DRAFT

Report of Geotechnical Engineering Investigation

**DEAD RIVER ROAD STORMWATER POND**

Lake County, Florida

PEC Project No. LC-110

GEC Project No. 2811G

May 6, 2008

Professional Engineering Consultants, Inc.
200 East Robinson Street, Suite 1560
Orlando, Florida 32801

Attention: Mr. David W. Hamstra, P.E.

Subject: Report of Geotechnical Engineering Investigation
**DEAD RIVER ROAD STORMWATER POND**
Lake County, Florida
PEC Project No. LC-110
GEC Project No. 2811G

Dear Mr. Hamstra:

Geotechnical and Environmental Consultants, Inc. (GEC) is pleased to present this Report of Geotechnical Investigation for the above-referenced project. This study was performed in general accordance with our Proposal No. 4821G dated April 24, 2007. The purpose of this investigation was to explore subsurface conditions at the site and to use the information obtained to develop geotechnical engineering recommendations for design and construction of the proposed stormwater pond expansion and pipelines. This report describes our exploration procedures, exhibits the data obtained and presents our conclusions and recommendations regarding the geotechnical aspects of the project.

GEC appreciates the opportunity to be of service to you on this project, and we trust that the information contained herein will be sufficient to meet your current needs. If you should have any questions or comments regarding the contents of this report, or if we can be of further assistance, please contact us.

Very truly yours,

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.

DRAFT

Craig G. Ballock, E.I.
Engineer Intern

Michael J. Preim, P.E.
Senior Project Manager
Florida License No. 24041

CGB/MJP/crp

# Table of Contents

**1.0 SITE AND PROJECT DESCRIPTION** ..... 1

**2.0 NRCS SOIL SURVEY REVIEW** ..... 1

**3.0 SUBSURFACE EXPLORATION** ..... 2
3.1 Machine Auger Borings ..... 2
3.2 Groundwater Measurement ..... 3

**4.0 LABORATORY TESTING** ..... 3

**5.0 DESCRIPTION OF SUBSURFACE CONDITIONS** ..... 3
5.1 Boring Results ..... 4
5.2 Groundwater Levels ..... 4

**6.0 GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS** ..... 5
6.1 Stormwater Pond Expansion Area ..... 5
6.2 Pipe Bedding, Backfill and Compaction ..... 6
6.3 Temporary Dewatering ..... 7
6.4 Utility Excavations ..... 7

**7.0 USE OF THIS REPORT** ..... 8

**APPENDIX**

| | |
|---|---|
| Figure 1: | USGS Quadrangle and NRCS Soil Survey Maps |
| Figure 2: | Boring Location Plan |
| Figures 3 – 7: | Boring Results |
| Table 4: | Summary of Boring Location Data |
| Table 5: | Summary of Groundwater Levels |

## 1.0 SITE AND PROJECT DESCRIPTION

The subject site is located in Section 25, Township 19 South, Range 25 East in Lake County, Florida. More specifically, the proposed regional stormwater pond and pipeline improvements are located south of the Dead River, east of Lake Harris, and north of Dead River Road in west central Lake County, Florida.

The project includes the expansion of an existing on-site pond... In addition, project plans include the installation of approximately 7,500 lf of pipeline...

The project includes the expansion of an existing on-site pond to treat stormwater runoff from a portion of Dead River Road, as well as portions of the Imperial Terrace West Mobile Home Park. In addition, project plans include the installation of approximately 7,500 lf of pipeline along roadways in Imperial Terrace and along Dead River Road. We understand this pipeline is expected to be installed no deeper than 8 feet. Pipe installation is expected to be by open cut methods along the entire alignment.

According to the USGS Leesburg East, Florida Quadrangle map and topographic survey information provided by Southeastern Surveying, existing natural ground surface elevations in the project area range from approximately +64 to +77 feet NAVD88. The project area is presented on Figure 2 in the Appendix.

## 2.0 NRCS SOIL SURVEY REVIEW

The Natural Resources Conservation Service (NRCS) (formerly SCS) Soil Survey of Lake County, Florida was reviewed to obtain near surface soil and groundwater information in the vicinity of the project site. The project area is shown on the NRCS Soil Survey Map (Figure 1) in the Appendix. The following NRCS Soil Survey soil types are identified within the project limits:

**Table 1**
**NRCS Soil Survey Summary**

| Unit No. | Soil Name | Depth (inches) | Soil Description | USCS Classification Symbol | Hydrologic Group | Depth to Seasonal High Groundwater (feet) |
|---|---|---|---|---|---|---|
| 4 | Anclote sand | 0 - 12<br>12 - 80 | Fine sand<br>Fine sand, loamy fine sand | SP-SM<br>SM, SC-SM | D | +2 - 0 |
| | Myakka sand | 0 - 20<br>20 - 36<br>36 - 80 | Sand, fine sand<br>Sand, fine sand<br>Sand, fine sand | SP, SP-SM<br>SP-SM, SM<br>SP, SP-SM | D | +2 - 0 |
| 8 | Candler sand, 0 to 5 percent slopes | 0 - 67<br>67 - 80 | Sand<br>Sand | SP, SP-SM<br>SP-SM | A | >6 |
| 17 | Arents | 0 - 80 | Sandy clay loam, fine sandy loam, sandy loam | SM, SM-SC, SC | B | 2.5 - 5 |
| 20 | Immokalee sand | 0 - 38<br>38 - 56<br>56 - 68 | Fine sand, sand<br>Fine sand, sand<br>Fine sand, sand | SP, SP-SM<br>SP-SM, SM<br>SP, SP-SM | B/D | 0.5 - 1.5 |

| Unit No. | Soil Name | Depth (inches) | Soil Description | USCS Classification Symbol | Hydrologic Group | Depth to Seasonal High Groundwater (feet) |
|---|---|---|---|---|---|---|
| 35 | Paola sand, 0 to 5 percent slopes | 0 – 80 | Sand | SP | A | >6 |

The soil units listed above are generally classified as sand with varying amounts of silt fines (SP, SP-SM, SM, SM-SC, SC). These soil units are generally appropriate for support of the proposed pipeline. The NRCS predicts seasonal high groundwater levels within the site limits to range from about 2 feet above existing ground surface to greater than 6 feet below existing ground surface. Within the proposed pond expansion limits, seasonal high groundwater levels are predicted to range from 0.5 to 1.5 feet below existing ground surface.

A majority of the soils in the Imperial Terrace West Mobile Home Park are classified as Arents. Arents soils are the result of numerous earthmoving and filling activities which result in non-indigenous soils with high variability in physical and chemical properties and therefore a high variability in the seasonal high groundwater levels.

*Information contained in the NRCS Soil Survey is very general and may be outdated.* It may not therefore be reflective of actual soil and groundwater conditions, particularly if recent development in the site vicinity has modified soil conditions or surface/subsurface drainage.

## 3.0 SUBSURFACE EXPLORATION

In addition to consulting the sources of information previously discussed for regional and site-specific soils data, GEC conducted a subsurface exploration to evaluate soil and groundwater conditions.

Subsurface conditions along the proposed pipeline alignment were explored by performing thirty-two, 10-foot deep machine auger borings on approximately 250-foot intervals. In addition, subsurface conditions within the proposed pond expansion footprint were explored by performing three, 20-foot deep machine auger borings.

The approximate locations of the borings drilled for this study are shown on Figure 2 in the Appendix. Machine auger boring locations were surveyed by Southeastern Surveying for horizontal and vertical control. A summary of the provided boring location data is included Table 4 in the Appendix.

### *3.1 Machine Auger Borings*

Machine auger borings were performed in accordance with ASTM Procedure D-4700. Machine auger borings were made by hydraulically turning a 4-inch wide continuous flight, solid-stem, auger into the ground in 5-foot increments until the desired boring termination depth was achieved. The auger flights were retrieved in 5-foot increments and examined by our technician prior to collection of representative soil samples. The samples were placed in sealed jars and transported to GEC's laboratory for further examination and limited laboratory testing.

### 3.2 Groundwater Measurement

A GEC engineering technician measured the depth to groundwater in the boreholes at the time of drilling and again after approximately 24 hours. Once the 24-hour groundwater measurement was recorded, the boreholes were backfilled with soil cuttings to prevailing ground surface.

## 4.0 LABORATORY TESTING

Selected soil samples retrieved from the borings were tested in accordance with Florida Standard Testing Methods (FM). Florida Standard Testing Methods are adaptations of recognized standards methods, e.g., ASTM and AASHTO, which have been modified to accommodate Florida's geological conditions. The GEC laboratory is reviewed annually by the Construction Materials Engineering Council, Inc. (CMEC) team to verify compliance with FM. A table summarizing the laboratory testing for this project is summarized below:

**Table 2**
**Summary of Laboratory Tests**

| Type of Test | Number of Tests |
|---|---|
| Percent Fines (FM 1-T88) | 9 |
| Atterberg Limits (FM 1-T89/90) | 1 |
| Organic Content (FM 1-T267) | 1 |
| Natural Moisture Content (FM 1-T265) | 2 |

The individual results of our laboratory tests are shown adjacent to the soil profiles at the approximate depths from which the tested samples were obtained on the Boring Results sheets (Figures 3 through 7) in the Appendix.

## 5.0 DESCRIPTION OF SUBSURFACE CONDITIONS

Subsurface conditions encountered in the borings performed for this study are presented on the Boring Results sheets in the Appendix. The boring logs describe the soil layers using the Unified Soil Classification System (USCS) symbol (e.g. SP-SM) and ASTM soils descriptions (e.g. sand with silt). We based our classifications and descriptions on visual examination and the limited laboratory testing described above.

*The boring logs indicate subsurface conditions only at the specific boring locations at the time of our field exploration.* Subsurface conditions, including groundwater levels, at other locations of the subject site may differ from conditions we encountered at the boring locations. Moreover, conditions at the boring locations can change over time. Groundwater levels fluctuate seasonally, and soil conditions can be altered by earthmoving operations.

The depths and thicknesses of the subsurface strata indicated on the boring logs were interpolated between samples obtained at different depths in the borings. The actual transition between soil layers may be different than indicated. *These stratification lines were used for our analytical purposes and construction estimates based on this information should be considered preliminary and approximate.*

## 5.1 Boring Results

...auger borings performed along the proposed pipeline alignment typically encountered fine sand and fine sand with silt (SP, SP-SM).

The auger borings performed along the proposed pipeline alignment typically encountered fine sand and fine sand with silt (SP, SP-SM). Exceptions to this general profile include:

- Clayey fine sand (SC) was encountered at boring location AB-3 from 7 to 10 feet below existing ground surface.
- Silty fine sand (SM) was encountered at boring locations AB-4 and AB-21 from existing ground surface to 1.5 feet below existing ground surface and from 8 to 10 feet below existing ground surface, respectively.
- Mucky fine sand (PT) was encountered at boring location AB-5 from 3 to 4 feet below existing ground surface.

The auger borings performed within the footprint of the proposed pond expansion area typically encountered fine sand with silt (SP-SM) to the 20-foot boring termination depths.

For specific soil information at each boring location, please refer to our Boring Results sheets on Figures 3 through 7 in the Appendix.

## 5.2 Groundwater Levels

Groundwater levels were measured at least 24 hours after completion of the borings.

Groundwater levels were encountered ...at elevations ranging from +58.8 to +61.8 feet NAVD88.

Groundwater levels were encountered in the borings at elevations ranging from +58.8 to +61.8 feet NAVD88. Groundwater was not encountered (GNE) at boring locations AB-1, AB-2, AB-19, AB-20, AB-22, AB-23, AB-24, AB-25, AB-26, AB-28, and AB-29.

Groundwater levels can vary seasonally and with changes in subsurface conditions between boring locations. Alterations in surface and/or subsurface drainage brought about by site development can also affect groundwater levels. *Therefore, groundwater depths measured at different times or at different locations along the project alignment can be expected to vary from those measured by GEC during this investigation.*

For purposes of this report, estimated seasonal high groundwater levels are defined as groundwater levels that are anticipated at the end of the wet season during a "normal rainfall" year under current site conditions. We define a "normal rainfall" year as a year in which rainfall quantity and distribution were at or near historical rainfall averages.

We estimate that the seasonal high groundwater elevation will range from about +61.7 to +64.3 feet NAVD88.

We estimate that the seasonal high groundwater elevation will range from about +61.7 to +64.3 feet NAVD88. Our estimated seasonal high groundwater levels, as well as the encountered groundwater levels, are presented on the Boring Results sheets in the Appendix. In addition, our estimated seasonal high groundwater elevations and encountered groundwater elevations are summarized in Table 5 in the Appendix.

## 6.0 GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

The analyses and recommendations contained in this report are based in part on the data obtained from a limited number of soil samples and groundwater measurements obtained from widely-spaced borings. The investigation methods used indicate subsurface conditions only at the specific boring locations, only at the time they were performed, and only to the depths penetrated. Borings cannot be relied upon to accurately reflect the variations that usually exist between boring locations and these variations may not become evident until construction. If variations from the conditions described in this report do become evident during construction, or if project characteristics described in this report change, GEC should be retained so that we can reevaluate this report's conclusions and recommendations in light of such changes.

### *6.1 Stormwater Pond Expansion Area*

Our stormwater pond borings, AB-33 through AB-35, typically encountered fine sand with silt (SP-SM) to the 20-foot boring termination depths, which appears suitable for use as structural fill. Sands excavated below the water table will need to be dried to a moisture content near optimum to achieve the required degree of compaction.

The following table summarizes our encountered groundwater levels and estimated seasonal high and low groundwater levels for the pond borings, AB-33 through AB-35, performed within the proposed pond expansion footprint.

**Table 3**
**Summary of Stormwater Pond Expansion Area Groundwater Levels**

| Boring No. | Ground Surface Elevation (ft NAVD88) | Encountered Groundwater Elevation (ft NAVD88) | Estimated Seasonal High Groundwater Elevation (ft NAVD88) | Estimated Seasonal Low Groundwater Elevation (ft NAVD88) |
|---|---|---|---|---|
| AB-33 | 64.4 | 60.1 | 62.9 | 59.6 |
| AB-34 | 64.8 | 60.0 | 62.8 | 59.5 |
| AB-35 | 64.8 | 59.9 | 62.8 | 59.4 |

St. Johns River Water Management Rules allow wet detention pond water levels to be controlled at or below "normal groundwater levels". SJRWMD defines "normal groundwater levels" as the average of the seasonal high and seasonal low groundwater levels.

### *6.2 Pipe Bedding, Backfill and Compaction*

The majority of the soils encountered in the auger borings are generally suitable for use as pipe bedding material and pipe excavation backfill. Ideally backfill soils should consist of non-plastic sands with less than about 12% fines content. The fill should not contain any significant amount of organic substances (less than 3% by weight) or other deleterious materials. The contractor should adhere to the following recommendations for bedding fill placement and compaction.

- Remove any soft, loose or organic soils from below the pipe invert elevation, for the full width of the trench, and to the depth required to reach suitable foundation material.
- Compact pipe bedding material to a minimum of 95% of the soil's Modified Proctor maximum dry density to a minimum depth of 6 inches below the bottom of pipe.
- Excavate and shape bedding soils to accommodate pipe "bells" to completely support each pipe section and help to eliminate point loading conditions.
- Place fill in level lifts no thicker than 12 inches.
- Compact each backfill lift to a minimum of 95% of the soil's modified Proctor maximum dry density as determined by AASHTO T-180 for each lift of fill placed.
- Compaction tests should be performed for each run of pipe between manholes or at least one test per 300 linear feet, with at least one test at an elevation of 1 foot above the top of pipe. In addition, one test should be run for every foot of backfill from 1 foot above the top of pipe to finished grade elevation.

- Allow an Engineering Technician, working under the direction of a registered Geotechnical Engineer, to perform in-place density tests to verify that the recommended degree of compaction has been achieved.

- Install sheeting and bracing or properly designed trench shields, if required, to support the sides of excavations during utility installation.

- All excavations including utility trenches, should comply with the recommendations included in the **Utility Excavations** section of this report.

- Where utility lines will traverse roadways and/or other permanent structures, such as sidewalks, the backfill should be compacted to 98% of the soil's Modified Proctor maximum dry density for a depth of 2 feet below the bottom of the pavement base or the bearing elevation of other structures.

## *6.3 Temporary Dewatering*

...temporary dewatering may be required to facilitate stable excavations and placement and compaction of fill

Depending on groundwater levels at the time of construction, temporary dewatering may be required to facilitate stable excavations and placement and compaction of fill. The contractor should be required to provide a dewatering system which maintains groundwater levels at least 2 feet below compaction surfaces, including the bottom of excavations. A system of ditches and sumps may be sufficient in some instances to achieve adequate dewatering, but the contractor should be prepared to install wellpoint dewatering systems as necessary.

## *6.4 Utility Excavations*

The owner and the contractor should be familiar with local, state and federal safety regulations, including current Occupational Safety and Health Administration (OSHA) excavation and trench safety standards. Construction site safety is the responsibility of the contractor. The contractor should also be responsible for the means, methods, techniques, sequences, and operations of the construction. The contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should not exceed those specified in local, state, or federal safety regulations; e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926. *OSHA regulations are strictly enforced and, if not followed, the owner, contractor, earthwork subcontractor or utility subcontractor could be liable for substantial penalties.*

The soil encountered in the borings performed by GEC at this site is primarily sand with varying amounts of silt. We anticipate that OSHA will classify these non-organic materials as Type C. OSHA recommends a maximum temporary slope inclination of 1.5 horizontal to 1 vertical for this soil type. Soils encountered in the construction excavations may vary significantly across the site. Our soil classifications are based on the materials encountered in widely-spaced borings. The contractor should verify that similar conditions exist throughout the proposed excavation area. If different subsurface conditions are encountered at the time of construction, GEC should be contacted immediately to evaluate the conditions encountered.

## 7.0 USE OF THIS REPORT

GEC has prepared this report for the exclusive use of our client, Professional Engineering Consultants, Inc., and the Lake County Department of Public Works, and for specific application to our client's project. GEC will not be held responsible for any other party's interpretation or use of this report's subsurface data or engineering analysis without our written authorization.

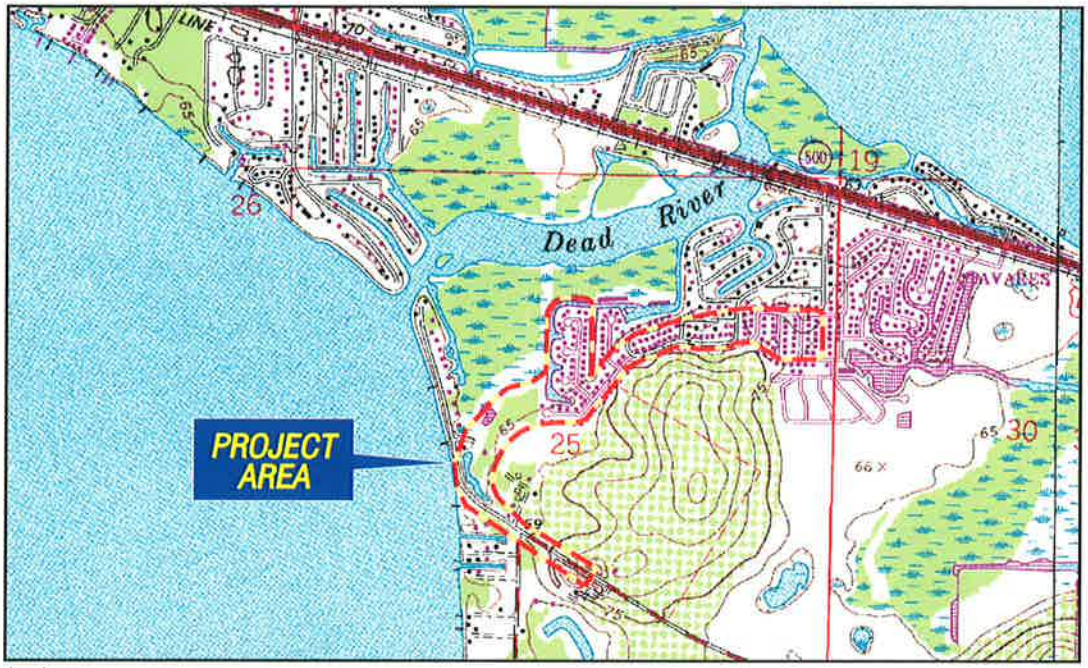
The sole purpose of the borings made by GEC at this site was to obtain indications of subsurface conditions as part of a geotechnical exploration program. As a part of this geotechnical study, GEC has not evaluated the site for the potential presence of contaminated soil or groundwater, nor have we subjected any soil samples to analysis for contaminants.

GEC has strived to provide the services described in this report in a manner consistent with that level of care and skill ordinarily exercised by members of our profession currently practicing in Central Florida. No other representation is made or implied in this document.

The conclusions or recommendations of this report should be disregarded if the nature, design, or location of the facilities is changed. If such changes are contemplated, GEC should be retained to review the new plans to assess the applicability of this report in light of proposed changes.

# APPENDIX

# USGS QUADRANGLE AND NRCS SOIL SURVEY MAPS




PREPARED FROM:
**USGS LEESBURG EAST, FLA. QUADRANGLE MAP**
**ISSUED 1965**
**PHOTOREVISED 1980**
**SECTION: 25**
**TOWNSHIP: 19 SOUTH**
**RANGE: 25 EAST**


PREPARED FROM:
**NRCS SOIL SURVEY OF LAKE CO., FLA.**

**COUNTY MAP UNIT LEGEND**

4 – ANCLOTE AND MYAKKA SOILS
8 – CANDLER SAND, 0 TO 5 PERCENT SLOPES
17 – ARENTS
20 – IMMOKALEE SAND
35 – PAOLA SAND, 0 TO 5 PERCENT SLOPES

Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882

# DEAD RIVER ROAD STORMWATER POND

| | |
|---|---|
| PROJECT NO.: | 2811G |
| DATE: | 3-12-08 |
| SENIOR PROFESSIONAL: P.E. NO. | MJP 24041 |
| PROJECT PROFESSIONAL: | CGB |
| DRAWN BY: | TLM |
| REVISION: | |

North

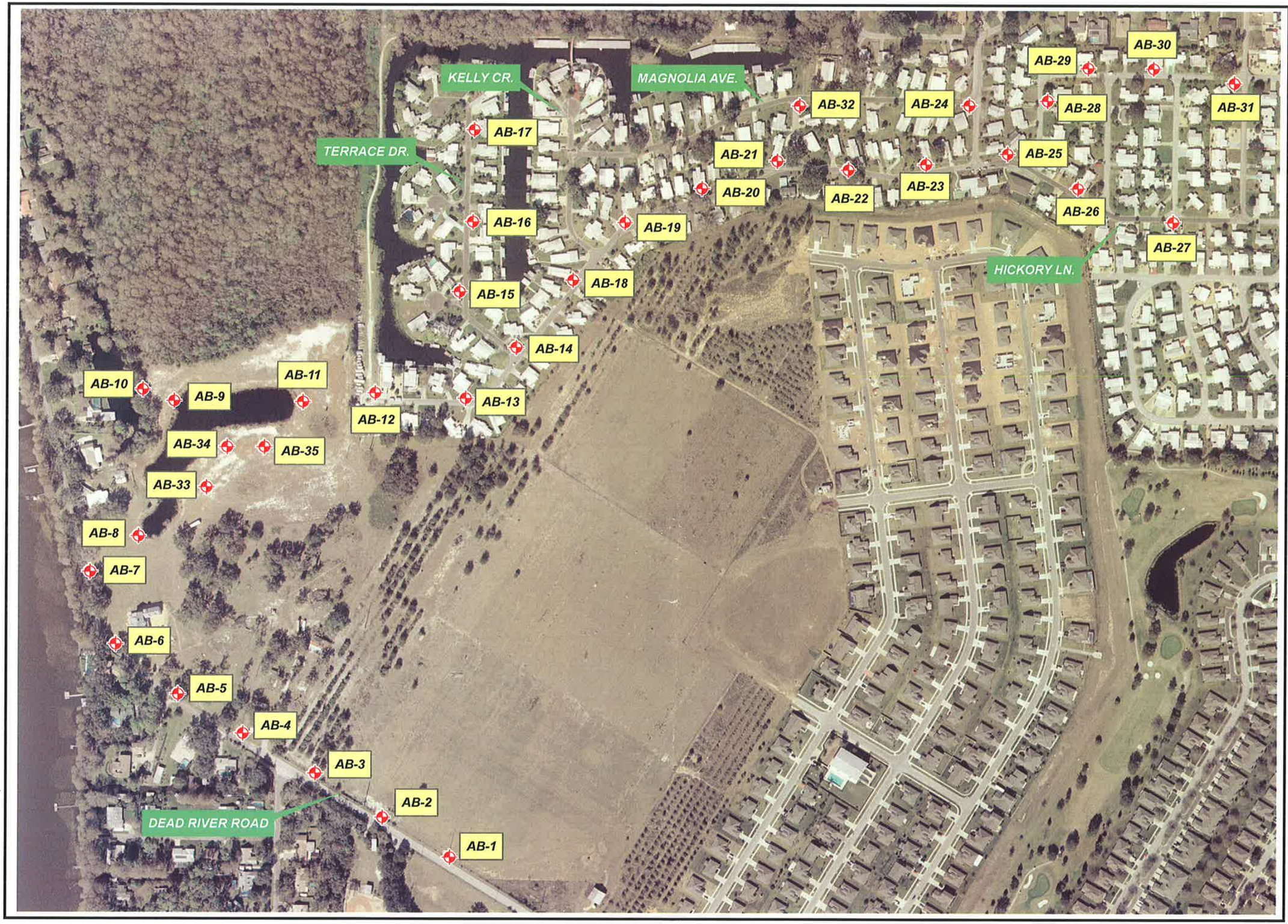
0 1000 2000
SCALE (FEET)

**USGS QUADRANGLE AND NRCS SOIL SURVEY MAPS**

**FIGURE 1**

J:\DATA\D69\2811G\2811Gquad.dwg, 5/6/2008 1:56:57 PM, 1:2000

# BORING LOCATION PLAN




D6912811\SITEMAP.mxd

Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882

# DEAD RIVER ROAD STORMWATER POND

| | |
|---|---|
| PROJECT NO.: | 2811G |
| DATE: | 3-13-08 |
| SENIOR PROFESSIONAL: P.E. NO. | MJP 24041 |
| PROJECT PROFESSIONAL: | CGB |
| DRAWN BY: | SKR |
| REVISION: | |
| REVISION: | |

Aerial photograph source:
LAKE County
Geographical Information
System - 2005

## LEGEND

APPROXIMATE AUGER BORING LOCATION

N

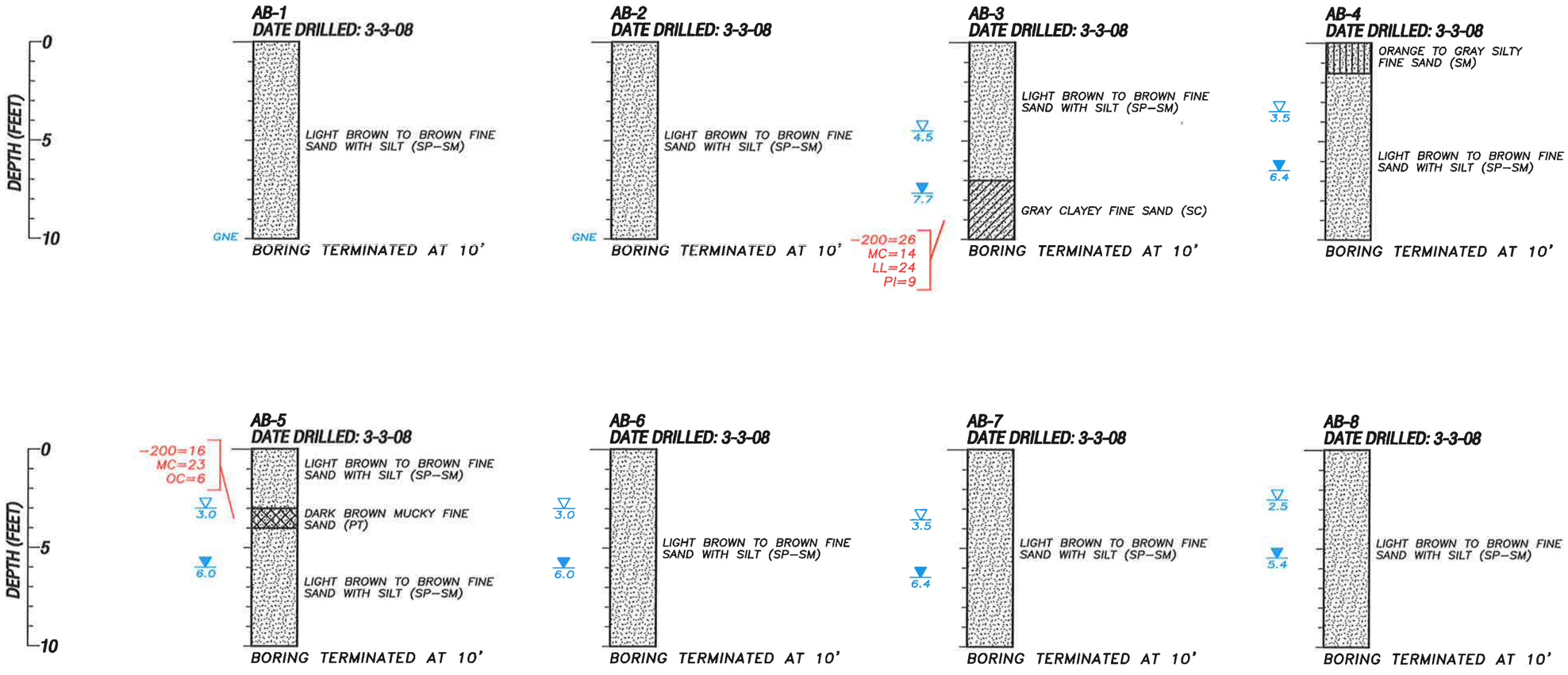
0 150 300

SCALE: FEET

## BORING LOCATION PLAN

FIGURE 2

# BORING RESULTS




## NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS DO NOT REPRESENT THE CONDITIONS BETWEEN THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.


Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882


# DEAD RIVER ROAD STORMWATER POND

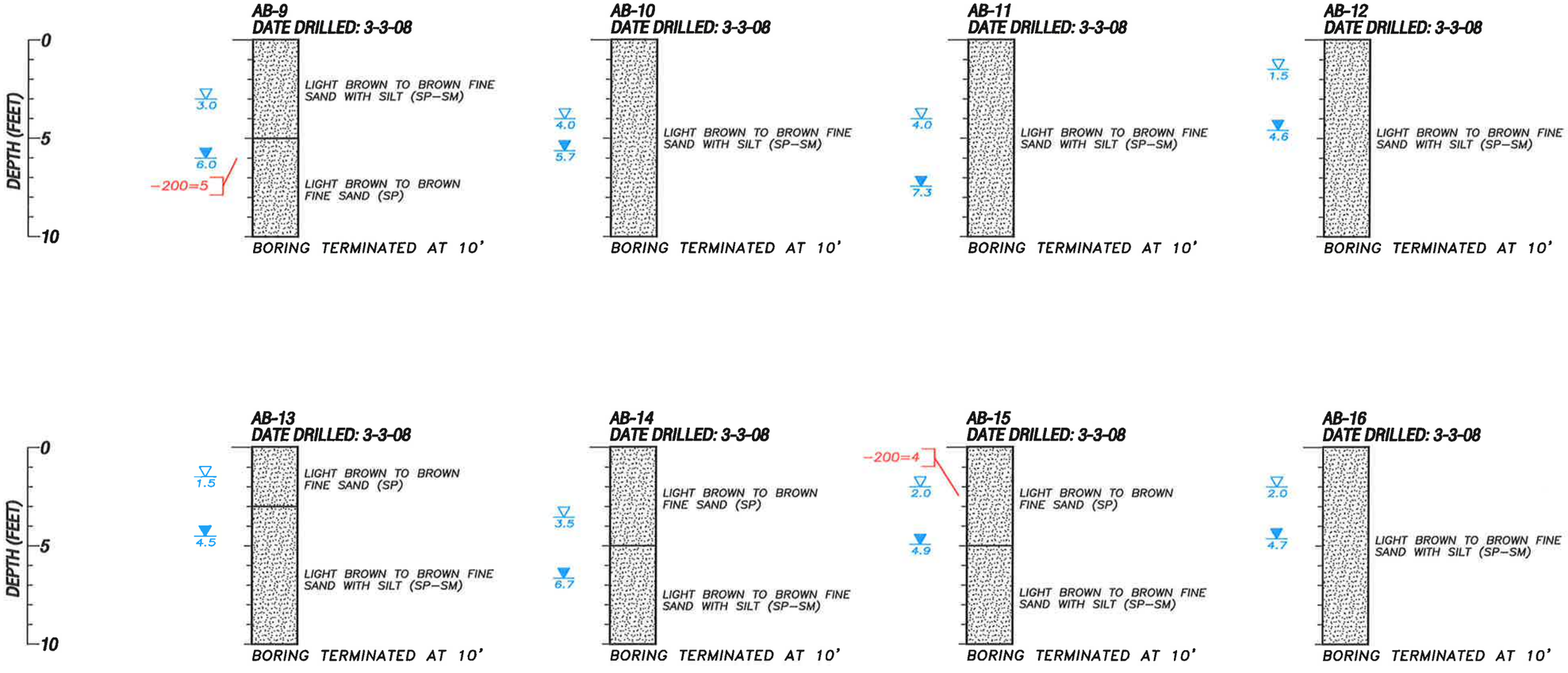
PROJECT NO.: 2811G
DATE: 3-13-08
SENIOR PROFESSIONAL: MJP
P.E. NO. 24041
PROJECT PROFESSIONAL: CGB
DRAWN BY: TLM
REVISION:

## LEGEND

- ▽ 4.5 — ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH (FEET)
- ▼ 7.7 — ENCOUNTERED GROUNDWATER DEPTH (FEET)
- GNE — GROUNDWATER NOT ENCOUNTERED DURING DRILLING OF BORING
- -200= — PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
- MC= — PERCENT NATURAL MOISTURE CONTENT
- LL= — LIQUID LIMIT
- PI= — PLASTICITY INDEX
- OC= — PERCENT ORGANIC CONTENT
- SAND
- SAND AND SILT
- SAND AND MUCK
- SAND AND CLAY

**BORING RESULTS**

**FIGURE 3**




## NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS DO NOT REPRESENT THE CONDITIONS BETWEEN THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.


Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882


# DEAD RIVER ROAD STORMWATER POND

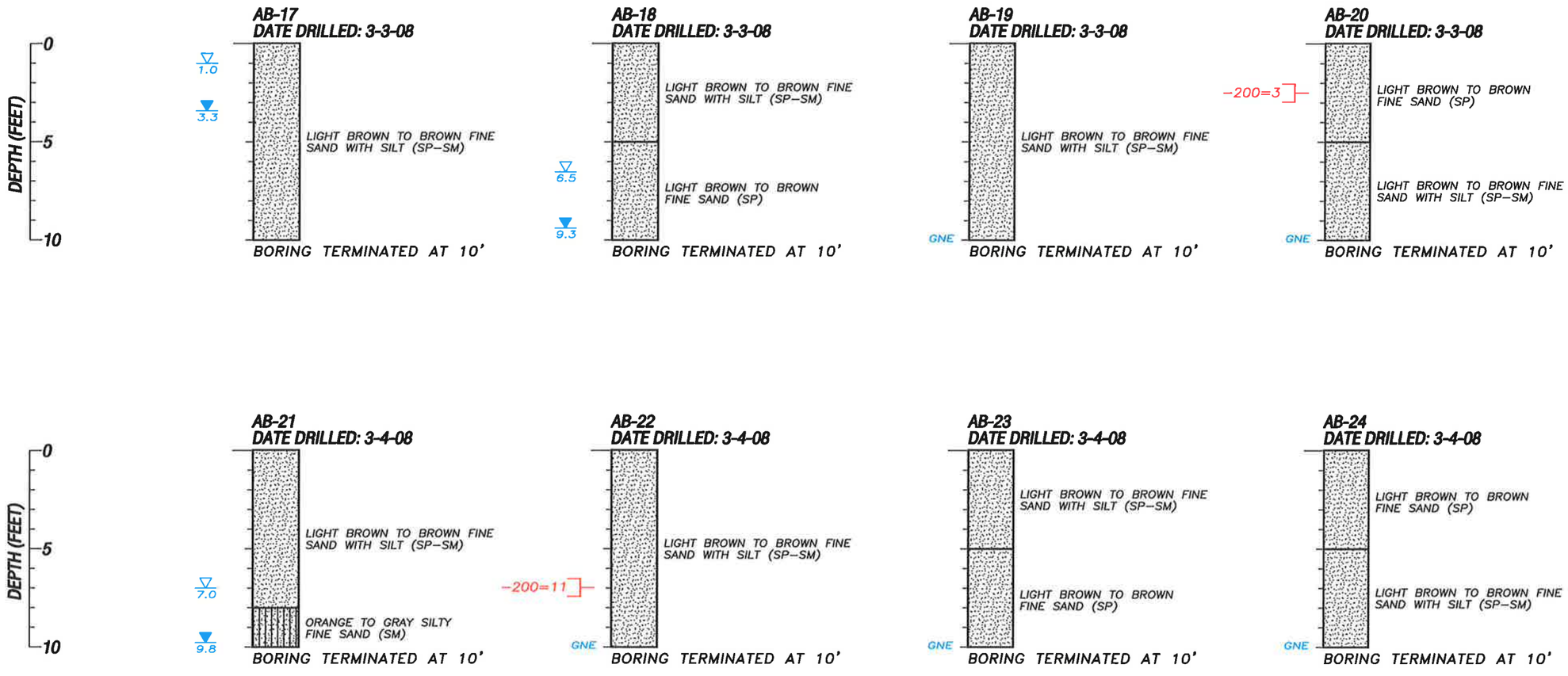
| | |
|---|---|
| PROJECT NO.: | 2811G |
| DATE: | 3-13-08 |
| SENIOR PROFESSIONAL: P.E. NO. | MJP 24041 |
| PROJECT PROFESSIONAL: | CGB |
| DRAWN BY: | TLM |
| REVISION: | |

## LEGEND

- ▽ 3.0 — ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH (FEET)
- ▼ 6.0 — ENCOUNTERED GROUNDWATER DEPTH (FEET)
- -200= — PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
- SAND

## BORING RESULTS

FIGURE 4




## NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS DO NOT REPRESENT THE CONDITIONS BETWEEN THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.


Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882


# DEAD RIVER ROAD STORMWATER POND

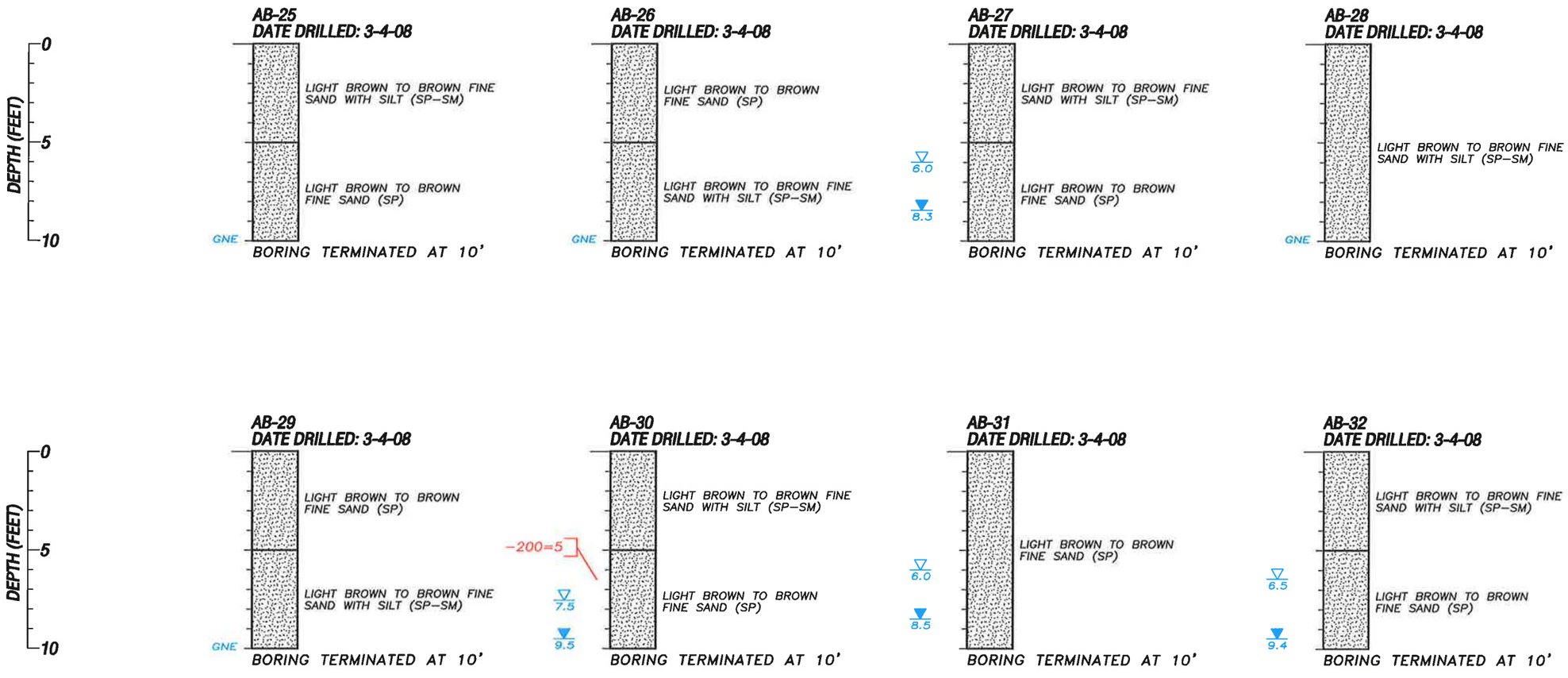
| | |
|---|---|
| PROJECT NO.: | 2811G |
| DATE: | 3-13-08 |
| SENIOR PROFESSIONAL: P.E. NO. | MJP 24041 |
| PROJECT PROFESSIONAL: | CGB |
| DRAWN BY: | TLM |
| REVISION: | |

## LEGEND

- 0.5 — ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH (FEET)
- 3.3 — ENCOUNTERED GROUNDWATER DEPTH (FEET)
- GNE — GROUNDWATER NOT ENCOUNTERED DURING DRILLING OF BORING
- -200= — PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
- SAND
- SAND AND SILT

**BORING RESULTS**

**FIGURE 5**




## NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS DO NOT REPRESENT THE CONDITIONS BETWEEN THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.


Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882


# DEAD RIVER ROAD STORMWATER POND

PROJECT NO.: 2811G
DATE: 3-13-08
SENIOR PROFESSIONAL: MJP
P.E. NO. 24041
PROJECT PROFESSIONAL: CGB
DRAWN BY: TLM
REVISION:

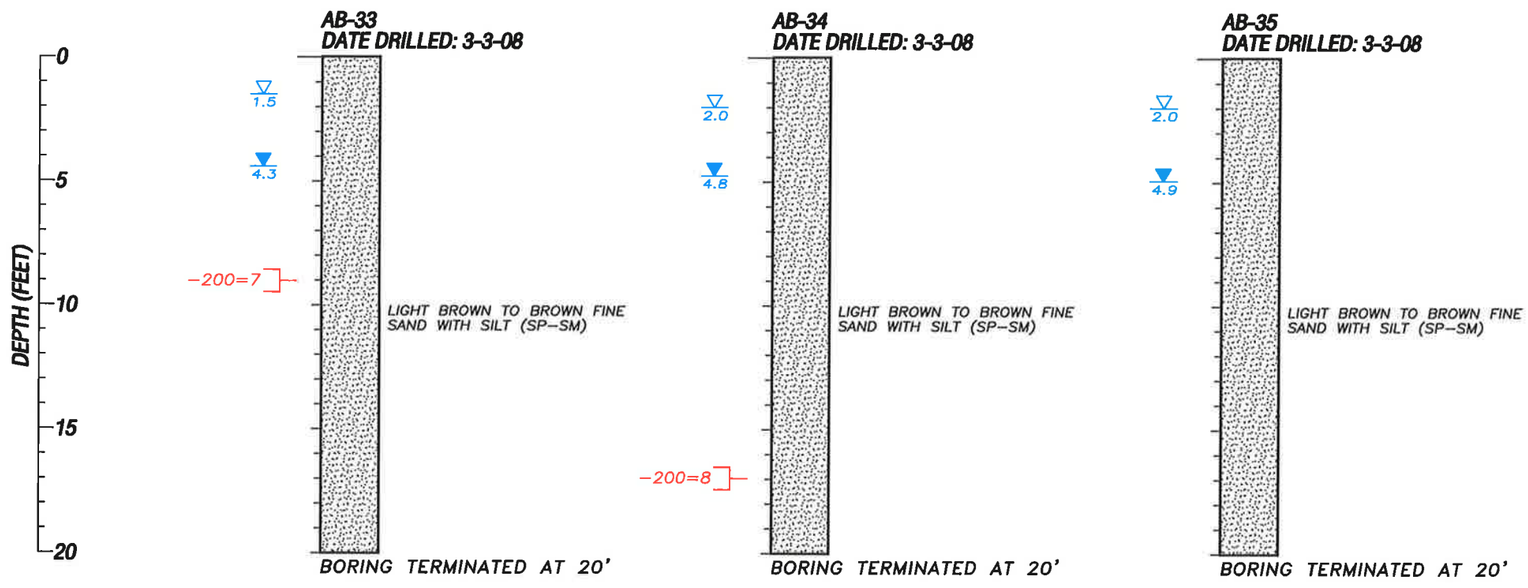
## LEGEND

- 6.0 — ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH (FEET)
- 8.3 — ENCOUNTERED GROUNDWATER DEPTH (FEET)
- GNE — GROUNDWATER NOT ENCOUNTERED DURING DRILLING OF BORING
- –200= — PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
- SAND

**BORING RESULTS**

**FIGURE 6**

J:\DATA\D69\2811G\2811Gbore.dwg, 5/6/2008 1:58:07 PM, 1:1




## NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS DO NOT REPRESENT THE CONDITIONS BETWEEN THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

Geotechnical and Environmental Consultants, Inc.
1230 E. HILLCREST ST.
ORLANDO, FLORIDA 32803
(407) 898-1818
FAX (407) 898-1897
COA NO. 00005882

# DEAD RIVER ROAD STORMWATER POND

PROJECT NO.: 2811G
DATE: 3-13-08
SENIOR PROFESSIONAL: MJP
P.E. NO. 24041
PROJECT PROFESSIONAL: CGB
DRAWN BY: TLM
REVISION:

## LEGEND

- 1.5 — ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH (FEET)
- 4.3 — ENCOUNTERED GROUNDWATER DEPTH (FEET)
- -200= PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
- SAND

**BORING RESULTS**

**FIGURE 7**

# SUMMARY OF BORING LOCATION DATA

**Table 4**
SUMMARY OF BORING LOCATION DATA
Dead River Road Stormwater Pond
GEC Project No. 2811G

| Boring No. | Northing | Easting | Ground Surface Elevation (ft NAVD88) |
|---|---|---|---|
| AB-1 | 1625799.5100 | 410960.1280 | 77.2 |
| AB-2 | 1625926.9300 | 410752.0280 | 72.4 |
| AB-3 | 1626065.4900 | 410526.9810 | 68.7 |
| AB-4 | 1626205.4000 | 410287.1840 | 66.4 |
| AB-5 | 1626349.7000 | 410069.5190 | 65.9 |
| AB-6 | 1626537.2300 | 409856.9120 | 65.9 |
| AB-7 | 1626765.3400 | 409785.2320 | 66.1 |
| AB-8 | 1626838.2600 | 409980.9400 | 64.9 |
| AB-9 | 1627301.6800 | 410050.4800 | 65.6 |
| AB-10 | 1627346.5200 | 409971.6500 | 66.9 |
| AB-11 | 1627298.4700 | 410500.3100 | 66.8 |
| AB-12 | 1627318.2600 | 410727.2920 | 64.4 |
| AB-13 | 1627306.9800 | 411017.5620 | 64.6 |
| AB-14 | 1627484.7400 | 411195.5600 | 66.5 |
| AB-15 | 1627660.7700 | 411000.2810 | 65.0 |
| AB-16 | 1627874.2100 | 411028.4200 | 66.3 |
| AB-17 | 1628207.2100 | 411033.7270 | 65.1 |
| AB-18 | 1627695.7300 | 411365.4220 | 68.3 |
| AB-19 | 1627888.3000 | 411533.9780 | 70.0 |
| AB-20 | 1627980.2600 | 411775.9110 | 71.7 |
| AB-21 | 1628100.7900 | 412127.5020 | 69.5 |
| AB-22 | 1628080.1300 | 412286.6300 | 71.0 |
| AB-23 | 1628082.7000 | 412524.9130 | 69.0 |
| AB-24 | 1628278.1200 | 412658.3410 | 67.4 |
| AB-25 | 1628107.9800 | 412746.4360 | 69.0 |
| AB-26 | 1628013.4800 | 412995.2340 | 70.7 |
| AB-27 | 1627895.5900 | 413334.0870 | 68.5 |
| AB-28 | 1628289.4700 | 412901.5350 | 71.1 |
| AB-29 | 1628399.0700 | 413045.3430 | 71.0 |
| AB-30 | 1628395.2200 | 413247.8350 | 70.2 |
| AB-31 | 1628345.5000 | 413541.8400 | 68.4 |
| AB-32 | 1628278.5700 | 412106.8660 | 68.2 |
| AB-33 | 1627024.3500 | 410163.6300 | 64.4 |
| AB-34 | 1627126.4200 | 410259.1100 | 64.8 |
| AB-35 | 1627116.8900 | 410391.5500 | 64.8 |

# SUMMARY OF GROUNDWATER LEVELS

**Table 5**
SUMMARY OF GROUNDWATER LEVELS
Dead River Road Stormwater Pond
GEC Project No. 2811G

| Boring No. | *Encountered Groundwater Depth Below Existing Ground Surface (ft) | Estimated Seasonal High Groundwater Depth Below Existing Ground Surface (ft) | Ground Surface Elevation (ft NAVD88/90) | Encountered Groundwater Elevation (ft NAVD88/90) | Estimated Seasonal High Groundwater Elevation (ft NAVD88/90) |
|---|---|---|---|---|---|
| AB-1 | GNE | -- | 77.2 | -- | -- |
| AB-2 | GNE | -- | 72.4 | -- | -- |
| AB-3 | 7.7 | 4.5 | 68.7 | 61.0 | 64.2 |
| AB-4 | 6.4 | 3.5 | 66.4 | 60.0 | 62.9 |
| AB-5 | 6.0 | 3 | 65.9 | 59.9 | 62.9 |
| AB-6 | 6.0 | 3 | 65.9 | 59.9 | 62.9 |
| AB-7 | 6.4 | 3.5 | 66.1 | 59.7 | 62.6 |
| AB-8 | 5.4 | 2.5 | 64.9 | 59.5 | 62.4 |
| AB-9 | 6.0 | 3 | 65.6 | 59.6 | 62.6 |
| AB-10 | 5.7 | 4 | 66.9 | 61.2 | 62.9 |
| AB-11 | 7.3 | 4 | 66.8 | 59.5 | 62.8 |
| AB-12 | 4.6 | 1.5 | 64.4 | 59.8 | 62.9 |
| AB-13 | 4.5 | 1.5 | 64.6 | 60.1 | 63.1 |
| AB-14 | 6.7 | 3.5 | 66.5 | 59.8 | 63.0 |
| AB-15 | 4.9 | 2 | 65.0 | 60.1 | 63.0 |
| AB-16 | 4.7 | 2 | 66.3 | 61.6 | 64.3 |
| AB-17 | 3.3 | 1 | 65.1 | 61.8 | 64.1 |
| AB-18 | 9.3 | 6.5 | 68.3 | 59.0 | 61.8 |
| AB-19 | GNE | -- | 70.0 | -- | -- |
| AB-20 | GNE | -- | 71.7 | -- | -- |
| AB-21 | 9.8 | 7 | 69.5 | 59.7 | 62.5 |
| AB-22 | GNE | -- | 71.0 | -- | -- |
| AB-23 | GNE | -- | 69.0 | -- | -- |
| AB-24 | GNE | -- | 67.4 | -- | -- |
| AB-25 | GNE | -- | 69.0 | -- | -- |
| AB-26 | GNE | -- | 70.7 | -- | -- |
| AB-27 | 8.3 | 6 | 68.5 | 60.2 | 62.5 |
| AB-28 | GNE | -- | 71.1 | -- | -- |
| AB-29 | GNE | -- | 71.0 | -- | -- |
| AB-30 | 9.5 | 7.5 | 70.2 | 60.7 | 62.7 |
| AB-31 | 8.5 | 6 | 68.4 | 59.9 | 62.4 |
| AB-32 | 9.4 | 6.5 | 68.2 | 58.8 | 61.7 |
| AB-33 | 4.3 | 1.5 | 64.4 | 60.1 | 62.9 |
| AB-34 | 4.8 | 2 | 64.8 | 60.0 | 62.8 |
| AB-35 | 4.9 | 2 | 64.8 | 59.9 | 62.8 |

*GNE: Groundwater not encountered