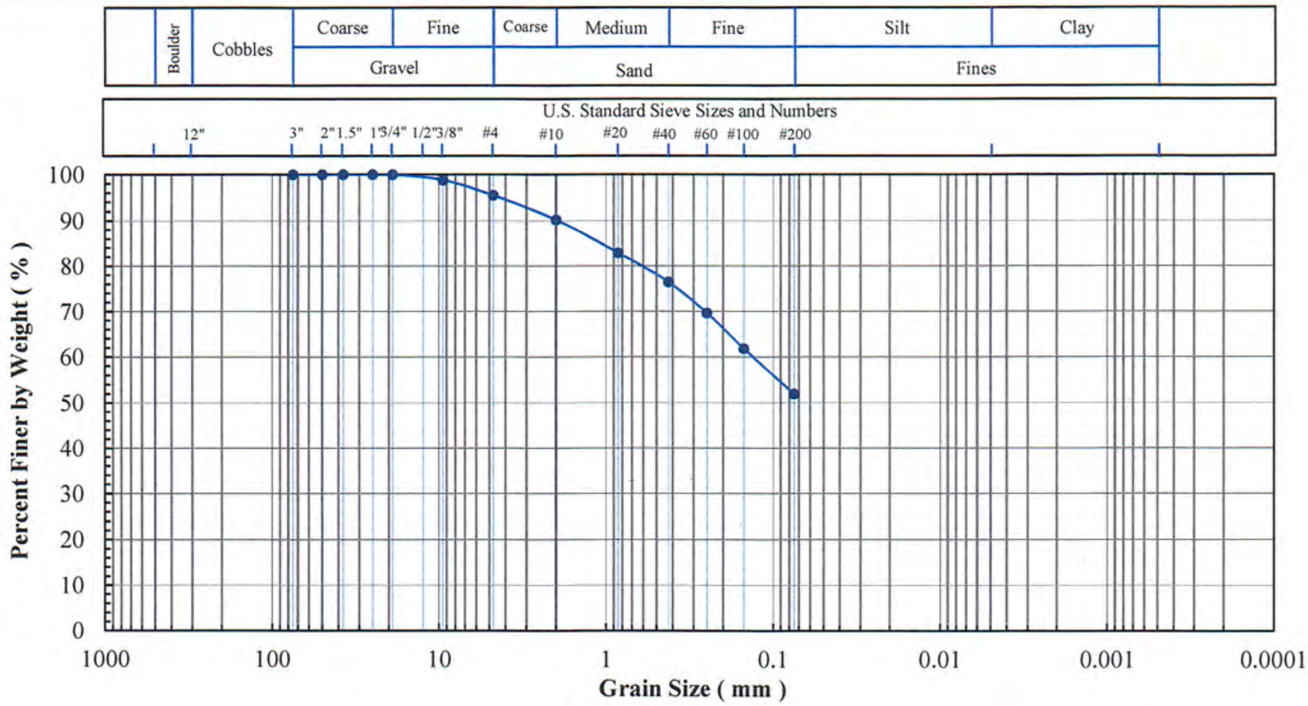
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-07 (43-45'), (48-50')
Lab Sample No:	16I019

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



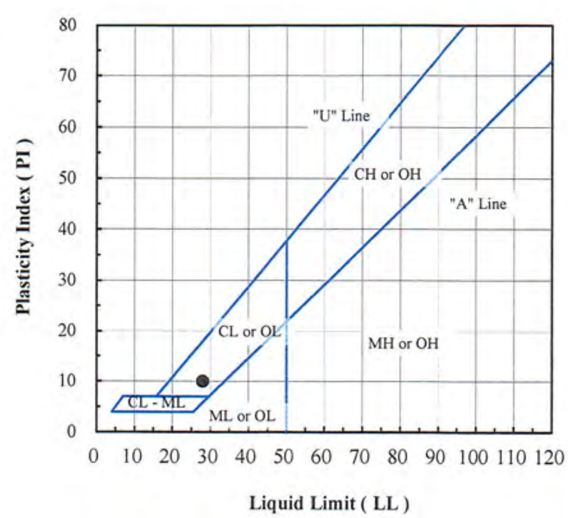
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	98.8
#4	4.75	95.5
#10	2.00	90.2
#20	0.850	82.9
#40	0.425	76.5
#60	0.250	69.6
#100	0.150	61.8
#200	0.075	51.9

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	4.5
Sand (%):	43.6
Fines (%):	51.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-07 (43-45'), (48-50')	16I019	31.5	51.9	28	18	10	CL - Sandy lean clay

Note(s):

9-15-2016
JW, NSR

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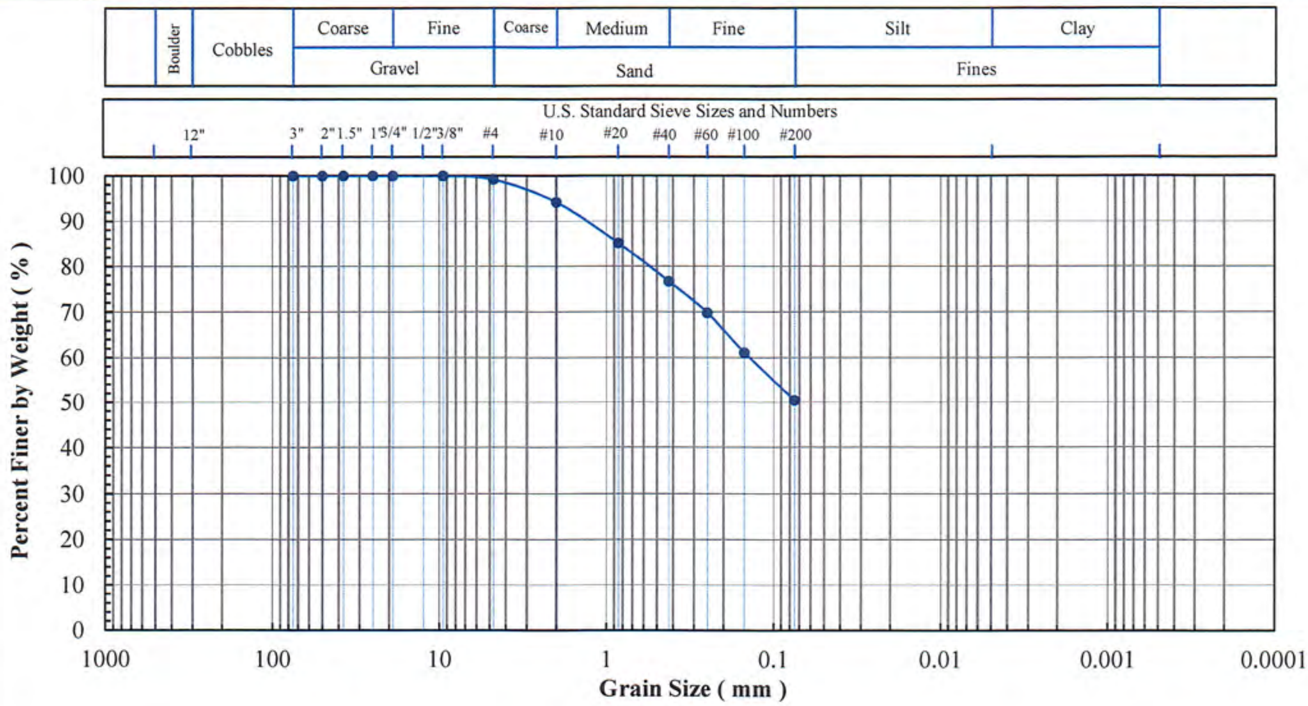
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	SPT-09 (43-45'), (48-50')
Lab Sample No:	16I020

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



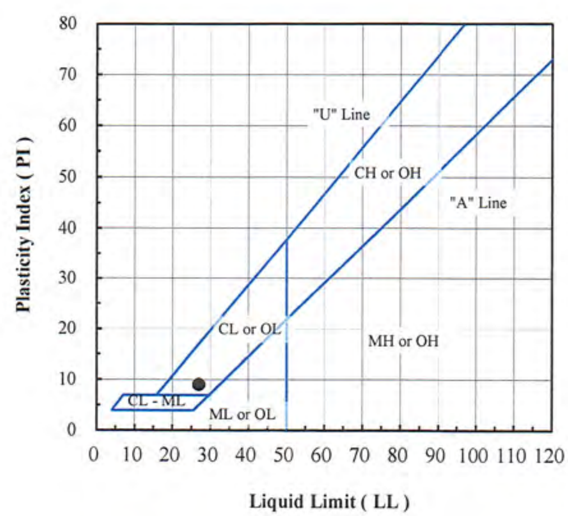
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.2
#10	2.00	94.2
#20	0.850	85.1
#40	0.425	76.7
#60	0.250	69.8
#100	0.150	61.1
#200	0.075	50.4

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.8
Sand (%):	48.8
Fines (%):	50.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
SPT-09 (43-45'), (48-50')	16I020	31.8	50.4	27	18	9	CL - Sandy lean clay

Note(s):

9-15-2016
JW, NSR

Excel Geotechnical Testing, Inc.
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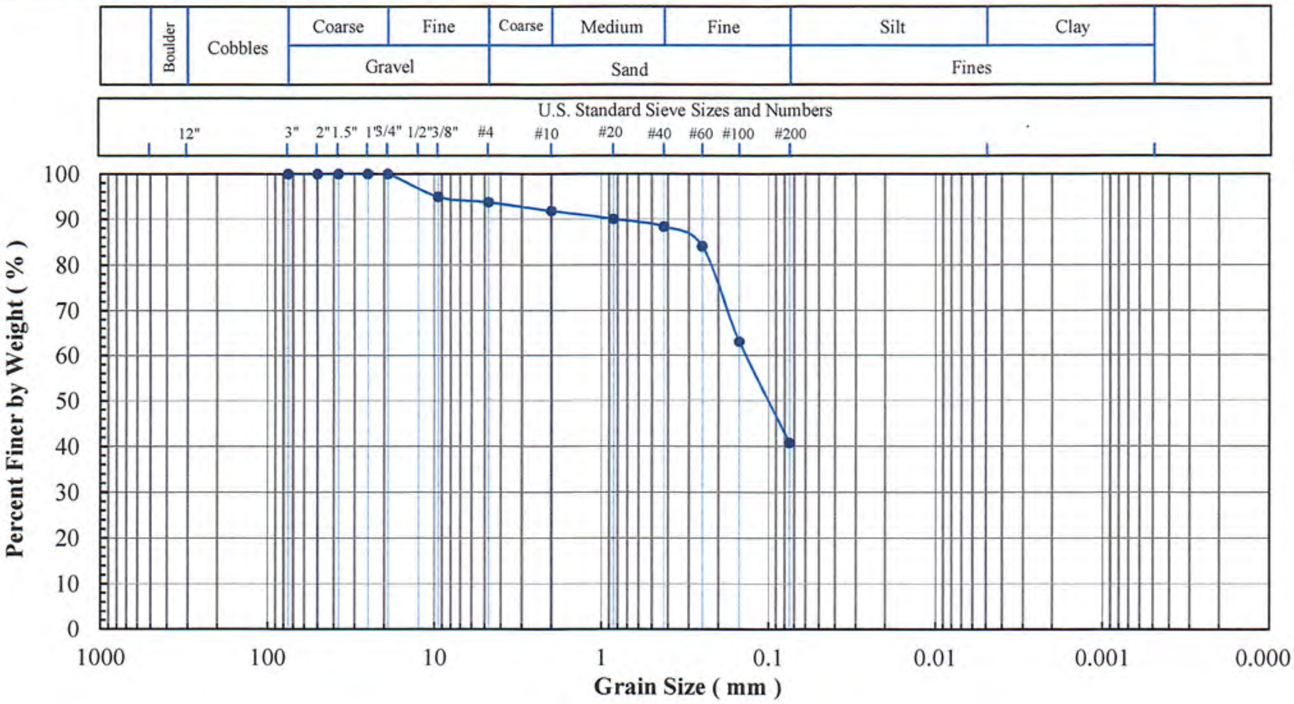
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	HA-01
Lab Sample No:	16I021

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



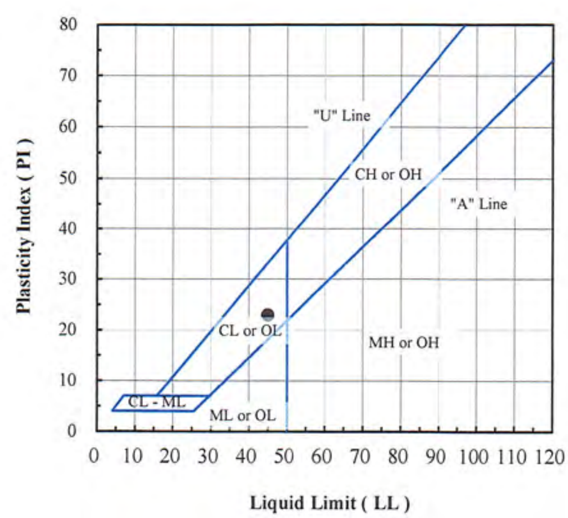
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	94.9
#4	4.75	93.7
#10	2.00	91.8
#20	0.850	90.0
#40	0.425	88.3
#60	0.250	84.0
#100	0.150	63.0
#200	0.075	40.7

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	6.3
Sand (%):	53.0
Fines (%):	40.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
HA-01	16I021	39.4	40.7	45	22	23	SC - Clayey sand

Note(s): **Organic Content (ASTM D 2974): 5.3%**

Test material contains organic matters, which may affect Atterberg and sieve analysis, as well as soil classification.

Engineering classification is based on the assumption that the fines are either CL or CH.

9-15-2016
JW, NSR

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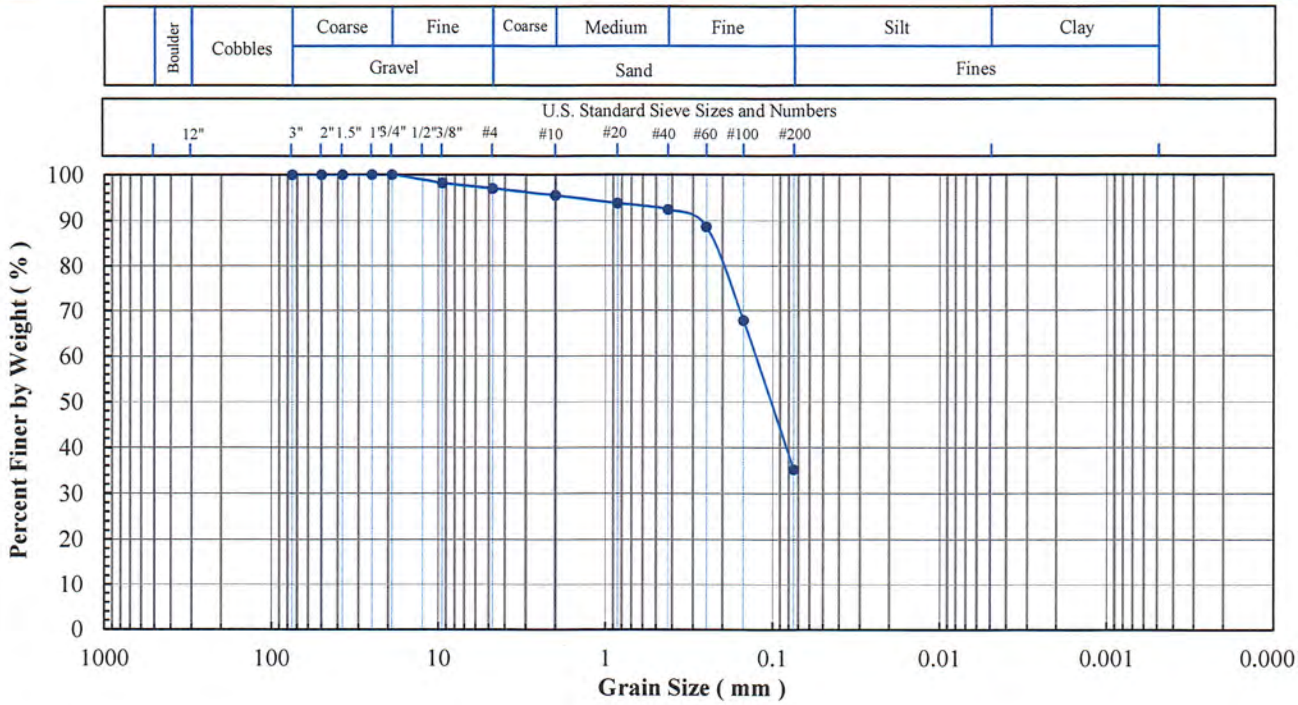
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	HA-02
Lab Sample No:	16I022

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



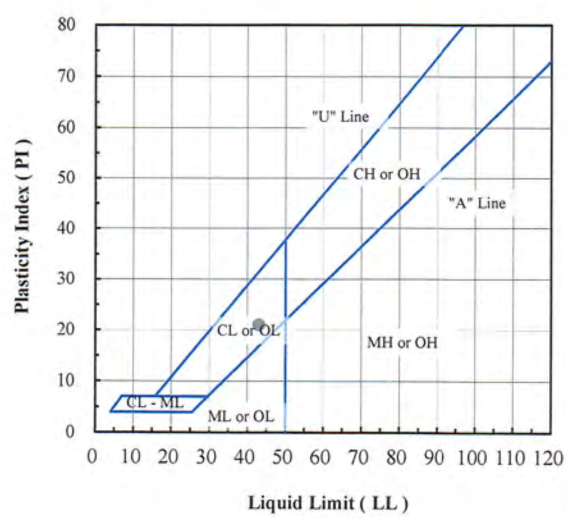
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	98.2
#4	4.75	97.0
#10	2.00	95.5
#20	0.850	93.8
#40	0.425	92.4
#60	0.250	88.6
#100	0.150	67.7
#200	0.075	35.2

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.0
Sand (%):	61.8
Fines (%):	35.2
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
HA-02	16I022	31.6	35.2	43	22	21	SC - Clayey sand

Note(s):

Engineering classification is based on the assumption that the fines are either CL or CH.

9-15-2016
JW, VSR

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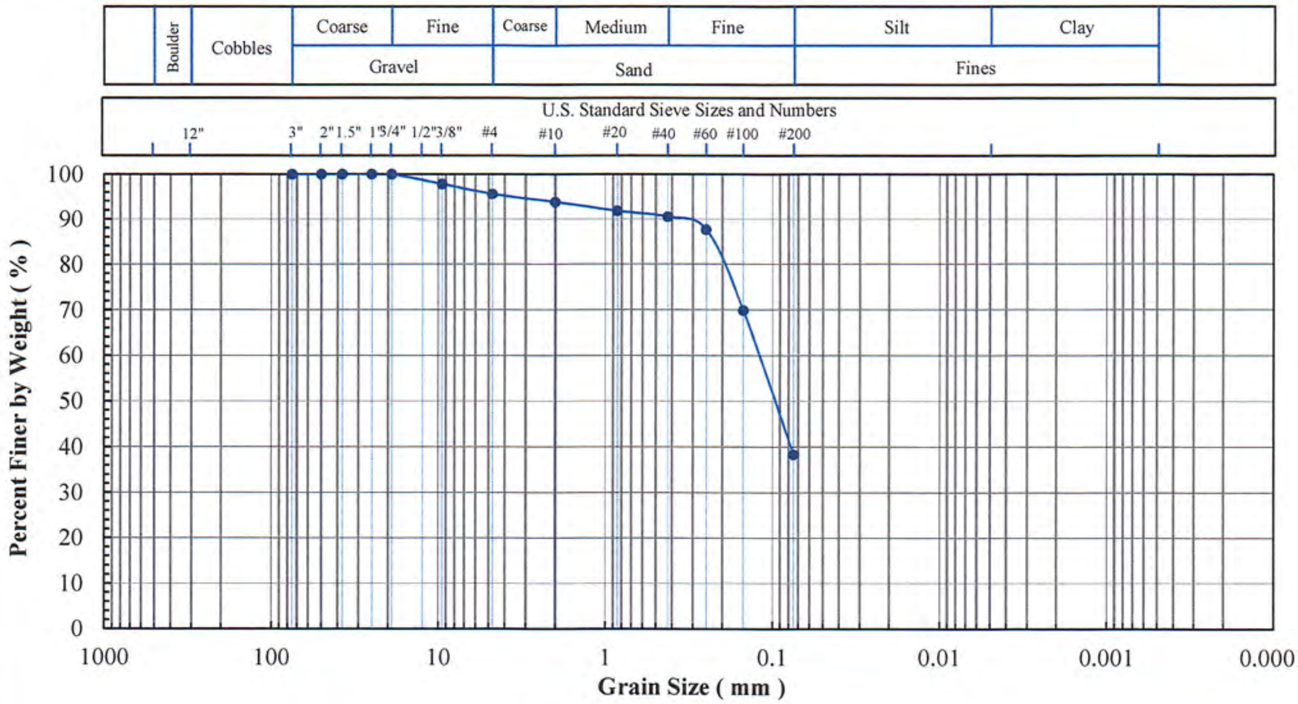
Project Name:	Baker Park Design and Permitting
Project No:	797
Client Sample ID:	HA-03
Lab Sample No:	16I023

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



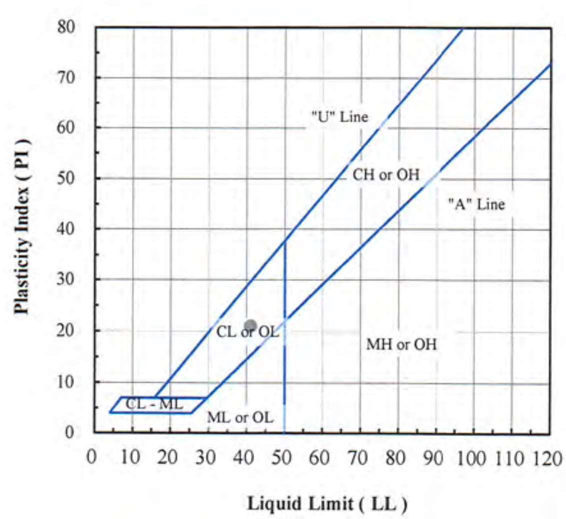
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	97.8
#4	4.75	95.6
#10	2.00	93.8
#20	0.850	91.8
#40	0.425	90.5
#60	0.250	87.6
#100	0.150	69.8
#200	0.075	38.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	4.4
Sand (%):	57.3
Fines (%):	38.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
HA-03	16I023	36.2	38.3	41	20	21	SC - Clayey sand

Note(s): **Organic Content (ASTM D 2974): 4.4%**

Test material contains organic matters, which may affect Atterberg and sieve analysis, as well as soil classification.

Engineering classification is based on the assumption that the fines are either CL or CH.

9-15-2016
JW, JSR

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LAST PAGE

Test Applicability and Limitations:

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

Storage Policy:

- Uncontaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of $1.00 per sample per day will be applied after the initial 3 month storage period.

- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned o the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of $1.30 per sample per day will be applied after the initial 3 months storage.

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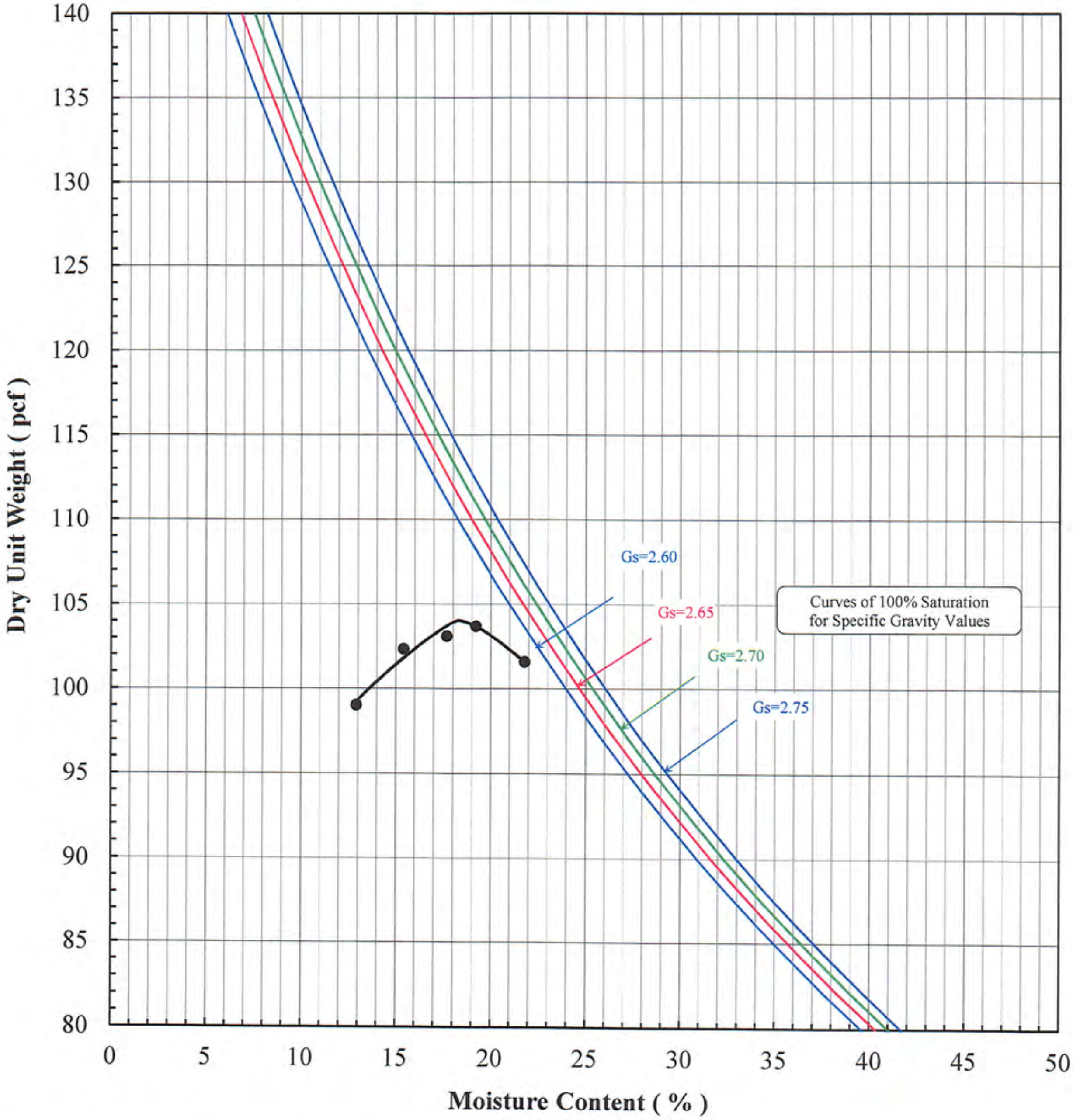
Project Name:	Baker Park Design & Permitting
Project No:	797
Client Sample ID:	HA-02
Lab Sample No:	16I022

ASTM D 698 - Method B

STANDARD PROCTOR COMPACTION

Moist Preparation



Client/Site Sample ID.	Lab Sample No.	Maximum Dry Unit Weight (pcf)	Optimum Moist. Content (%)	Laboratory Visual Soil Description (-)
HA-02	16I022	104.0	18.3	Gray clayey sand with some gravel

Note(s): Unless coarse correction is required, all particles passed through 1.0 in. Sieve were used.

From the bucket received, 1 particle was larger than 1.0 inch, but smaller than 1.5 inches.

9-23-16 NSR

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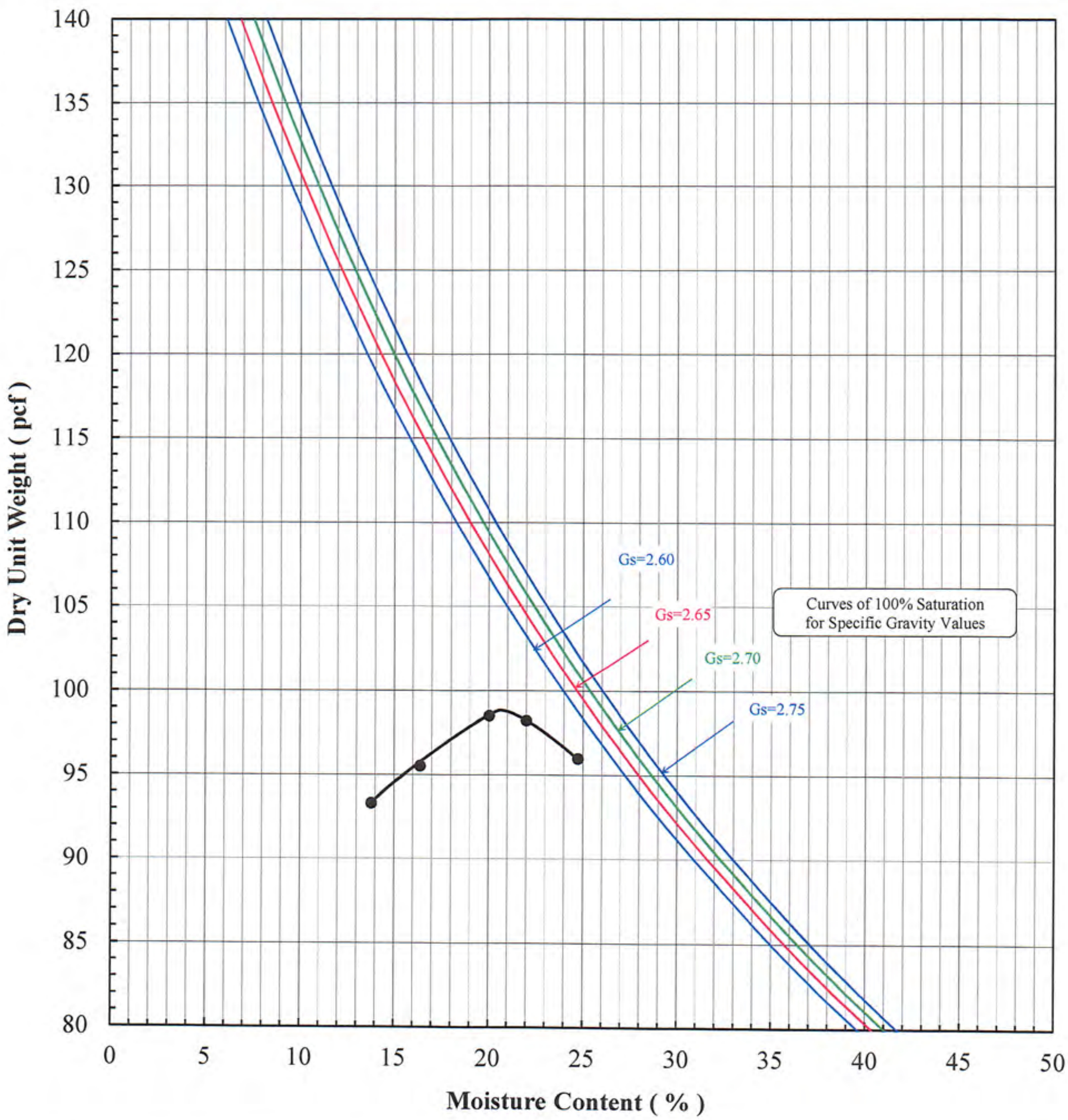
Project Name:	Baker Park Design & Permitting
Project No:	797
Client Sample ID:	HA-01
Lab Sample No:	16I021

ASTM D 698 - Method B | **STANDARD PROCTOR COMPACTION** | **Moist Preparation**



Client/Site Sample ID.	Lab Sample No.	Maximum Dry Unit Weight (pcf)	Optimum Moist. Content (%)	Laboratory Visual Soil Description (-)
HA-01	16I021	98.9	20.6	Gray clayey sand with some gravel

Note(s): Unless coarse correction is required, all particles passed through 1.0 in. Sieve were used.

From the bucket received, 1 particle was larger than 1.0 inch, but smaller than 1.5 inches.

9-23-16
NSR

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