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REPORT OF PRELIMINARY GEOTECHNICAL EXPLORATION

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida
Contract DACW17-01-D-0020
Task Order 11

LAW Project No. 40521-1-8482-15

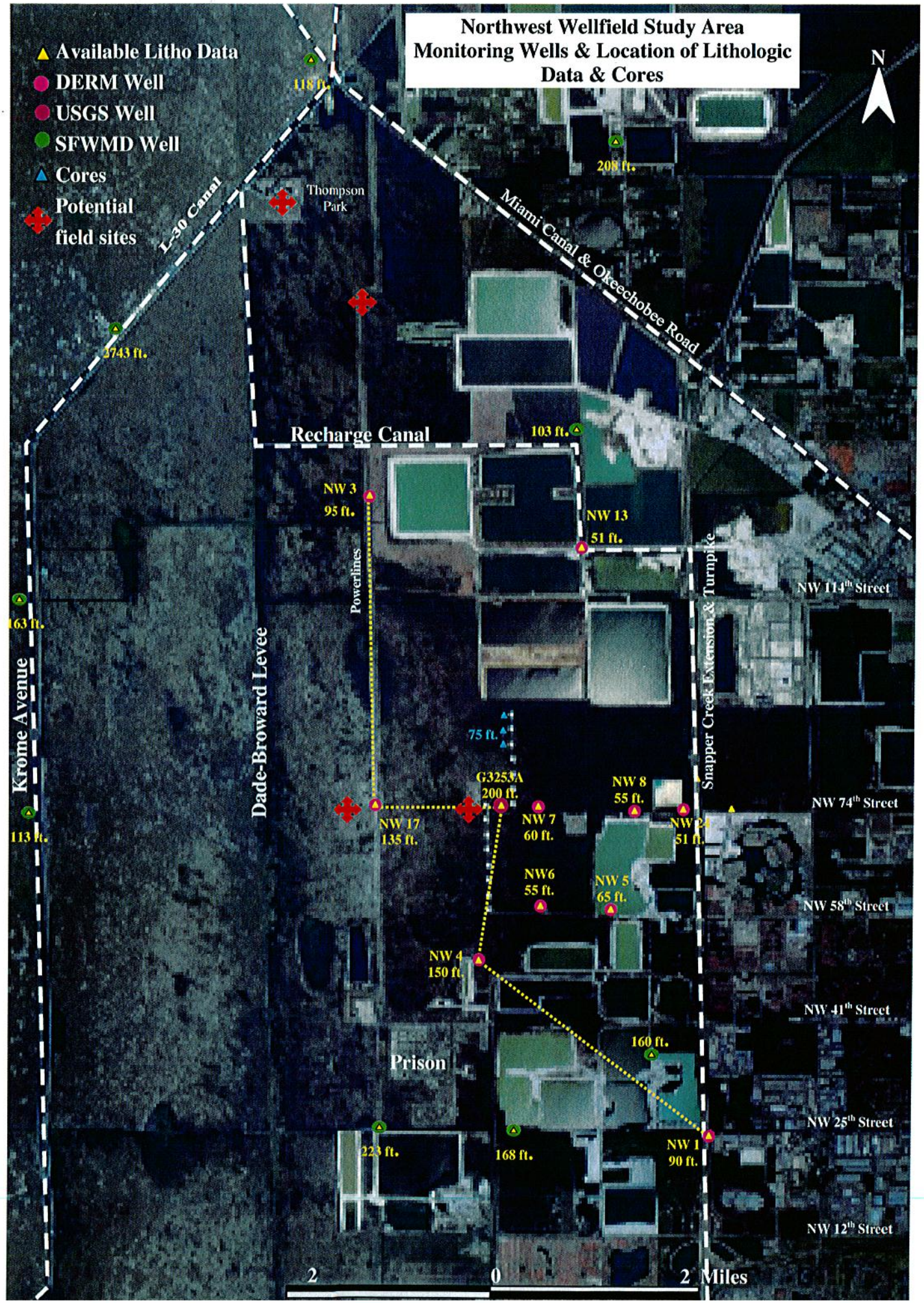
- Prepared For -

U.S. Army Corp of Engineers
Geotechnical Branch
P. O. Box 4970
Jacksonville, Florida 32232-0019

- Prepared By -

LAW Engineering and Environmental Services, Inc.
3901 Carmichael Avenue
Jacksonville, Florida 32207

January 10, 2003


Northwest Wellfield Study Area
Monitoring Wells & Location of Lithologic Data & Cores
Available Litho Data
DERM Well
USGS Well
SFWMD Well
Cores
Potential field sites
N
118 ft.
208 ft.
Thompson Park
I-30 Canal
Miami Canal & Okeechobee Road
3743 ft.
Recharge Canal
103 ft.
NW 3
95 ft.
NW 13
51 ft.
Powerlines
Dade-Broward Levee
Snapper Creek Extension & Turnpike
NW 114th Street
163 ft.
Krome Avenue
75 ft.
G3253A
200 ft.
NW 8
55 ft.
NW 74th Street
NW 17
135 ft.
NW 7
60 ft.
NW 24
51 ft.
113 ft.
NW6
55 ft.
NW 5
65 ft.
NW 58th Street
NW 4
150 ft.
NW 41st Street
160 ft.
Prison
NW 25th Street
223 ft.
168 ft.
NW 1
90 ft.
NW 12th Street
2
0
2 Miles

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RESOURCES CREATING SOLUTIONS

January 10, 2003

Explorations Manager
U.S. Army Corps of Engineers
Geotechnical Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

Subject: **Revised Draft Report of Geotechnical Exploration**
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida
Contract DACW17-01-D-0020
Task Order 11
LAW Project No. 40522-1-8482-15

Dear Ms. Pauline Smith:

Law Engineering and Environmental Services, Inc. (LAW) has performed a geotechnical exploration for the subject project in general accordance with our Proposal No. 40599-0-0000-1936 dated April 26, 2002, and supplemental proposal dated June 7, 2002. Authorizations for our services were provided by the Notice-To-Proceed letter signed by Sara Pines of the U.S. Army Corps of Engineers (USACOE) on June 27, 2002.

In summary, this report presents the results of our core borings and associated laboratory tests, as well as the results of pump tests conducted at three of the selected well cluster locations. In addition, the results of the down-hole geophysical testing conducted by our subcontractor, M.V. Geophysical, are also included herein. Generalized geologic sections showing the various geologic formations encountered by the borings are also provided. We have enjoyed assisting you and look forward to serving as your geotechnical consultant on future projects. If you have any questions concerning this report, please contact us.

Sincerely,

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Brian S. Hathaway, E.I.
Staff Geotechnical Engineer

James A. Horton, P.E.
Principal Geotechnical Engineer
Florida Registration No. 23315

Distribution: Addressee (6)
File (1)

Law Engineering and Environmental Services, Inc.
3901 Carmichael Avenue
Jacksonville, Florida 32207
Phone: (904) 396-5173 • Fax: (904) 396-5703

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1.0 PROJECT INFORMATION

1.1 General

The purpose of this exploration was to obtain data which will be used by others to evaluate the subsurface geologic, hydrologic, and geotechnical characteristics to facilitate the planning of the pilot study area and the overall feasibility assessment of the full-scale in-ground reservoir project.

Project information was provided by Ms. Pauline Smith of U.S. Army Corps of Engineers – Jacksonville District during the period of February 11 to August 14, 2002. We have been furnished with the following documents:

- Core Drilling Instructions
  Prepared by: U.S. Army Corps of Engineers
  Dated: March 27, 2002, revised May 28, 2002

- Aerial Map of proposed Site
  Unauthored
  Undated

We understand that this project is part of the Comprehensive Everglades Restoration Plan (CERP). This particular project deals mainly with the Water Preserve Area (WPA) Feasibility Study of the CERP Project.

We understand that the full-scale Lake Belt In-Ground Reservoir Project proposes to enclose a total of approximately 15 square miles of the existing rock mines and other areas of anticipated excavation with seepage barriers. Due to the porous nature of the near-surface geology, storing water in an aboveground reservoir would not be feasible. The purpose behind the in-ground reservoir is to provide surplus water to areas experiencing drought during the dry season, while during wetter periods, the excess capacity of the reservoir would be used to discharge stormwater runoff into the reservoir when levels of the Water Conservation Area (WCA) are too high. However, without the use of a seepage barrier, a surplus of water to the below-ground reservoir would affect the surficial groundwater aquifer, initiating flood impacts. Likewise, when water would be drawn from the reservoir without seepage barriers a drawdown in the surficial aquifer could result, affecting well fields and increasing seepage from the WCAs to the west (Everglades area).

We understand that the seepage barrier technology has minimal experience in endeavors such as this project intended usage. We understand that the Lake Belt In-Ground Reservoir Technology

Pilot Project intends to address the small-scale implications of the seepage barriers by assessing the hydrogeologic characteristics of the subsurface lithology through the construction of two to five test cells. We understand that the first phase of the pilot test will encompass a test area consisting of approximately 4 acres. The purpose of this study was to preliminarily explore the hydrogeology of the Tamiami Formation, with particular attention to the absence or presence of the Gray Limestone. Based on the results of this exploration, possible locations for the Pilot Study were to be evaluated.

We understand it is desired for us to identify the stratification of the various subsurface geologic formations and provide preliminary engineering data and geotechnical properties of the soils/rocks in order to assist in a regional modeling effort, to be performed by others. As requested, we have included the following items in the report:

- Detailed boring logs of the soil/rock encountered at each core boring location.
- Generalized representations of the various geologic formations encountered.
- Laboratory test results of representative materials recovered from the core borings.
- Well installation and development logs.
- Pump test data reflecting the specific capacity of the control well and the resultant drawdown affect of the companion monitoring wells at the well cluster locations (CB-2, CB-4, & CB-9)
- Pump test water quality testing.
- Down-hole geophysical field logs for five core boring locations (CB-1, CB-2, CB-4, CB-7, & CB-9.
- Discussion of the site characterization which can affect the overall performance of both the full scale reservoir project as well as the small scale pilot study, and recommendations for the study area location.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

In order to explore the subsurface conditions within the perimeter of the proposed reservoir, eight core borings were drilled to depths ranging from 210 feet to 250 feet below the existing ground surface. The boring locations were selected by USACOE personnel and were located in the field by LAW's field engineers using our hand-held Global Positioning System (GPS) device. The borings were drilled by LAW drilling crews based out of both our Jacksonville and Tampa offices. Field engineers from these offices were present during the drilling operations to log the borings and provide direction to the drill crews.

The borings, where sampling was involved, were advanced by a combination of mud rotary drilling using both fish tail drag and roller cone bits and diamond bit rock core barrels using water or bentonite drilling mud as a drilling aid.

Initially drilling services incorporated traditional continuous sampling methods, using either standard penetration testing or rock coring for core borings CB-1 and CB-5 to a depth of 210 feet each. After these boring were completed a modification to the scope of work extended the core boring depths, each to 250 feet. Additionally, to help expedite the drilling services, the SPT-driven sampling intervals were also modified to a five-foot on-center spacing. The modification applied only for spoon samples within a depth ranges from the ground surface to a depth of 80 feet and again between a depth range from 160 feet to 250 feet. Rock core runs were generally sampled in 5-foot core runs. Standard split-spoon sampling was employed until the specified refusal blow count criteria (in excess of 50 blows per 6 inches) were encountered, at which point rock coring was initiated. However, in some instances refusal blow count materials were not suitable for rock coring based on core recovery. The cemented and/or dense sand seams were generally advanced to the next testing interval using a typical tri-cone roller bit or fish-tail drag bit.

As noted in the Appendices, the borings encountered both soil and rock materials. Because limestone was encountered relatively close to the surface (<15 feet below ground surface) which required standard rock coring, six inch diameter casing was set soon after commencement of the boring. Due to the presence of the required casing, the interpretation of drilling fluid losses may not accurately reflect the water loss that would have been recorded in an open bore hole. The upper 90 to 100 feet of material (the Biscayne Aquifer Formation) is considered relatively porous.

The approximate boring locations are shown on the Field Exploration Plan in Appendix A. The boring locations were subsequently surveyed by Allen Engineering, Inc. Ground surface elevations (NAVD 1988) and State Plane FL East NAD 1983 northing and easting coordinates were also determined for each boring location by Allen Engineering, Inc., and are provided on each Drilling Log in Appendix A.

We attempted to obtain the requested undisturbed Shelby tube samples within the Tamiami Formation and the Hawthorne Formation; however, due to the densities and non-plastic nature of the soils at the requested sampling intervals, limited to no recovery was obtained. The Shelby tube samples that were collected were capped, sealed and transported back to our Jacksonville soils laboratory where the designated laboratory tests were performed. The locations of these samples are shown on the Drilling Logs.

The Drilling Logs, in Appendix A, present the penetration resistances, coring times, down pressures, drilling fluid return, and the soil descriptions for each boring. The stratification lines and depth designations on the boring records represent the approximate boundaries between soil and rock types. In some instances, the transition between soil and rock types may be gradual. Brief descriptions of the exploratory drilling and sampling techniques used are presented in the Field Procedures section of Appendix A.

In addition to the borings, a total of nine 4-inch monitoring wells were installed at the selected borehole locations CB-2, CB-4 and CB-9. Three wells were each installed at each of the three well clusters. The screen intervals were selected by your office. The wells were installed by roto-sonic drilling methods which used high frequency, low amplitude vibration to install 8-inch diameter casing.

Four-inch diameter schedule 40 PVC was then installed for the wells. A centralizer was placed both at the bottom of the screen and at about 4 feet below the ground surface. A sand pack consisting of 20 - 30 silica sand was then placed around the screen to a height of 2.5 to 5 feet above the top of the screen. A bentonite seal was then placed on the top of the sand pack. The bentonite seal consisting of bentonite chips varied in thickness from 3.5 to 10 feet. The remaining annular space was then grouted to the surface using a cement based grout with a slight amount of bentonite to help avoid shrinkage.

The wells were developed by pumping with a submersible pump. Development continued for the discharge of five well volumes with measurements of turbidity, pH, temperature and conductivity for

each well volume. These measurements are tabulated in Appendix E within the Well Construction Report.

The following table provides the well designation number, the inner casing surface elevations (NAVD 1988) and State Plane FL East NAD 1983 northing and easting coordinates (also performed by Allen Engineering, Inc.). Table 2, summarizes the depth of various components used in the well construction. Well Construction Reports as well as the Well Development Logs are provided in Appendix E.

Table 1. Monitoring Well Location/Elevation

Well Designation No.	Northing	Easting	Top of Casing Elevation (feet, NGVD 1988)
CP02-LKBPP-CB-02A	590353	850777	7.0
CP02-LKBPP-CB-02B	590353	850780	5.9
CP02-LKBPP-CB-02C	590353	850782	7.3
CP02-LKBPP-CB-04A	577129	849152	8.3
CP02-LKBPP-CB-04B	577123	849161	8.5
CP02-LKBPP-CB-04C	577117	849169	8.6
CP02-LKBPP-CB-09A	561459	857051	7.9
CP02-LKBPP-CB-09B	561467	857045	7.7
CP02-LKBPP-CB-09C	561475	857039	8.1

Table 2. Monitoring Well Component Depths

Well Designation	Depth to Top of Bentonite Sand	Depth to Top Sand Pack	Depth of Screen Interval
CP02-LKBPP-CB-02A	87.5	91.0	94' – 114'
CP02-LKBPP-CB-02B	119.0	123.5	126' – 146'
CP02-LKBPP-CB-02C	163.0	167.0	170' – 190'
CP02-LKBPP-CB-04A	85.0	95.0	100' – 120'
CP02-LKBPP-CB-04B	118.0	122.5	127' – 157'
CP02-LKBPP-CB-04C	145.0	155.0	160' – 220'
CP02-LKBPP-CB-09A	90.0	100.0	105' – 120'

Well Designation	Depth to Top of Bentonite Sand	Depth to Top Sand Pack	Depth of Screen Interval
CP02-LKBPP-CB-09B	105.0	115.0	120' – 145'
CP02-LKBPP-CB-09C	135.0	145.0	150' – 190'

A relatively short-duration (two hours) pump test was performed at each well cluster (total of 3 tests). The designated control wells were selected by your office. The purpose of these short duration pump tests was to facilitate calculation of specific yield values thereby providing a general indication of the hydraulic properties of the well intake interval. The pump tests were performed by placing a three inch diameter Grundflos Redi-Flo3 submersible pump to a level of approximately 5 feet above the top of the screen interval. A smaller capacity pump (Grundfos Redi-Flo2) was used for the pump test at the core boring CB-2 location to avoid pumping the well dry. The water level in the central (pumping) well, as well as the companion wells, were measured by 30 psi Mini-Trolls. Well discharge volumes were determined using a discharge flow meter manufactured by Fill-Rite. The results of these tests are presented in Appendix F. A general description of the testing procedures is provided in the Field Procedures in Appendix A. A summary of these results are presented in the following table.

2.1.1 Specific Capacity – The specific capacity (C_s) of selected wells was calculated to help provide a general indication of the hydraulic properties of the stratigraphic intervals penetrated by the well intake screens. The calculated specific capacity values are based on the following solution:

$$C_s = Q/\Delta h_w$$

where:

Q = pumping rate

Δh_w = draw down in the well due to both aquifer draw down and well loss

As indicated on the attached analysis reports in Appendix F, the specific capacities of wells CB2A, CB4B, and CB9C are 6.65 E-1 ft^2/min, 8.15 ft^2/min, and 4.15 ft^2/min, respectively.

Table 3. Summary of Pump Test Results

Test Location	Screened Interval (Depth, Ft.)	Start of Test Water Level (BGS, Ft.)	Pump Rate (GPM)	Maximum Drawdown (Ft.)	Total Pumping Time (Hrs.)	Specific Capacity C_S (Ft^2/Min)
CP-02-LKBPP-CB-02A	94 - 114	4.6	1.2	37.2	2.06	6.65E-1
CP-02-LKBPP-CB-04B	127 - 157	4.3	17.5	17.1	2.04	8.15E+1
CP-02-LKBPP-CB-09C	150 - 190	4.5	18.0	4.6	2.04	4.15+1

2.1.2 Vertical Hydraulic Gradient - The vertical hydraulic gradients (I_v) were calculated to help provide an indication of the potential hydraulic interaction between strata penetrated by the well intake screens of the CB2, CB4, and CB9 well series. The calculated vertical hydraulic gradient values are based on the following solution:

$$I_v = dh/dl$$

where:

I_v = vertical hydraulic gradient
dh = difference in head
dl = distance between screens (midpoint)
+ values = downward flow
- values = upward flow

As indicated on the attached calculation sheet, the CB2, CB4, and CB9 well series exhibit vertical hydraulic gradients ranging from –0.0440 ft/ft to +0.0978 ft/ft.

In the CB2 well series, the interval between wells CB2A and CB2B exhibits a downward gradient. The intervals between wells CB2B and CB2C, and CB2C and CB2A exhibit upward hydraulic gradients.

In the CB4 well series, the intervals between wells CB4A and CB4B, and CB4 and CB4C exhibit downward gradients. The interval between well CB4B and CB4C exhibits an upward gradient.

In the CB9 well series, the intervals between wells CB9B and CB9C, and CB9C and CB9A exhibit downward gradients. The interval between wells CB9A and CB9B exhibits an upward hydraulic gradient.

Table 4. Vertical Hydraulic Gradient Summary

Stations	Screened Intervals (Depth, Ft.)	Vertical Hydraulic Gradient (I_v)
CP-02-LKBPP-CB-02A/2B	94 - 114 and 126 - 146	0.0109 ↓ downward flow
CP-02-LKBPP-CB-02B/2C	126 - 146 and 170 - 190	-0.0255 ↑ upward flow
CP-02-LKBPP-CB-02C/2A	170 - 190 and 94 - 114	-0.0101 ↑ upward flow
CP-02-LKBPP-CB-04A/4B	100 - 120 and 127 - 157	0.0978 ↓ downward flow
CP-02-LKBPP-CB-04B/4C	127 - 157 and 160 - 220	-0.0054 ↑ upward flow
CP-02-LKBPP-CB-04C/4A	160 - 220 and 100 - 120	0.0359 ↓ downward flow
CP-02-LKBPP-CB-09A/9B	105 - 120 and 120 - 145	-0.0440 ↑ upward flow
CP-02-LKBPP-CB-09B/9C	120 - 145 and 150 - 190	0.0272 ↓ downward flow
CP-02-LKBPP-CB-09C/9A	150 - 190 and 105 - 120	0.0024 ↓ downward flow

Down-hole geophysical testing was performed by MV Geophysical at five core boring locations: CB-1, CB-2, CB-4, CB-7 and CB-9 to obtain hydrogeologic characterization of the subsurface lithology. Due to conditions of the boreholes at the completion of standard drilling and sampling, namely consisting of a mudded and or cased bore hole, not all of the desired down-hole geophysical methods could be performed. Copies of the field logs were presented to the USACOE at the completion of fieldwork. The USACOE personnel analyzed the data obtained from these tests and well screen intervals were selected based on prior lithology knowledge and these geophysical results. Both an electronic copy and paper copy of the field geophysical tests have been provided to your office under separate cover.

2.2 Laboratory Testing

In order to aid in classifying the soils and to help quantify and correlate engineering properties, laboratory classification tests were performed on representative soil samples obtained from the core borings and undisturbed samples. The quantity and types of tests, as well as the samples to be tested, were selected by USACOE personnel. The laboratory classification testing included the following:

- 31 grain size distribution tests
- 15 hydrometer analysis
- 17 Atterberg limits (plasticity) tests
- 19 specific gravity tests
- 33 moisture content tests

- 12 constant head permeability tests
- 9 unconfined compression tests

The results of these tests are presented on the Summary of Laboratory Test Results sheets in Appendix B. Additionally, one Unconsolidated-Undrained triaxial test and five direct shear tests were performed on samples obtained from the core borings. The results of these tests are presented in Appendix C and Appendix D, respectively.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site is located in northwestern Miami-Dade County, Florida, near the vicinity of the intersection of U.S. Highway 27 and The Florida Turnpike. The proposed areas of exploration extends northward to the Dade and Broward County lines and also extends southward into the Tarmac rock quarry property. We understand some of the land use, within the proposed exploration area, consists or consisted of rock-mining quarries. We further understand that some of the quarries on this site extend to depths of 80 feet in depth.

Generally the boring locations were located adjacent to canal access roadways. Several of these access roadways were managed by the South Florida Water Management District (S.F.W.M.D) and required a key to obtain access through the gated entryways. The canal banks are generally maintained and managed by the S.F.W.M.D. A standard truck mounted two-wheel drive drill rig was used to access these locations and drill the borings. The figures provide below offer an illustration of the typical site topography and canal systems.

We note for your awareness and planning, that during our drilling services, our drilling equipment was generally left on-site, within the gated and locked S.F.W.M.D. management area. Vandalism and looting of our drill rig, including our truck batteries, our drill tools and pumps occurred on multiple occasions.

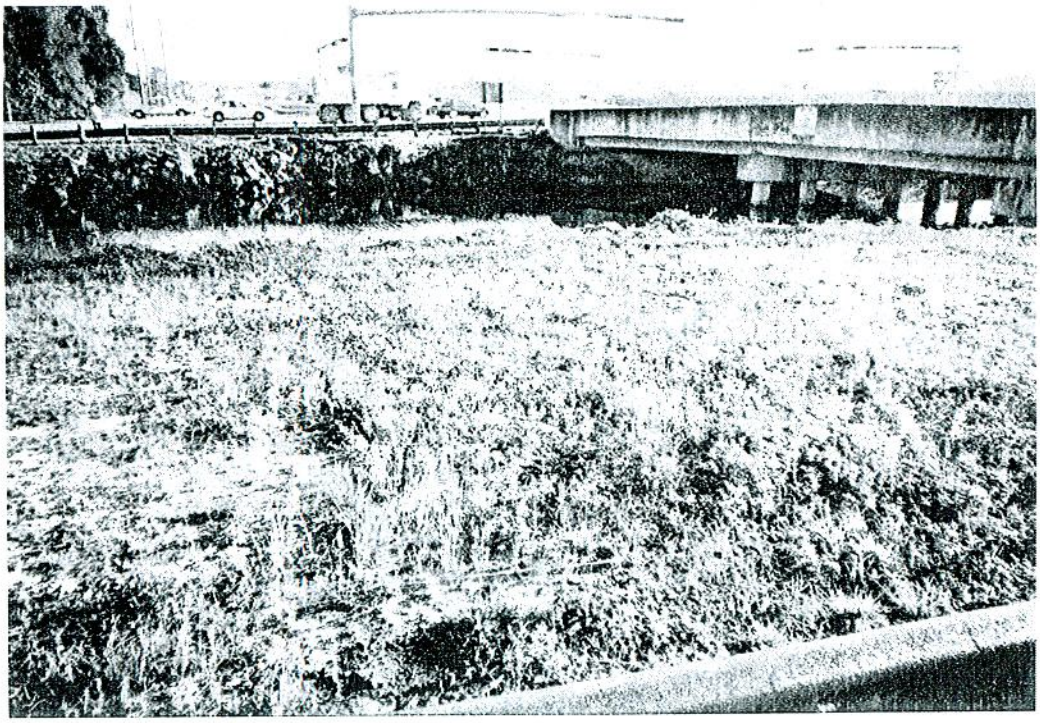


Figure 1. Core Boring CB-5 Location (view to the northeast)

Figure 2. Core Boring CB-4 Location (view to the west)

3.2 Area Geology

The geology in the area of the borings is reasonably typical of South Florida. This consists of the undifferentiated units of the Biscayne Aquifer, primarily the Miami Limestones and the Ft. Thompson Formation. This upper unit was underlain by the Tamiami Formation which may or may not have contained the Gray Limestone Aquifer Hydrogeologic Unit. Below the Tamiami Formation, the bottom of which constitutes the base of the Surficial Aquifer System, the Hawthorne Formation was encountered.

3.3 Subsurface Conditions

A pictorial view of the subsurface conditions encountered are presented on the Generalized Subsurface Profile. Locations of the well screens are also presented in this same document. In addition to the profiles, each boring profile is shown with key geophysical signatures.

In addition, contour maps have been presented which display the following:

- top of the Tamiami Formation
- top of the Gray Limestone Formation
- thickness of the Gray Limestone Formation
- top of the Hawthorne Formation

From these generalized profiles, we note the following:

- The top of the Tamiami Formation tends to slope downward from west to east from about Elevation -69.5 to Elevation -113.1.

- The Gray Limestone Formation was not encountered in the eastern section of the site, but was encountered with a thickness of about 30 feet in the western most boring.

- The top of the Hawthorne Formation was relatively level, being encountered from Elevation -171.1 to Elevation -185.2.

- In the borings where the gray limestone was not encountered, zones of moderately cemented soils were noted at similar elevation, Elevation -130 to Elevation -150.

- Within the Hawthorne Formation, the percent fines content generally increased with increasing depth into this formation. The fines content range, for the samples tested, varied from 10 to 45 percent.

4.0 PRELIMINARY EVALUATION AND RECOMMENDATIONS

4.1 General

We understand the purpose of the study was to provide general geotechnical and hydrogeologic data to help in the selection of a Pilot Test Study site. We understand that it is anticipated that the use of an impervious seepage boundary, such as slurry trench walls, to minimize reservoir loss is anticipated. Based on the subsurface conditions encountered at this site, the seepage barrier will likely be imbedded within the semi-confining unit located below the Biscayne Aquifer. The degree of embedment may vary across the Pilot Study Area.

The seepage conditions that occur within the semi-confining Tamiami Formation will be directly related to hydraulic conductivity of this formation. Based on our field services, along with the results of our laboratory test results, a highly variable fines content exists within this formation. Generally, the soils encountered within the Tamiami Formation consisted of fine quartz sands with varying degrees of silt/clay content.

4.2 Pilot Test Study Areas

It is our understanding that the selected location for the pilot test study area is desired to be performed in the geologic setting that promotes the worst case (greatest) leakance potential. Based on our exploration and geophysical data, we have identified areas where the influence of the higher permeability, Gray Limestone is apparent.

In our opinion, a combination of the influence of the Gray Limestone compiled with a relatively thin low fines content material in the upper Tamiami above the Gray Limestone, would represent the worst case potential.

From a very general perspective the three pump tests revealed the following:

- At CB-2, pumping from the well located in the upper semi-confining unit did not impact wells in the Gray Limestone and lower semi-confining unit. We note, however, the upper well was placed in a very high fines content portion of this stratum.

- At CB-4, pumping from the well located in the Gray Limestone did not impact the wells above the upper semi-confining unit. It did impact the well located in the lower semi-confining unit, however, we note that the filter pack of well CB-4C may have been in close enough proximity to the base of the Gray Limestone Stratum to interact with the filter pack of well CB-4B.

- At CB-9, pumping from the well located in the lower elevations of the Tamiami Formation did not impact the higher wells located above within this formation. We note that at the same pumping rates that were achieved for the CB-4 well in Gray Limestone, less drawdown was achieved.

Based on the data collected and using the criteria above, in our opinion, areas near the vicinity of the core boring CB-4, CB-5 and CB-7 should be further evaluated for consideration.

A table of key geotechnical impactors are shown in the table below:

Location	Depth to Top of Semi-Confining Unit (ft.)	Thickness of Semi-Confining Unit (ft.)	Depth to Top of Gray Limestone (ft.)	Measured Percent Fines Content of Semi-Confining Unit	Other Key Information
CB-4	85	42	127	14% @ 89 ft. 34% @ 120 ft.	---
CB-5	100	46	146	26% @ 112 ft. 19% @ 126 ft.	---
CB-7	80	46	126	---	Lab: H = 7.3×10^{-4} cm/s

Based upon this information, we would rate in order of greatest to least seepage potential as follows: CB-4, CB-7 and CB-5.

4.3 Recommended Future Exploration and Testing

Additional subsurface exploration will be required to finalize the selection of the most conservative area to perform the pilot study. As indicated above, we believe key features in this selection should be:

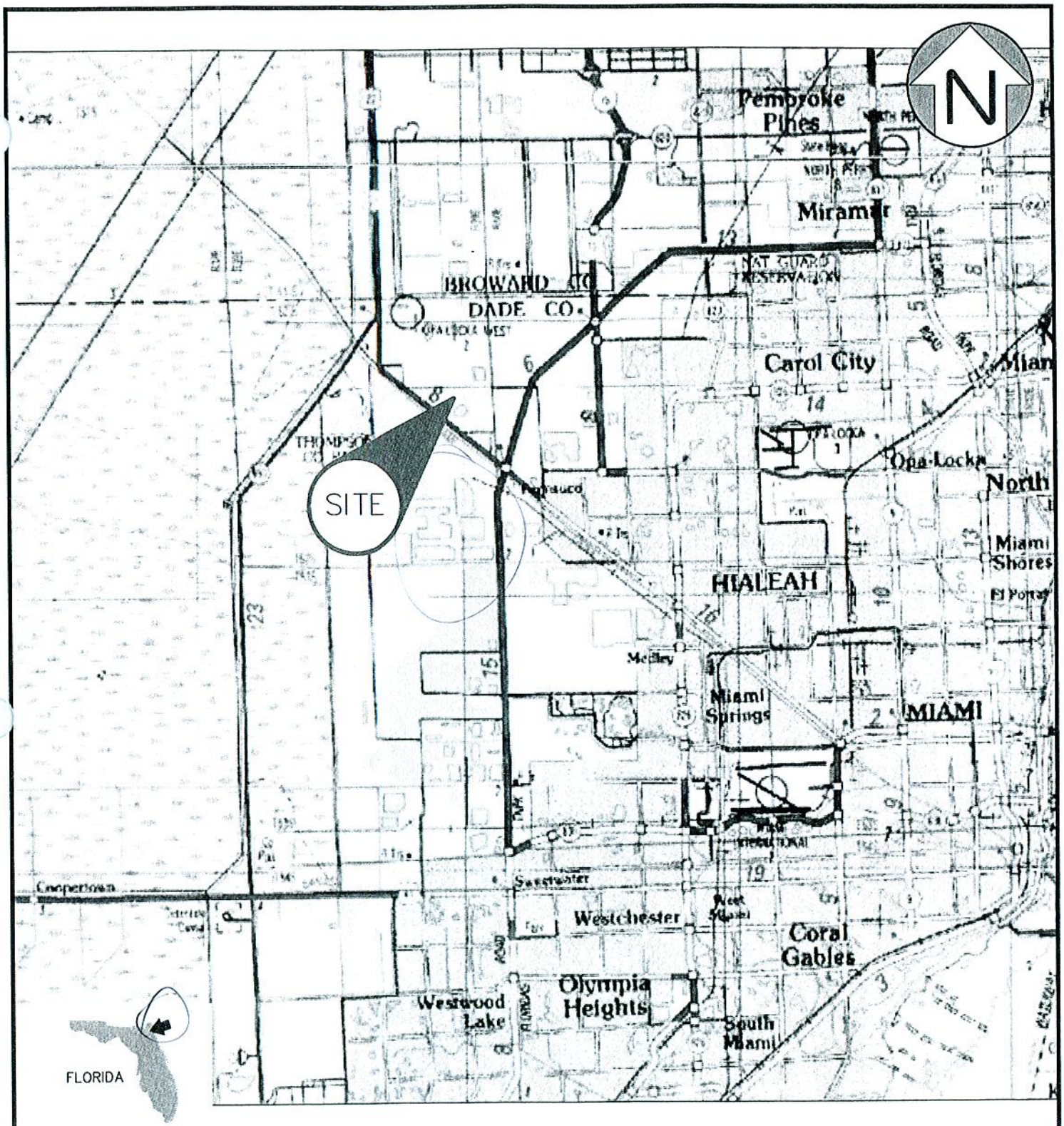
- depths to the top of the semi-confining unit

- thickness of the upper semi-confining unit
- the fines content directly relating to the hydraulic conductivity of the semi-confining unit
- the presence of the Gray Limestone Aquifer

Depending upon the desirability of the sites rated above from a availability and logistics perspective, we would further the study of one or all of these locations. Key aspects of this study should include:

- a more in depth analysis of the fines content variations of the upper semi-confining unit
- wells installed at various elevations within the upper semi-confining unit and in the Gray Limestone
- longer- duration pump tests

APPENDIX A



QUADRANGLE LOCATION

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JACKSONVILLE, FL 32207
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SITE LOCATION MAP

Lake Belt In-Ground Reservoir Technology Pilot Project
Dade County, Florida

0 3000' 6000'
GRAPHIC SCALE

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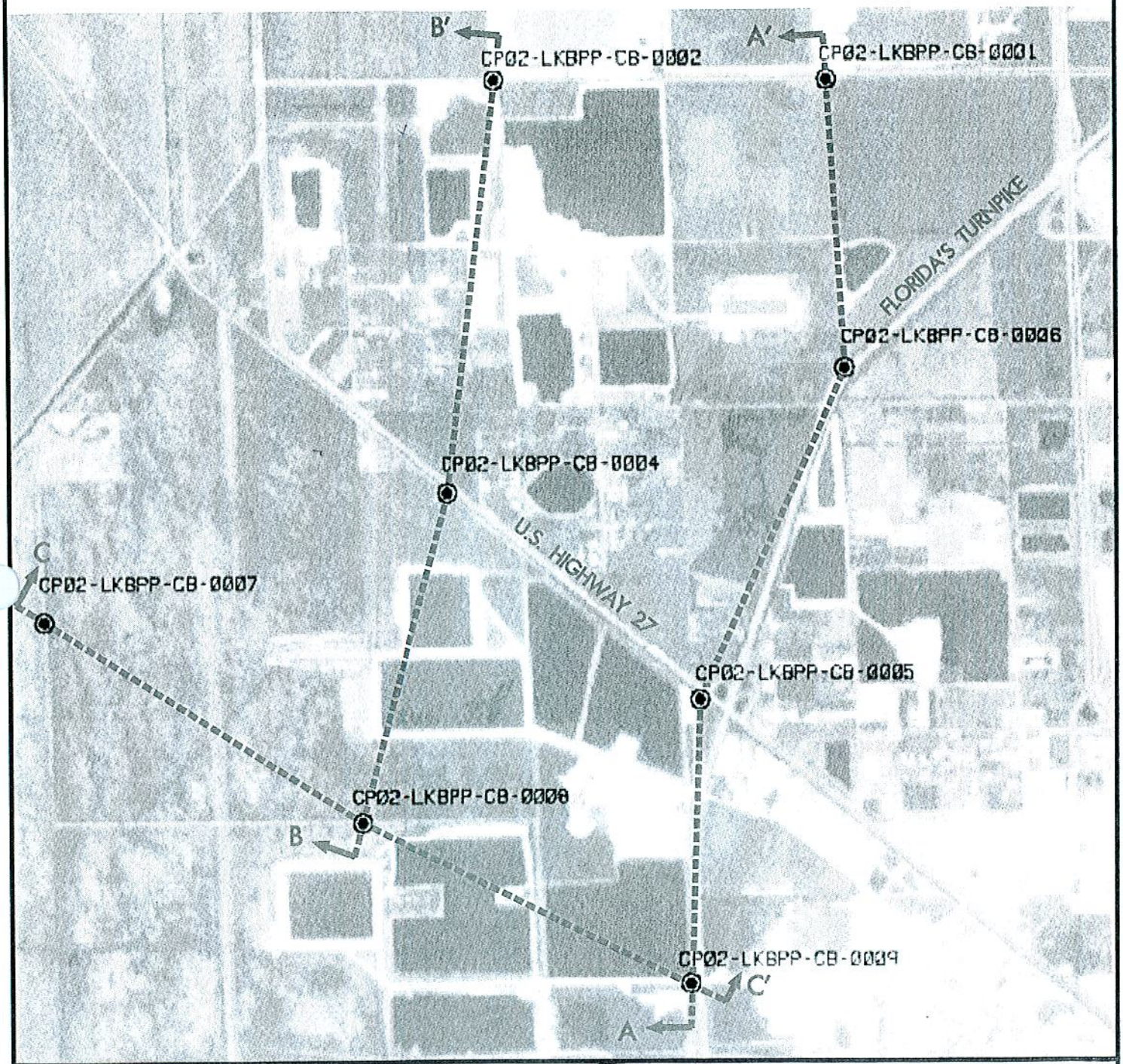

LEGEND

- ⊙ CORE BORING LOCATION
- C C' LINE OF GEOLOGIC SECTION

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FIELD EXPLORATION PLAN

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

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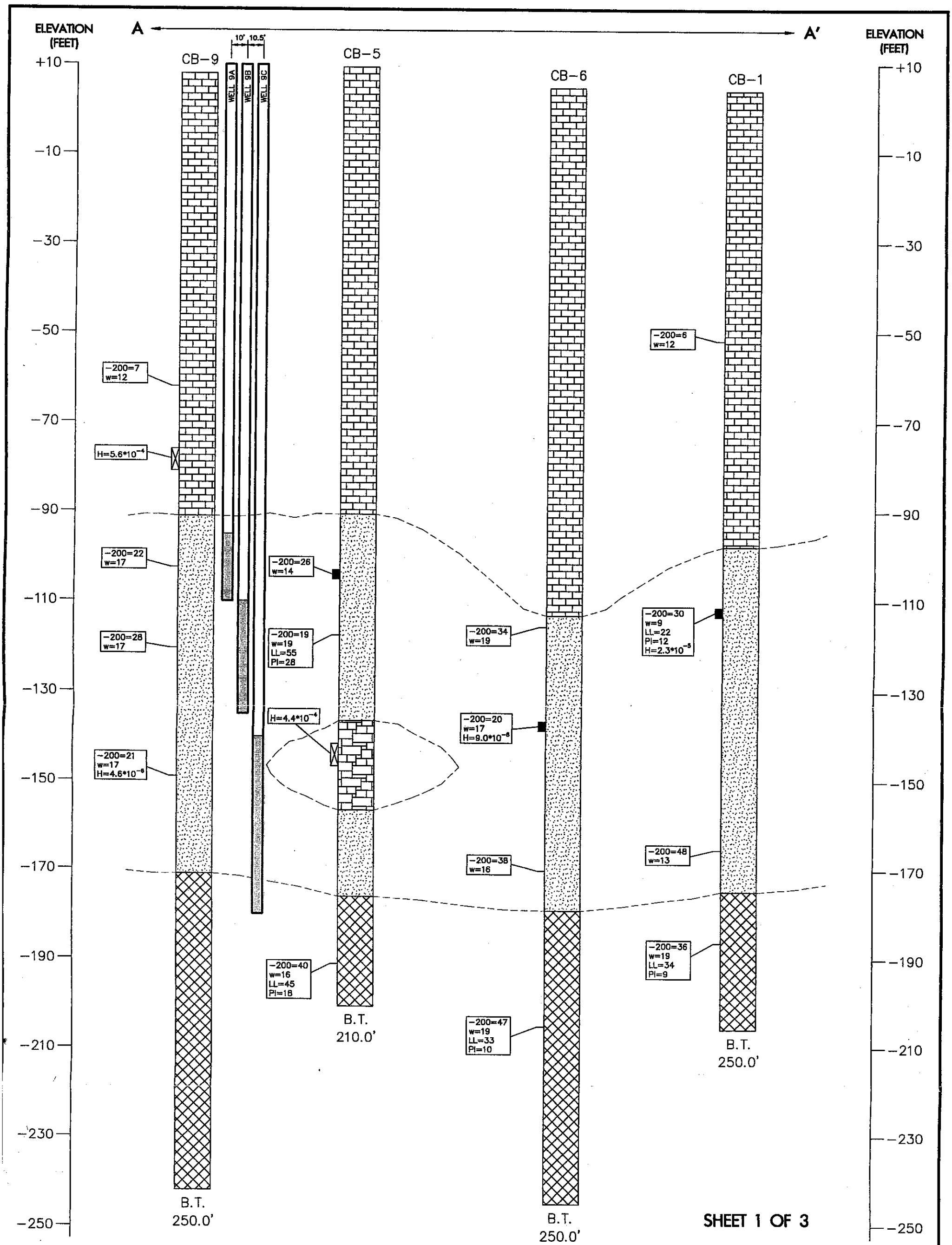

SHEET 1 OF 3

LEGEND

- BISCAYNE AQUIFER
- GRAY LIMESTONE FORMATION
- TAMIAMI FORMATION
- HAWTHORNE FORMATION
- CORE RUN
- UNDISTURBED SAMPLE
- -200 PERCENT PASSING NO. 200 SIEVE
- w MOISTURE CONTENT
- LL LIQUID LIMIT
- PI PLASTICITY INDEX
- H HYDRAULIC CONDUCTIVITY

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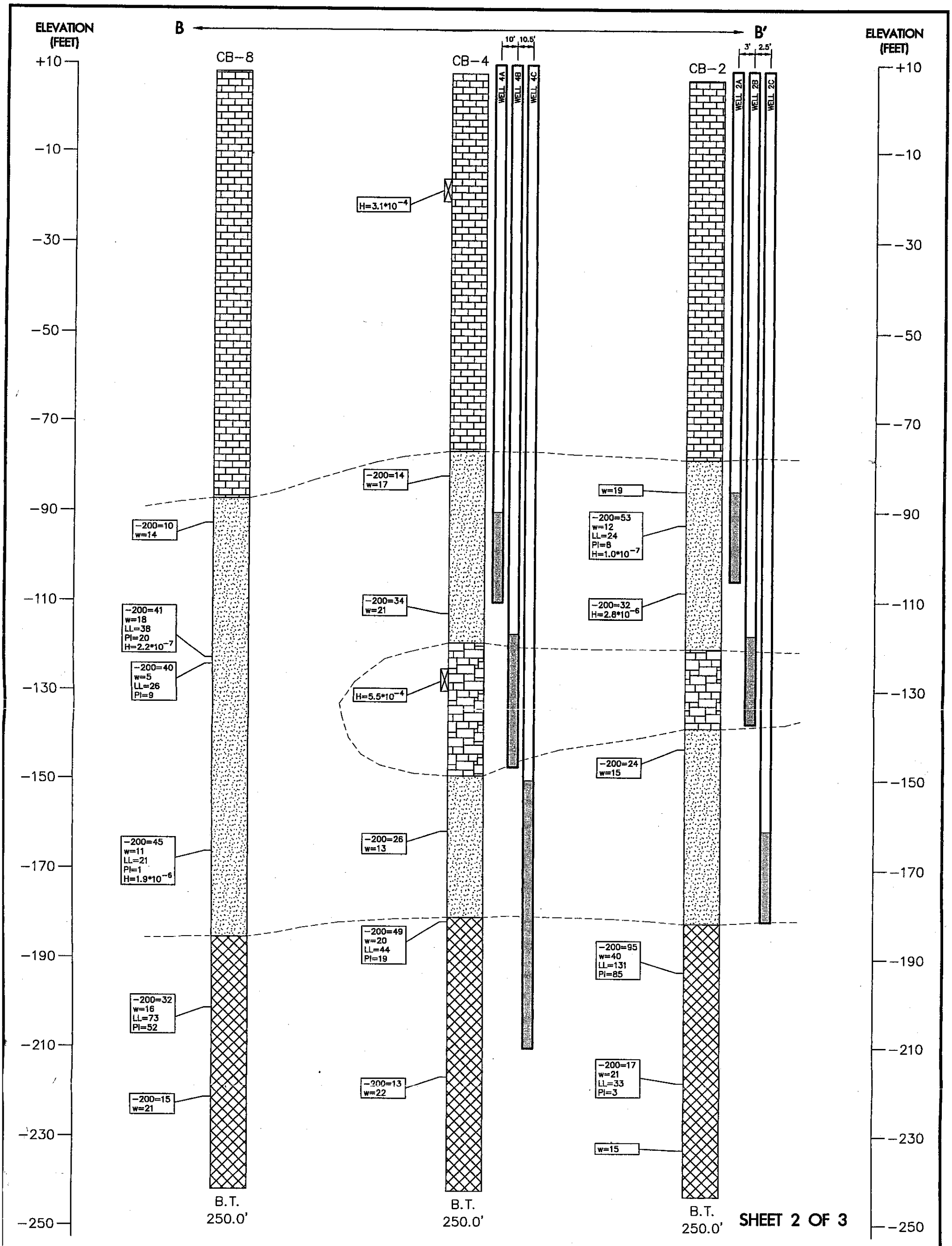
(904) 396-5173

GENERALIZED GEOLOGIC SECTION

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 11/26/02	SCALE: 1"=20'(V)
CHECKED: BSH	PROJ. NO. 40521-2-8482-15	1"=5000'(H)



SHEET 2 OF 3

LEGEND

- BISCAYNE AQUIFER
- GRAY LIMESTONE FORMATION
- TAMIAMI FORMATION
- HAWTHORNE FORMATION
- CORE RUN

–200 PERCENT PASSING NO. 200 SIEVE
w MOISTURE CONTENT
LL LIQUID LIMIT
PI PLASTICITY INDEX
H HYDRAULIC CONDUCTIVITY

LAW
RESOURCES CREATING SOLUTIONS
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

GENERALIZED GEOLOGIC SECTION

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 11/26/02	SCALE:	1"=20'(V)
CHECKED: BSH	PROJ. NO. 40521-2-8482-15		1"=5000'(H)

C ⟵ ⟶ C′

ELEVATION (FEET)

+20
0
−20
−40
−60
−80
−100
−120
−140
−160
−180
−200
−220
−240

CB−7

CB−8

CB−9

10′ 10.5′

WELL 9A
WELL 9B
WELL 9C

−200=32
w=14
LL=38
PI=16

H=7.3*10^{-4}

−200=10
w=14

−200=41
w=18
LL=38
PI=20
H=2.2*10^{-7}

−200=40
w=5
LL=26
PI=9

−200=45
w=11
LL=21
PI=1
H=1.9*10^{-6}

−200=32
w=16
LL=73
PI=52

−200=15
w=21

−200=7
w=12

H=5.6*10^{-4}

−200=22
w=17

−200=28
w=17

−200=21
w=17
H=4.6*10^{-6}

B.T. 250.0′

B.T. 250.0′

B.T. 250.0′

ELEVATION (FEET)

+20
0
−20
−40
−60
−80
−100
−120
−140
−160
−180
−200
−220
−240

SHEET 3 OF 3

LEGEND

- BISCAYNE AQUIFER
- TAMIAMI FORMATION
- GRAY LIMESTONE FORMATION
- HAWTHORNE FORMATION
- CORE RUN
- −200 PERCENT PASSING NO. 200 SIEVE
- w MOISTURE CONTENT
- LL LIQUID LIMIT
- PI PLASTICITY INDEX
- H HYDRAULIC CONDUCTIVITY

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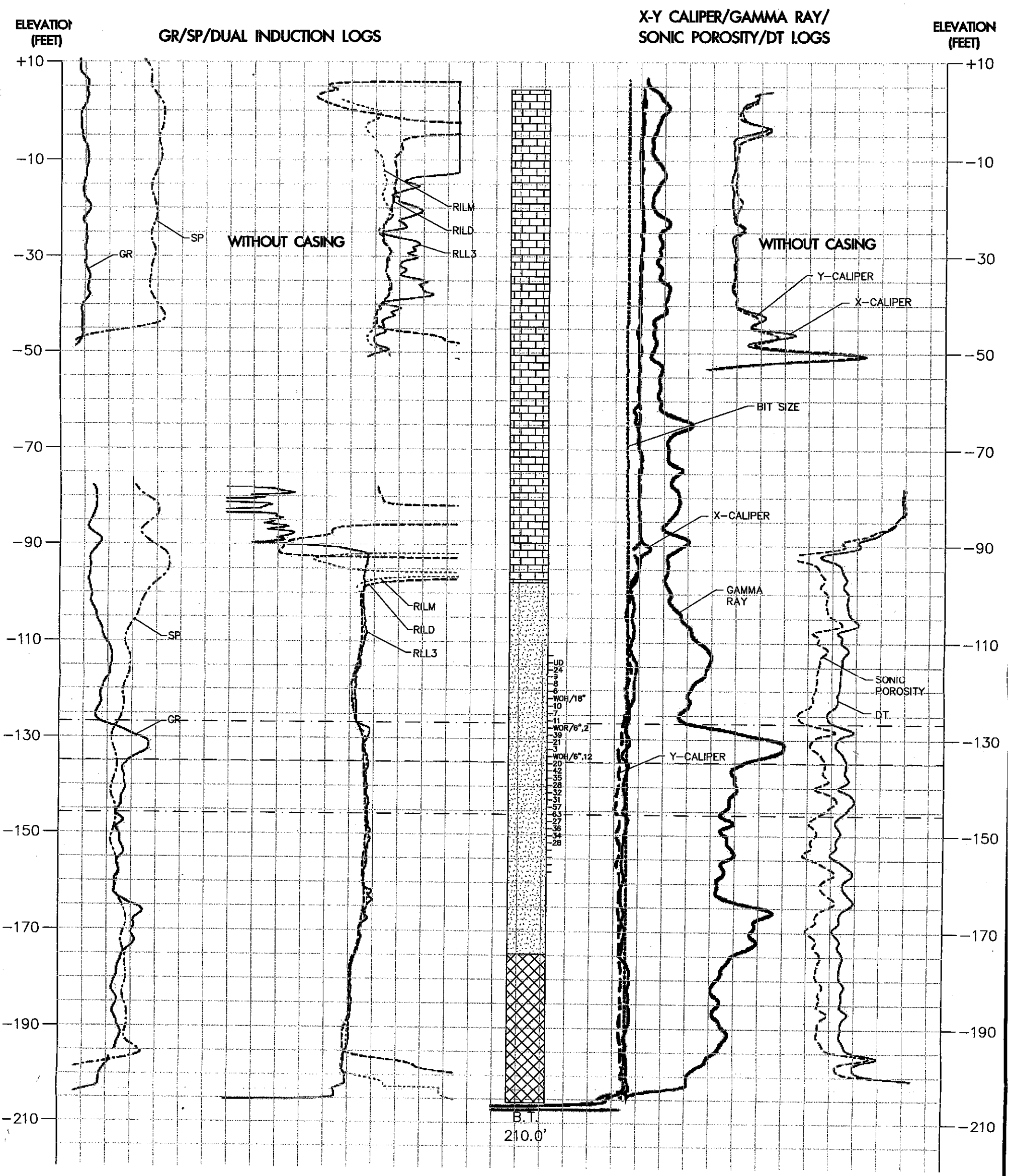
JACKSONVILLE, FL 32207
(904) 396−5173

GENERALIZED GEOLOGIC SECTION

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 11/26/02	SCALE:	1″=20′(V)
CHECKED: BSH	PROJ. NO. 40521-2-8482-15		1″=5000′(H)

CB-1



NOTE: DETAILED SIGNAL UNITS DEPICTED ON FIELD LOGS.

LEGEND

- BISCAYNE AQUIFER
- TAMIAMI FORMATION
- GRAY LIMESTONE FORMATION
- HAWTHORNE FORMATION

LAW
RESOURCES CREATING SOLUTIONS

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JACKSONVILLE, FL 32207
(904) 396−5173

GEOPHYSICAL SIGNATURE WITH PROFILE
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/8/03	SCALE: AS SHOWN
CHECKED: BSH	PROJ. NO. 40521-2-8482-15	

CB-2

ELEVATION (FEET)

+10 −10 −30 −50 −70 −90 −110 −130 −150 −170 −190 −210 −230 −250

GR/SP/DUAL INDUCTION LOGS

WITHOUT CASING

SP
GR
RILM
RILD
RLL3

X-Y CALIPER/GAMMA RAY/ SONIC POROSITY/DT LOGS

WITHOUT CASING

BIT SIZE
X-CALIPER
GAMMA RAY
Y-CALIPER
DT
SONIC POROSITY

13 10 5 14 UD 13 31 52 33 29 49 36 30 29 42 75+ 57 70 28 33 48 43 47 57 27 75+ 75+ 75+ 95+

B.T. 250.0'

NOTE: DETAILED SIGNAL UNITS DEPICTED ON FIELD LOGS.

LEGEND

- BISCAYNE AQUIFER
- GRAY LIMESTONE FORMATION
- GRAY SANDY LIMESTONE FORMATION
- TAMIAMI FORMATION
- HAWTHORNE FORMATION

LAW
RESOURCES CREATING SOLUTIONS
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

GEOPHYSICAL SIGNATURE WITH PROFILE
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/8/03	SCALE: AS SHOWN
CHECKED: BSH	PROJ. NO. 40521-2-8482-15	

CB-4

ELEVATION (FEET)

GR/SP/DUAL INDUCTION LOGS

X-Y CALIPER/GAMMA RAY/ SONIC POROSITY/DT LOGS

ELEVATION (FEET)

+10
−10
−30
−50
−70
−90
−110
−130
−150
−170
−190
−210
−230
−250

SP
GR
WITHOUT CASING
RILM
RILD
RLL3
WOH/6"
5
4
5
WOH/6"
11
13
29
75+
RQD
53
40
5
79
BIT SIZE
X-CALIPER
Y-CALIPER
GAMMA RAY
SONIC POROSITY
DT
B.T. 250.0'

NOTE: DETAILED SIGNAL UNITS DEPICTED ON FIELD LOGS.

LEGEND

- BISCAYNE AQUIFER
- TAMIAMI FORMATION
- GRAY LIMESTONE FORMATION
- HAWTHORNE FORMATION

LAW
RESOURCES CREATING SOLUTIONS
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

GEOPHYSICAL SIGNATURE WITH PROFILE
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/8/03	SCALE: AS SHOWN
CHECKED: BSH	PROJ. NO. 40521-2-8482-15	

CB-7

ELEVATION (FEET)

GR/SP/DUAL INDUCTION LOGS

X-Y CALIPER/GAMMA RAY/ SONIC POROSITY/DT LOGS

ELEVATION (FEET)

+10 −10 −30 −50 −70 −90 −110 −130 −150 −170 −190 −210 −230 −250

GR
SP
WITHOUT CASING
RILM
RILD
RLL3
BIT SIZE
WITHOUT CASING
X-CALIPER
GAMMA RAY
Y-CALIPER
DT
SONIC POROSITY
DT

5
WOR/18"
18
24
24
WOR/6"
42
100+
RQD
RQD
RQD
RQD
39
27
24
26
29
80
30
28
39
31
30
20
31
96
71
63
44

B.T.
250.0'

NOTE: DETAILED SIGNAL UNITS DEPICTED ON FIELD LOGS.

LEGEND

- BISCAYNE AQUIFER
- GRAY LIMESTONE FORMATION
- GRAY SANDY LIMESTONE FORMATION
- TAMIAMI FORMATION
- HAWTHORNE FORMATION

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JACKSONVILLE, FL 32207
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GEOPHYSICAL SIGNATURE WITH PROFILE
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/8/03	SCALE: AS SHOWN	
CHECKED: BSH	PROJ. NO. 40521-2-8482-15		

ELEVATION (FEET)

GR/SP/DUAL INDUCTION LOGS

CB-9

X-Y CALIPER/GAMMA RAY/ SONIC POROSITY/DT LOGS

ELEVATION (FEET)

+10
−10
−30
−50
−70
−90
−110
−130
−150
−170
−190
−210
−230
−250

GR
SP
RILM
RILD
RLL3
BIT SIZE
X-CALIPER
GAMMA RAY
Y-CALIPER
SONIC POROSITY
DT

4
10
17
4
9
16
13
41
50
13
17
8
23
67
23
24
21
9
34
60
54
50+
36
81
26
58
20
44

B.T.
250.0'

NOTE: DETAILED SIGNAL UNITS DEPICTED ON FIELD LOGS.

LEGEND

- BISCAYNE AQUIFER
- TAMIAMI FORMATION
- GRAY LIMESTONE FORMATION
- HAWTHORNE FORMATION

LAW
RESOURCES CREATING SOLUTIONS
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

GEOPHYSICAL SIGNATURE WITH PROFILE
Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

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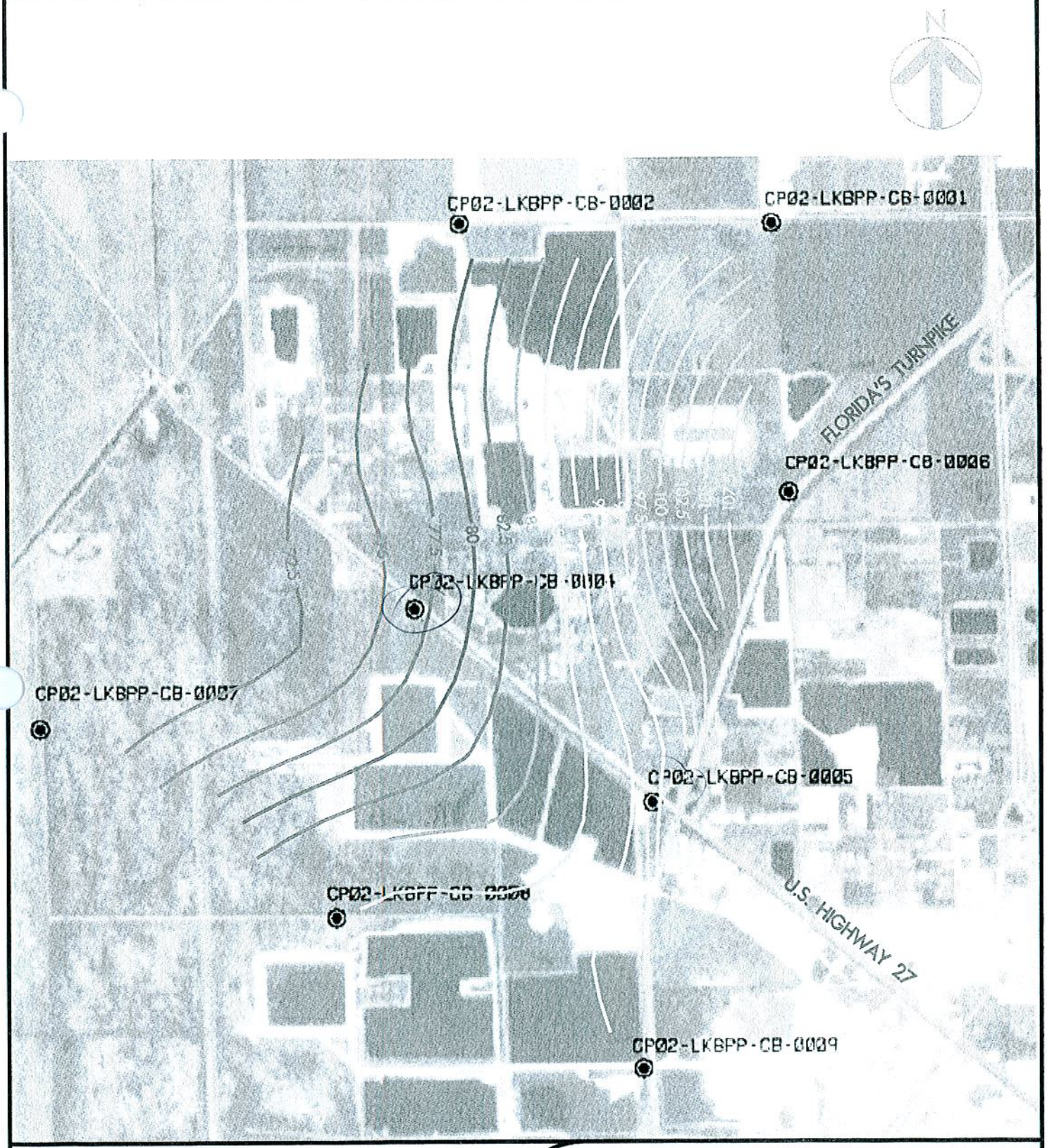
CHECKED: BSH	PROJ. NO. 40521-2-8482-15	



LEGEND

⊙ CORE BORING LOCATION

—75— CONTOUR INTERVAL SHOWING DEPTH TO TOP OF TAMIAMI FORMATION (IN FEET)

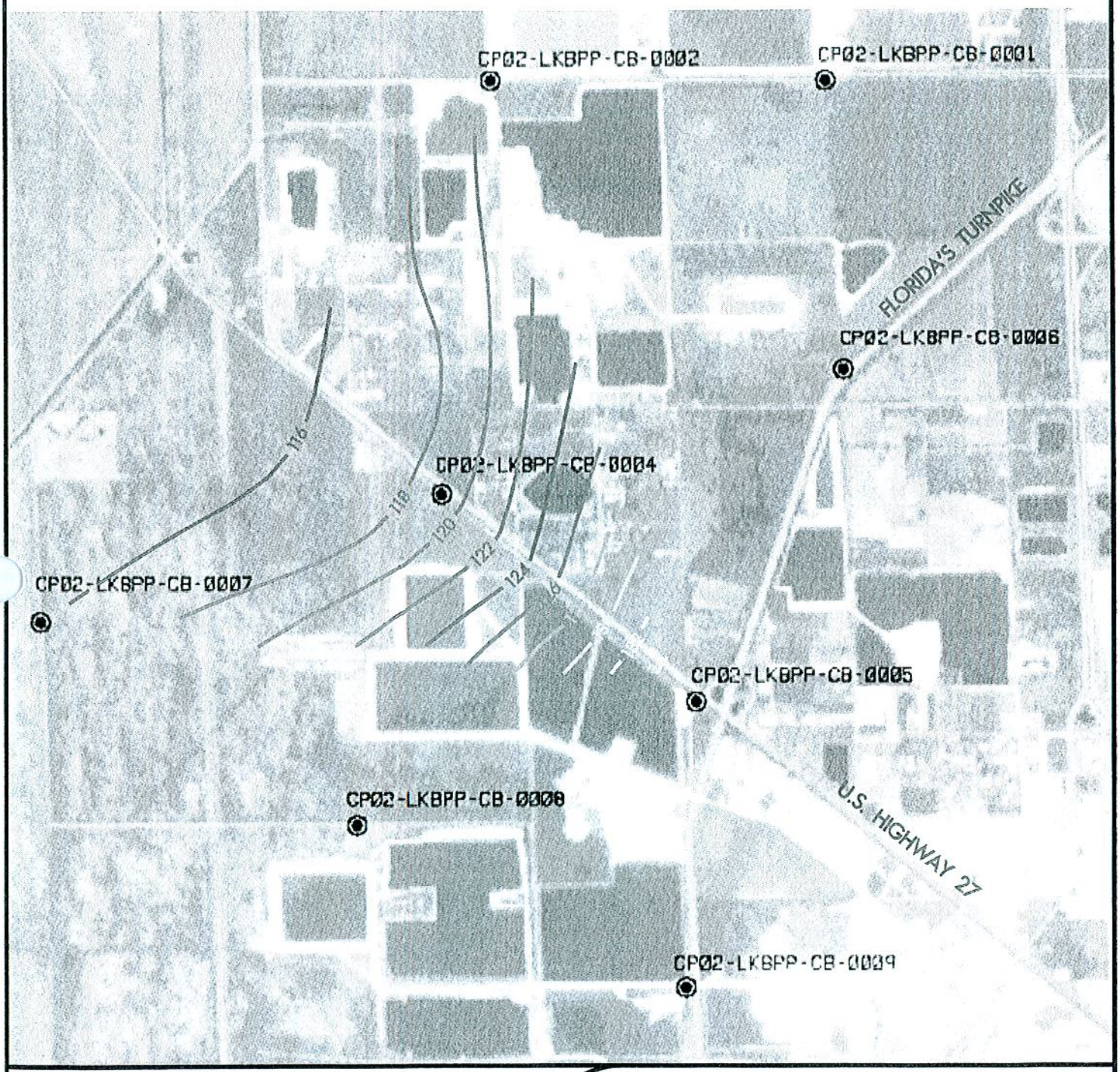
LAW

3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

KEY UNIT CONTOUR MAP: Depth to Top of Tamiami Formation

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/9/03	SCALE: N.T.S.
CHECKED: BSH	PROJ. NO. 40521-1-8482-15	



LEGEND

◉ CORE BORING LOCATION

— 116 — CONTOUR INTERVAL SHOWING DEPTH TO TOP OF GRAY LIMESTONE FORMATION (IN FEET)

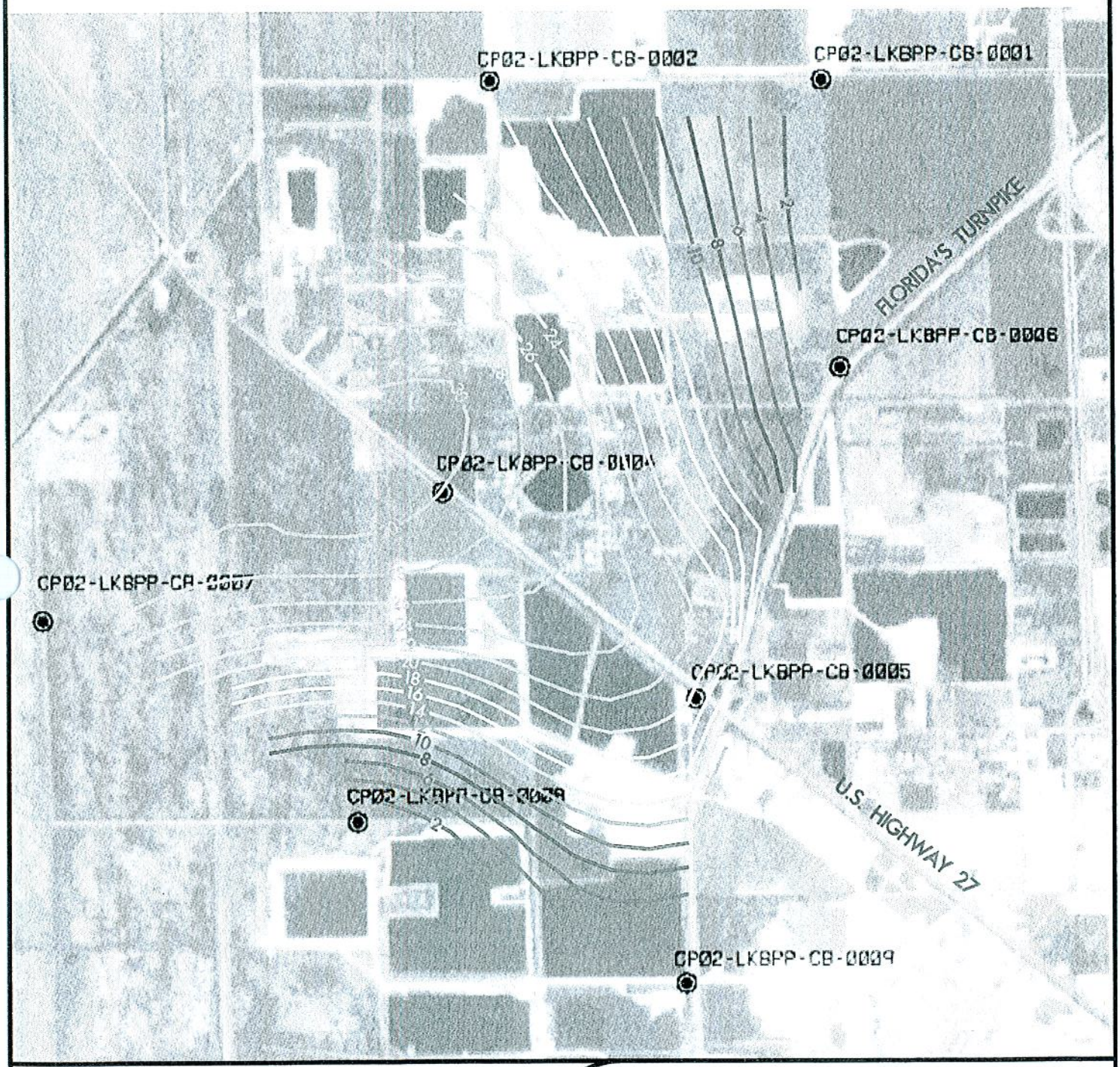
LAW

3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

KEY UNIT CONTOUR MAP: Depth to Top of Gray Limestone Formation

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/9/03	SCALE: N.T.S.
CHECKED: BSH	PROJ. NO. 40521-1-8482-15	



LEGEND

◉ CORE BORING LOCATION

CONTOUR INTERVAL SHOWING THICKNESS OF GRAY LIMESTONE FORMATION (IN FEET)

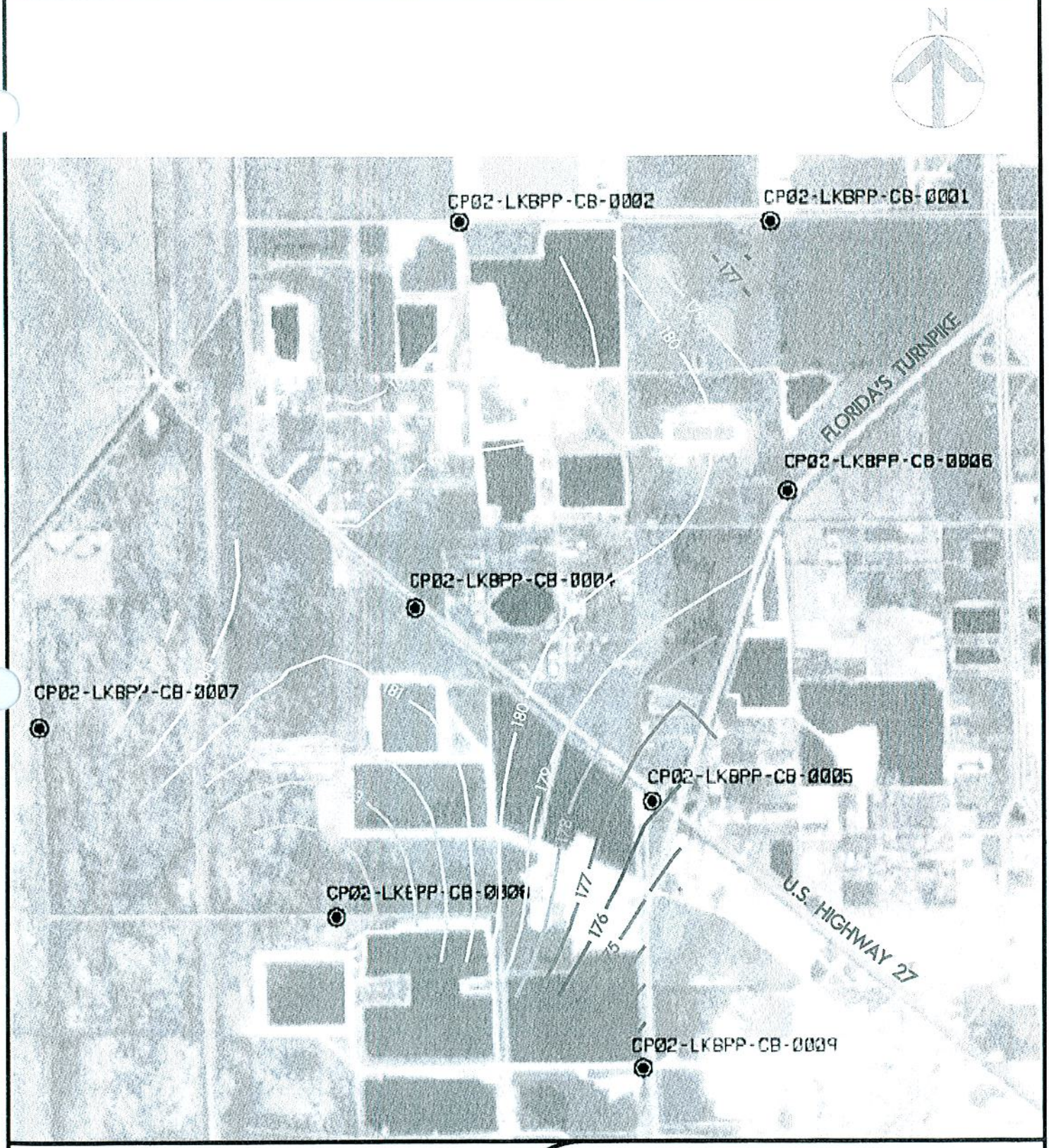
LAW

3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

KEY UNIT CONTOUR MAP: Thickness of Gray Limestone Formation

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/9/03	SCALE: N.T.S.
CHECKED: BSH	PROJ. NO. 40521-1-8482-15	



LEGEND

- ⊙ CORE BORING LOCATION
- -177- CONTOUR INTERVAL SHOWING DEPTH TO TOP OF HAWTHORNE FORMATION (IN FEET)

LAW

3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

KEY UNIT CONTOUR MAP: Depth to Top of Hawthorne Formation

Lake Belt In-Ground Reservoir Technology Pilot Project
Miami-Dade County, Florida

DRAWN: JP	DATE: 1/9/03	SCALE: N.T.S.
CHECKED: BSH	PROJ. NO. 40521-1-8482-15	

FIELD PROCEDURES

Core Borings

The core borings were performed in general accordance with ASTM D-1586, "Penetration Test and Split-Barrel Sampling of Soils." The borings were initially advanced by augering. A rotary drilling process was subsequently used and bentonite drilling fluid was circulated in the boreholes to stabilize the sides and flush the cuttings. At specified intervals (every 18 inches and/or every five-foot center to center spacing), the drilling tools were removed and soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler. The sampler was first seated 6 inches and then driven an additional foot with blows of a 140-pound automatically tripped hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance." The penetration resistance, when properly interpreted, is an index to the soil and rock strength and density. The length of each sample recovered in the split-tube sampler was measured for the determination of the percent recover.

The samples were examined and classified by an engineer in the field during the drilling operations. Representative portions of the soil and rock samples, obtained from the sampler, were placed in plastic jars and transported to our laboratory.

Undisturbed Sampling (Shelby Tube)

The relatively undisturbed samples were obtained by forcing a section of 3-inch O.D., 16-gauge steel tubing (Shelby tube) into the soil at the desired sampling level. The sampling procedure is described by ASTM Specification D-1587. The tube, together with the encased soil, was carefully removed from the ground, sealed at each end with paraffin, and transported to our laboratory.

Rock Coring

At varying elevations within the limestone, the standard drilling tools were removed from the borehole and a rock barrel was inserted. The limestone was cored using a diamond-studded bit fastened to the end of a hollow, 4" x 5½" double-tube core barrel. The coring procedure employed was similar to that described by ASTM D-2113. The core barrel is rotated at high speeds and is capable of cutting the hardest rock. Core samples of the material penetrated are protected and retained in the swivel-mounted inner tube. Upon completion of each drill run, the core barrel is brought to the surface and the samples removed and placed in wooden boxes.

The rock was identified and the recovery determined by an engineer in the field. The recovery is the ratio of the sample length obtained to the depth drilled, expressed as a percent. The percent recovery

is related to the rock soundness and continuity. In addition, the Rock Quality Designation (RQD) was determined. The RQD is defined as the sum of the lengths of recovered pieces equal to or larger than 4 inches divided by the length of rock cored, expressed as a percentage. The rock description, percent recovery, and RQD are shown on the appropriate Drilling Log in Appendix A.

Groundwater Monitoring Well Construction

The wells were installed by roto-sonic drilling methods, which used high frequency low amplitude vibration to install 8-inch diameter casing. Four-inch diameter schedule 40 PVC was then installed. A centralizer was placed both at the bottom of the screen and at about 4 feet below the ground surface. A sand pack consistency of 20 - 30 screen was then placed around the screen to a height of 2.5 to 5 feet above the top of the screen. A bentonite seal was then placed on the top of the sand pack. The bentonite seal consisting of bentonite chips varied in thickness from 3.5 to 10 feet. The remaining annular space was then grouted to the surface using a cement based grout with a slight amount of bentonite to help avoid shrinkage.

Well Development

The wells were developed by pumping method with a submersible pump. Development continued for five well valves with measurements of turbidity, pH, temperature and conductivity on each well volume.

Pump Test

The short duration pump test was performed using a two to three inch submersible pump. The pump test was performed over a two-hour duration. During testing, discharge volumes where monitoring using a digital readout flow meter. Ground water levels within the main (pump well) and slave (monitoring well) wells were recorded using data loggers.

LABORATORY PROCEDURES

Water Content

The water content is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the solid particles. This test was conducted in general accordance with ASTM D 2216.

Atterberg Limits (Plasticity)

A soil's Plasticity Index (PI) is the numerical difference between the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in general accordance with ASTM D 4318. The PL is the moisture content at which the soil begins to crumble when rolled into a small thread and is also determined in general accordance with ASTM D 4318.

Specific Gravity

The specific gravity of soil solids is the ratio of the weight in air of a given volume of soil particles to the weight in air of an equal volume of water. This test was conducted in general accordance with ASTM D 854.

Grain Size Distribution

The grain size tests were performed to determine the particle size and distribution of the samples tested. For each test, the sample was dried, weighed, and washed over a No. 200 mesh sieve. The dried sample was then passed through a standard set of nested sieves to determine the grain size distribution of the soil particles coarser than the No. 200 sieve. This test is similar to that described by ASTM D 422.

Hydrometer

Materials passing the NO. 40 mesh sieve were suspended in water in a hydrometer test cylinder and the grain size distribution measured by the rate of settlement of the soil particles. The soil which passes a No. 200 sieve is classified in the silt and clay size range. This test is similar to that described by ASTM D-422.

Triaxial Shear (UU)

The undrained shear strength parameters of selected clayey soil samples were estimated by triaxial shear testing. Unconsolidated-Undrained (UU) test was conducted. The test sample was selected and cut from a portion of the undisturbed sample. The test sample was about 3 inches in diameter,

with the height of each sample approximately twice the diameter. The test samples, after final cutting and trimming, were encased in rubber membranes, and placed in a compression chamber. All-round confining pressures varying from about 15 to 35 psi were then applied. Increasing axial loads were then applied until the sample failed in shear. During the testing, the sample's internal drainage was closed. The test results are presented in the form of Mohr diagrams and stress-strain curves on the Triaxial Shear Test Results sheets in Appendix C.

For samples where there was not enough available material for individual test specimens, the Dutch loading method was used. In this method, the axial load on the test specimen is removed prior to failure, the confining pressure is increased, and the axial load is reapplied until shear failure of the specimen occurs. This process was repeated two times prior to failure.

Permeability (Constant Head)

The coefficient of permeability (or hydraulic conductivity) of selected soil samples was obtained by constant head permeability testing. The test samples were selected from non-remolded portions of the undisturbed samples of the very loose to loose clayey sands and very soft to soft sandy clays. The test samples were about 3 inches in diameter, with the length of each sample approximately equal to the diameter. The test samples were encased in rubber membranes, placed in a triaxial compression chamber, saturated with water, and consolidated by a differential confining pressure. Constant pressure is applied to the specimen while drainage is open on the bottom of the test specimen.

During permeability testing, a constant water head differential was maintained at the top of the sample in order to cause the water to flow through the test sample. After performing the test for a sufficient time period, the coefficient of permeability was calculated as follows:

$$k = QL / Ath$$

where

k	=	coefficient of permeability,
Q	=	quantity of water discharged,
L	=	test sample length,
A	=	cross-sectional area of specimen,
t	=	total time of discharge,
h	=	water head differential between sample ends.

This test was performed in general accordance with ASTM Designation D 2334.

pH

The pH is an expression of the concentration of dissociated hydrogen ions present in aqueous solution. pH values range from 1 to 14 with values below 7 indicating acidic conditions and values above 7 indicating alkaline conditions. This test is performed using a calibrated electronic pH meter with a sensing probe. The meter is calibrated by immersing the probe in a solution with a known pH. The soil pH is determined by mixing equal weights of soil and distilled water and testing the supernatent solution with the pH probe. This test was performed by Environmental Conservation Laboratories, Inc. of Jacksonville, Florida in general accordance with FM 5-550.

Chloride Content

The chloride content of the soil sample was determined by titration with mercuric nitrate. The soil was rinsed with an amount of distilled water equal in weight to the dry soil. The soil was then removed from the water (which consisted of distilled water and natural soil moisture) and the mercuric nitrate titration was performed on the water. This test was performed by Environmental Conservation Laboratories, Inc. of Jacksonville, Florida, in general accordance with FM 5-552.

Sulfate Content

The sulfate content of the soil sample was determined turbidimetrically. The soil was rinsed with an amount of distilled water equal in weight to the weight of dry soil. The soil was then removed from the water (which consisted of distilled water and natural soil moisture) and the turbidity of the water was determined using a photometer. The turbidity gives an indirect indication of the sulfate content. This test was performed by Environmental Conservation Laboratories, Inc. of Jacksonville, Florida, in general accordance with FM 5-553.

Unconfined Compression

Test samples were obtained from unfractured core samples of rock-like materials. The sample diameters varied from about 2 to 4 inches with the height and twice the sample diameter. For sample

heights less than twice the diameter, the test results were corrected using established correction factors from ASTM Designation C-42, "Obtaining and Testing Drilled Cores and Sawed Beams of Concrete". The ends of the samples were either precisely trimmed or were "capped" by a cementing agent in order to form a smooth surface for testing. The test samples were then individually placed in the testing device, and vertical loads applied continuously until the sample failed in shear. Vertical deformation during some of the test were measured with a micrometer dial indicator at the top of the specimen. This test was performed in general accordance with ASTM Designation D-2938.

Direct Shear

The direct shear test allows the determination of the shear strength parameters along a pre-determined failure plane. The test samples were selected from (1) non-remolded portions of the undisturbed samples of the very dense silty sands/sandy silts (marl formation), and (2) remolded samples obtained from the standard penetration tests.

The undisturbed or remolded test samples were placed in a split cylindrical container 2.5-inches in diameter and 1-inch in height. Prior to testing, the desired stress level (7 to 50 psi) was applied normal to the plane in the sample on which the shearing would take place. The sample was then allowed to consolidate under the applied normal stress. A shearing force was applied to 1/2 of the container, with the other half held stationary. During the test, the shearing action was performed at a constant strain rate and at a rate such that increased pore pressures were allowed to dissipate (i.e. drain) and not affect the test results. The shearing force and horizontal displacement were measured, in addition to the vertical displacement due to consolidation in the direction normal to the shearing force. The peak shear stress from each of the stress versus displacement curves is plotted versus the normal stress. This test was performed in general accordance with ASTM Designation D-3080.

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG	DIVISION: South Atlantic	INSTALLATION: Jacksonville District	SHEET 1 OF 12 SHEETS

1. PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP02-LKBPP-CB-001	LOCATION COORDINATES: X = 863,658 Y = 590,412	11. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	☒ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Law Engineering	CONTRACTOR FILE NO.: 40521-1-8482-15	12. TOTAL SAMPLES	DISTURBED: 88 / UNDISTURBED (UD): 1
4. NAME OF DRILLER: David Johns, Jr.		13. TOTAL NUMBER CORE BOXES: 12	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER: 1.3 Ft.
		15. DATE BORING	STARTED: 08-02-02 / COMPLETED: 08-20-02
6. THICKNESS OF OVERBURDEN: 11.0 Ft.		16. ELEVATION TOP OF BORING: 4.3 Ft.	
7. DEPTH DRILLED INTO ROCK: 78.0 Ft.		17. TOTAL RECOVERY FOR BORING: 79 %	
8. TOTAL DEPTH OF BORING: 210.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
4.3	0.0						4.3		
		Slightly Weathered	Limestone, moderately hard, slightly weathered, fine-grained, fine quartz sand seams with calcareous silt, light tan	45	1		SPT Sampler	25 32 19	51
2.3	2.0						2.8		
			SAND, silty, mostly subrounded fine-grained quartz, few silt, few fine gravel-sized limestone, strong reaction with HCl, dry, brown (SM)	33	2		SPT Sampler	17 7 2	9
							1.3		
0.3	4.0			33	3		SPT Sampler	WOH WOH 6	6
							-0.2		
		Moderately Weathered	Limestone, moderately hard, moderately weathered, fine-grained, fossiliferous, dissolutioned, calcareous silt, light tan	85	4		SPT Sampler	10 9 16	25
							-1.7		
				80	5		SPT Sampler	14 15 18	33
							-3.2		
			From El. -3.7 to -5.7 Ft., little fine gravel-sized to coarse sand-sized shell limestone matrix, very soft	10	6		SPT Sampler	4 3 2	5
							-4.7		
			From El. -5.7 to -6.7 Ft., some fine-grained quartz seams	30	7		SPT Sampler	3 2 23	25
							-6.2		
				0			-6.2 SPT Sampler	50/0.0'	
			From El. -6.7 to -11.7 Ft., pitted, seams of silty sand				-6.7 Advanced Boring w/ tricone roller bit		
				70	BOX 2	RQD 17	4 x 5-1/2" Diamond Set Bit DT = 68 mins HP = 100 psi		

0 5 10 15

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 12 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 863,658 Y = 590,412	ELEVATION TOP OF BORING: 4.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
				70		RQD 17	4 x 5-1/2" Diamond Set Bit DT = 68 mins HP = 100 psi		
-11.7	16.0						-11.7		
			Limestone, hard, slightly weathered, partially dissolutioned with calcareous silt sand-filled cavities						
		Slightly Weathered	At El. -14.2 Ft., 45 degree rock fracture	75	BOX 3	RQD 33	4 x 5-1/2" Diamond Set Bit DT = 36 mins HP = 100 psi		
							-16.7		
		Moderately Weathered	From El. -16.7 to -17.7 Ft., moderately weathered, vuggy						
			At El. -17.7 Ft., mostly cemented shell		BOX 3				
		Unweathered	From El. -19.2 to -21.7 Ft., unweathered, lateral fracture	95		RQD 62	4 x 5-1/2" Diamond Set Bit DT = 34 mins HP = 100 psi		
-21.7	26.0						-21.7		
			Limestone, moderately hard, slightly weathered, pitted, fossiliferous with calcite replacement						
			At El. -23.7 Ft., 15 degree rock fracture	58		RQD 40	4 x 5-1/2" Diamond Set Bit DT = 46 mins HP = 100 psi		
		Slightly Weathered	From El. -24.7 to -25.7 Ft., shelly sand bedding (limited recovery),		BOX 4				
-26.7	31.0						-26.7		
			Limestone, hard						
			From El. -28.2 to -29.7 Ft., high shell content		BOX 4				
			At El. -28.7 Ft., lateral fracture	95		RQD 64	4 x 5-1/2" Diamond Set Bit DT = 23 mins HP = 150 psi		

15 20 25 30 35

SAJ FORM 1836-A
JUN 02

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 12 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 863,658 Y = 590,412	ELEVATION TOP OF BORING: 4.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CR	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				95		RQD 64	4 x 5-1/2" Diamond Set Bit DT = 23 mins HP = 150 psi		
		Unweathered	From El. -31.7 to -32.7 Ft., unweathered, fossiliferous				-31.7		
			At El. -33.2 Ft., sand seams	100		RQD 88	4 x 5-1/2" Diamond Set Bit DT = 34 mins HP = 150 psi		
			At El. -34.7 Ft., lateral fracture		BOX 5		-36.7		
			From El. -36.7 to -37.2 Ft., slightly weathered						
			At El. -37.2 Ft., shelly						
			At El. -38.2 Ft., sand seams (2" thick)						
			At El. -38.7 Ft., vuggy, (5" thick)	65		RQD 33	4 x 5-1/2" Diamond Set Bit DT = 13 mins HP = 300 psi		
-41.7	46.0						-41.7		
		Slightly Weathered	Limestone, moderately hard, pitted to vuggy, trace shell; little sand seams (sand inclusions) at 46.5'; fracture along sand seam at 47'; pitted sand seam at 48', light gray		BOX 5				
			At El. -42.2 Ft., little sand seams (sand inclusions)	60		RQD 8	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 300 psi		
			At El. -42.7 Ft., fracture along sand seam		BOX 6				
			At El. -43.7 Ft., pitted, sand seam				-46.7		
-48.7	53.0								
			SAND, poorly-graded, mostly subrounded fine-grained quartz, trace silt, seams of limestone (SP)	4	BOX 1	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 7 mins HP = 300 psi		
							-50.7		

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				30	9		SPT Sampler	5 8 7	15
							-52.2		
				40	10		SPT Sampler	6 6 7	13
							-53.7		
				45	11		SPT Sampler	6 5 7	12
							-55.2		
				10	12		SPT Sampler	7 7 8	15
							-56.7		
				40	13		SPT Sampler	5 6 5	11
							-58.2		
				25	14		SPT Sampler	7 6 7	13
							-59.7		
				30	15		SPT Sampler	5 4 6	10
							-61.2		
				40	16		SPT Sampler	5 8 8	16
							-62.7		
				47	17		SPT Sampler	8 50/0.3'	
							-63.5		
-63.7	68.0						-63.7 Advanced Boring		
			Limestone, hard, slightly weathered, fine-grained, vuggy, trace cemented sand inclusions;, light tan		BOX 6				
-65.7	70.0	Slightly Weathered	Limestone, moderately hard, lateral fracture	94		RQD 63	4 x 5-1/2" Diamond Set Bit DT = 23 mins HP = 250 psi		
-67.7	72.0		Limestone, hard, weathered, fossiliferous, pitted to vuggy	80		RQD 0	4 x 5-1/2" Diamond Set Bit DT = 13 mins HP = 250 psi		

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 12 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 863,658 Y = 590,412	ELEVATION TOP OF BORING: 4.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				80	BOX 8	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 13 mins HP = 250 psi		
							-72.7		
			At El. -72.7 Ft., little shell		BOX 7				
			At El. -74.7 Ft., fracture	100		RQD 70	4 x 5-1/2" Diamond Set Bit DT = 12 mins HP = 300 psi		
			At El. -75.5 Ft., little fine-grained quartz and cemented sand						
			From El. -76.0 to -76.5 Ft., moderately weathered, few shell; sand seam				-77.7		
			At El. -77.7 Ft., pitted, fractures along several fine sand and fine sand-sized shell seams; little fine-grained quartz;						
		Moderately Weathered		75	BOX 2	RQD 33	4 x 5-1/2" Diamond Set Bit DT = 9 mins HP = 250 psi		
-82.7	87.0						-82.7		
			Limestone, moderately hard, medium-grained, trace shell		BOX 8				
				45		RQD 10	4 x 5-1/2" Diamond Set Bit DT = 3 mins HP = 300 psi		
			At El. -85.7 Ft., soft, weathered, vuggy, seam of fine to medium sand along fracture; little sand-sized shell				-87.7		
			From El. -87.7 to -90.7 Ft., moderately hard, fine-grained, little shell; trace clayey sand beds, light gray						
			From El. -89.2 to -90.2 Ft., soft, some clayey sand, light gray-green	82		RQD 25	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 200 psi		

75 80 85 90 95

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(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 6 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -90.7 Ft., moderately hard, slightly weathered, light gray	82		RQD 25	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 200 psi		
		Slightly Weathered					-92.7		
		Highly Weathered	At El. -92.7 Ft., highly weathered, medium-grained, little clayey sand seams;, light gray-green	22	BOX 1	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 200 psi		
-97.7	102.0						-97.7		
			SAND, poorly-graded, mostly subrounded fine-grained quartz, trace medium-grained quartz, trace shell, trace clay, weak reaction with HCl, moist, with thin limestone seams (Top of Tamiami Formation) (SP)	100	18		SPT Sampler	5 6 10	16
							-99.2		
				100	19		SPT Sampler	6 8 8	16
							-100.7		
-101.2	105.5								
			SAND, poorly-graded with clay, mostly subrounded fine-grained quartz, few clay, weak reaction with HCl, wet, gray-green (SP-SC)	100	20		SPT Sampler	6 8 8	16
							-102.2		
			At El. -102.7 Ft., trace fine to coarse gravel-sized shell	100	21		SPT Sampler	5 7 9	16
							-103.7		
				100	22		SPT Sampler	5 6 6	12
							-105.2		
			At El. -105.5 Ft., trace medium-grained shell	100	23		SPT Sampler	5 8 12	20
-106.7	111.0						-106.7		
			SAND, clayey, mostly fine to medium-grained quartz, little clay, trace medium-grained shell, weak reaction with HCl, wet, green-gray (SC)	100	24		SPT Sampler	3 6 6	12
							-108.2		
				100	25		SPT Sampler	4 7 16	23
							-109.7		
			At El. -110.2 Ft., discontinue	100	26		SPT Sampler	WOR 7	

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 7 OF 12 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 863,658 Y = 590,412	ELEVATION TOP OF BORING: 4.3 Ft.	

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		medium-grained quartz	100	26		-111.2 SPT Sampler	15	22
				1	UD1	Shelby -113.2		
		At El. -113.2 Ft., little silt	100	27		SPT Sampler	5 9	24
		At El. -114.2 Ft., green				-114.7	15	
		At El. -114.7 Ft., trace fine-grained shell	100	28		SPT Sampler	4 4	9
						-116.2	5	
			100	29		SPT Sampler	1 2	8
						-117.7	6	
			100	30		SPT Sampler	WOH WOH	6
						-119.2	6	
		At El. -119.7 Ft., discontinue shell	100	31		SPT Sampler	WOH WOH	0
						-120.7	WOH	
			100	32		SPT Sampler	1 1	10
						-122.2	9	
		At El. -122.8 Ft., trace fine-grained shell	100	33		SPT Sampler	1 1	7
						-123.7	6	
			100	34		SPT Sampler	WOH 1	11
						-125.2	10	
			100	35		SPT Sampler	WOR WOR	2
		At El. -126.7 Ft., weak cementation				-126.7	2	
-127.2	131.5	SAND, silty, mostly fine to medium-grained quartz, little silt, few clay, few shell, weak reaction with HCl, wet, weak cementation, gray-green (SM)	100	36		SPT Sampler	3 12	39
						-128.2	27	
			40	37		SPT Sampler	14 13	21
						-129.7	8	
		At El. -129.7 Ft., some silt, trace shell	33	38		SPT Sampler	4 2	

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 Ft.	N-VALUE
				33	38		-131.2 SPT Sampler	1	3
				100	39		SPT Sampler	WOH / WOH / 12	12
							-132.7		
				100	40		SPT Sampler	3 / 5 / 15	20
							-134.2		
			At El. -134.7 Ft., few fine to coarse gravel-sized shell	100	41		SPT Sampler	7 / 18 / 24	42
							-135.7		
				100	42		SPT Sampler	22 / 19 / 16	35
							-137.2		
				100	43		SPT Sampler	5 / 9 / 19	28
							-138.7		
				100	44		SPT Sampler	6 / 12 / 20	32
							-140.2		
			At El. -140.2 Ft., discontinue medium-grained quartz	100	45		SPT Sampler	14 / 15 / 16	31
							-141.7		
				100	46		SPT Sampler	WOH / 9 / 48	57
							-143.2		
				100	47		SPT Sampler	16 / 35 / 28	63
							-144.7		
			At El. -144.7 Ft., few clay, trace fine-grained shell, green-gray	100	48		SPT Sampler	8 / 12 / 15	27
							-146.2		
				100	49		SPT Sampler	9 / 20 / 16	36
							-147.7		
				100	50		SPT Sampler	9 / 13 / 21	34
-149.2	153.5						-149.2		
			SAND, poorly-graded with silt, mostly subangular to subrounded fine-grained quartz, few silt, few clay, trace shell, weak reaction with HCl, wet, weak cementation, gray-green (SP-SM)	100	51		SPT Sampler	11 / 12 / 16	28
							-150.7		

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -150.3 Ft., moderate cementation	100	52		SPT Sampler	WOH 13 16	29
							-152.2		
			At El. -152.7 Ft., weak cementation	100	53		SPT Sampler	10 19 23	42
							-153.7		
				100	54		SPT Sampler	9 16 23	39
							-155.2		
				75	55		SPT Sampler	13 14 11	25
							-156.7		
				100	56		SPT Sampler	8 12 19	31
							-158.2		
			At El. -158.7 Ft., trace clay	100	57		SPT Sampler	20 42 40	82
							-159.7		
				100	58		SPT Sampler	19 38 24	62
-161.2	165.5						-161.2		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, few clay, few fine-grained shell, weak reaction with HCl, wet, weak cementation, green-gray (SM)	100	59		SPT Sampler	2 6 12	18
							-162.7		
			At El. -162.9 Ft., few fine to coarse gravel-sized shell	100	60		SPT Sampler	8 15 20	35
							-164.2		
			At El. -164.7 Ft., trace shell, discontinue weak cementation	100	61		SPT Sampler	20 58 40	98
							-165.7		
				100	62		SPT Sampler	19 29 48	77
							-167.2		
				50	63		SPT Sampler	18 16 3	19
							-168.7		
			At El. -168.7 Ft., little clay	70	64		SPT Sampler	WOR 2 3	5
							-170.2		
				50	65		SPT Sampler	3	

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -170.7 Ft., trace phosphate, trace fine-grained shell, wet, dark green	50	65		SPT Sampler	24 48	72
							-171.7		
				50	66		SPT Sampler	22 44 49	93
							-173.2		
				82	67		SPT Sampler	9 30 37	67
-174.7	179.0						-174.7		
			SAND, clayey, mostly subrounded fine-grained quartz, some clay, little silt, trace phosphate, weak reaction with HCl, wet, (Top of Hawthorne Formation), dark green (SC)	100	68		SPT Sampler	3 9 9	18
							-176.2		
				100	69		SPT Sampler	2 4 5	9
							-177.7		
			At El. -178.0 Ft., trace fine-grained quartz, thin seam (5" thick)	100	70		SPT Sampler	3 5	8
							-179.2		
				100	71		SPT Sampler	WOR 2 4	6
							-180.7		
				100	72		SPT Sampler	WOR 3 8	11
							-182.2		
				100	73		SPT Sampler	WOR 1 4	5
							-183.7		
				100	74		SPT Sampler	1 2 8	10
							-185.2		
			At El. -185.7 Ft., little clay, little silt	100	75		SPT Sampler	WOR 2 4	6
							-186.7		
			From El. -187.7 to -189.7 Ft., few silt	100	76		SPT Sampler	1 3 6	9
							-188.2		
				100	77		SPT Sampler	WOR 2 5	7
							-189.7		
			From El. -189.7 to -191.3 Ft., little silt	100	78		SPT Sampler	WOR 4	

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		From El. -191.3 to -193.0 Ft., few silt	100	78		-191.2 SPT Sampler	15	19
			100	79		SPT Sampler	WOR / WOR / 7	7
			100	80		-192.7 SPT Sampler	WOR / 1 / 2	3
			100	81		-194.2 SPT Sampler	1 / 2 / 8	10
			100	82		-195.7 SPT Sampler	WOR / 2 / 2	4
		At El. -197.9 Ft., some clay At El. -198.4 Ft., little clay	100	83		-197.2 SPT Sampler	WOR / WOR / 1	1
			100	84		-198.7 SPT Sampler	2 / 4 / 11	15
			100	85		-200.2 SPT Sampler	WOR / 2 / 4	6
-202.7	207.0		100	86		-201.7 SPT Sampler	WOR / WOR / 7	7
		SILT, inorganic-H, little sand, little clay, moist (MH)	100	87		-203.2 SPT Sampler	2 / 4 / 8	12
-205.7	210.0		150	88		-204.7 SPT Sampler	4 / 7	
						-205.7		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
9	55.0/56.5	SP*
UD1	/1.5	SC
61	168.5/170.0	SM*
75	189.5/191.0	SC

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.

(Continued)

Boring Designation CP02-LKBPP-CB-001

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 863,658 Y = 590,412	4.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits. 3. Additional Laboratory Testing 9 Moisture Content UD1 Moisture Content UD1 Specific Gravity 61 Moisture Content 75 Moisture Content 75 Specific Gravity						

215
220
225
230
235

SAJ FORM 1836-A
JUN 02

DRILLING LOG

DIVISION	South Atlantic
INSTALLATION	Jacksonville District
SHEET	1 OF 14 SHEETS
1. PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional
2. BORING DESIGNATION	CP02-LKBPP-CB-002
LOCATION COORDINATES	X = 850,779 Y = 590,356
3. DRILLING AGENCY	Law Engineering
CONTRACTOR FILE NO.	40521-1-8482-15
4. NAME OF DRILLER	David Johns, Jr.
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	70.0 Ft.
7. DEPTH DRILLED INTO ROCK	15.0 Ft.
8. TOTAL DEPTH OF BORING	249.8 Ft.
9. SIZE AND TYPE OF BIT	See Remarks
10. COORDINATE SYSTEM/DATUM	State Plane, FLE (U.S. Ft.)
HORIZONTAL	NAD83
VERTICAL	NAVD88
11. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
	☒ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED 67 / UNDISTURBED (UD) 1
13. TOTAL NUMBER CORE BOXES	4
14. ELEVATION GROUND WATER	
15. DATE BORING	STARTED 08-21-02 / COMPLETED 09-13-02
16. ELEVATION TOP OF BORING	6.6 Ft.
17. TOTAL RECOVERY FOR BORING	67 %
18. SIGNATURE AND TITLE OF INSPECTOR	Jeffrey Samuels, Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							6.6		
			At El. 6.6 Ft., Precut Reference Boring to 70.0 feet.						
							Advanced Boring w/ tricone roller bit		

0
5
10
15

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

15
20
25
30
35

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 850,779 Y = 590,356	ELEVATION TOP OF BORING: 6.6 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

35
40
45
50
55

(Continued)

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-63.4	70.0						-63.4		
			Limestone, hard, slightly weathered, fine-grained, pitted, fossiliferous, tan-white		BOX 1				
		Slightly Weathered		65		RQD 47	4 x 5-1/2" Diamond Set Bit DT = 60 mins HP = 300 psi		
			At El. -67.4 Ft., few calcite seams						
-68.4	75.0						-68.4		

55
60
65
70
75

SAJ FORM 1836-A
JUN 02

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 5 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			Limestone, soft, trace silt, light gray	35	BOX 7	RQD 10	4 x 5-1/2" Diamond Set Bit DT = 15 mins HP = 150 psi		
							-73.4		
		Slightly Weathered		20	BOX 2	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 200 psi		
-78.4	85.0						-78.4		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace shell, weak reaction with HCl, wet, (Top of Tamiami Formation), gray-green (SM)	100	1		SPT Sampler	WOR WOR WOR	0
							-79.9		
				100	2		SPT Sampler	WOR WOR WOH	0
							-81.4		
				100	3		SPT Sampler	WOH WOH 3	3
							-82.9		
				100	4		SPT Sampler	1 3 6	9
			At El. -84.4 Ft., trace clay				-84.4		
				100	5		SPT Sampler	2 4 5	9
							-85.9		
				100	6		SPT Sampler	1 4 8	12
							-87.4		
				100	7		SPT Sampler	WOR 2	

75 80 85 90 95

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 6 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-88.9	95.5		At El. -88.4 Ft., few clay	100	7		-88.9 SPT Sampler	30	32
			SAND, clayey, mostly fine-grained quartz, little clay, few silt, trace shell, weak reaction with HCl, wet, gray (SC)	70	8		SPT Sampler	10 30 20	50
			At El. -90.4 Ft., gray-green	90	9		-90.4 SPT Sampler	WOR 4 6	10
			At El. -91.9 Ft., some clay	100	10		-91.9 SPT Sampler	1 6 8	14
				100	11		-93.4 SPT Sampler	1 2 6	8
				100	12		-94.9 SPT Sampler	WOH 2 4	6
				70	13		-96.4 SPT Sampler	WOH 1 1	2
				90	14		-97.9 SPT Sampler	WOR 1 4	5
				80	15		-99.4 SPT Sampler	WOH 2 3	5
			At El. -101.4 Ft., few shell	100	16		-100.9 SPT Sampler	1 3 7	10
				100	17		-102.4 SPT Sampler	2 10 9	19
			At El. -103.4 Ft., green-tan	100	18		-103.9 SPT Sampler	1 3 8	11
				100	19		-105.4 SPT Sampler	1 8 7	15
				100	20		-106.9 SPT Sampler	2 2 8	10
							-108.4		

95 100 105 110 115

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 7 OF 14 SHEETS
	Jacksonville District		
PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	ELEVATION TOP OF BORING		
X = 850,779 Y = 590,356	6.6 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				60	21		SPT Sampler	4 5 8	13
							-109.9		
				100	22		SPT Sampler	2 2 8	10
							-111.4		
				90	23		SPT Sampler	1 3 2	5
			At El. -112.4 Ft., trace shell				-112.9		
				100	24		SPT Sampler	2 5 9	14
							-114.4		
				0		UD1	Shelby		
							-116.4		
			At El. -116.4 Ft., weak cementation	80	25		SPT Sampler	WOR 5 8	13
							-117.9		
				60	26		SPT Sampler	1 12 19	31
							-119.4		
			At El. -119.4 Ft., thin limestone seams, gray	35	27		SPT Sampler	9 29 23	52
-120.9	127.5						-120.9		
			Limestone, soft, highly weathered, fine-grained, dissolutioned with some clay, few silt, few shell (Top of Gray Limestone Formation), gray-green	25	28		SPT Sampler	9 22 11	33
		Highly Weathered					-122.4		
				35	29		SPT Sampler	1 12 17	29
							-123.9		
				70	30		SPT Sampler	15 23 26	49
-125.4	132.0						-125.4		
			SAND, clayey, mostly subrounded fine to medium-grained quartz, little clay, few silt, weak reaction with HCl, moist, weak cementation, occasional thin limestone seam (SC)	80	31		SPT Sampler	14 16 20	36
							-126.9		
				90	32		SPT Sampler	11 15 15	30
							-128.4		

115 120 125 130 135

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				80	33		SPT Sampler	8 12 17	29
							-129.9		
				50	34		SPT Sampler	5 15 27	42
							-131.4		
				95	35		SPT Sampler	15 25 50/0.4'	75+
							-132.8		
							-132.9 Advanced Boring		
				90	36		SPT Sampler	36 32 25	57
							-134.4		
				50	37		SPT Sampler	6 34 36	70
							-135.9		
				25	38		SPT Sampler	7 13 13	26
-137.4	144.0						-137.4		
-138.9	145.5	Sl. Weathered	Limestone, soft, slightly weathered, fine-grained, little clay, gray	25	39		SPT Sampler	7 10 23	33
							-138.9		
			SAND, silty, mostly fine-grained quartz, little silt, weak reaction with HCl, wet, weak cementation, few limestone seams, gray-green (SM)	35	40		SPT Sampler	18 21 27	48
							-140.4		
				30	41		SPT Sampler	12 20 23	43
							-141.9		
				50	42		SPT Sampler	9 20 27	47
							-143.4		
				50	43		SPT Sampler	15 26 31	57
							-144.9		
				25	44		SPT Sampler	8 13 14	27
							-146.4		
				41	45		SPT Sampler	18 50/0.4'	
							-147.3		
							-147.9 Advanced Boring w/ tricone roller bit		
				46	46		SPT Sampler	30	

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				46	46		-148.7 SPT Sampler	50/0.3'	
							-149.4 Advanced Boring w/ tricone roller bit		
			At El. -149.4 Ft., trace shell	46	47		-150.2 SPT Sampler	47 / 50/0.3'	
							-150.9 Advanced Boring w/ tricone roller bit		
				27	48		SPT Sampler	23 / 45 / 50/0.4'	95+
							-152.3 -152.4 Advanced Boring		
				25	49		SPT Sampler	17 / 40 / 40	80
							-153.9 Advanced Boring w/ tricone roller bit		
							-156.9		
				50	50		SPT Sampler	32 / 48 / 50	98
							-158.4 Advanced Boring w/ tricone roller bit		
							-161.9		
				80	51		SPT Sampler	25 / 37 / 50	87
							-163.4 Advanced Boring w/ tricone roller bit		
-166.9	173.5						-166.9		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, no reaction with HCl, wet, gray (SC)	98	52		SPT Sampler	24 / 50/0.4'	
							-167.8		

155 160 165 170 175

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-171.9		
			At El. -171.9 Ft., green-gray	60	53		SPT Sampler	16 35 50	85
							-173.4		
							Advanced Boring w/ tricone roller bit		
							-176.9		
			At El. -176.9 Ft., some clay	50	54		SPT Sampler	40 33 34	67
							-178.4		
							Advanced Boring w/ tricone roller bit		
-181.9	188.5						-181.9		
			CLAY, fat, high plasticity, firm, mostly subrounded fine-grained quartz, no reaction with HCl, moist, (Top of Hawthorne Formation), dark green (CH)	100	55		SPT Sampler	1 6 22	28
							-183.4		
							Advanced Boring w/ tricone roller bit		
							-186.9		
			At El. -186.9 Ft., few fine-grained quartz	100	56		SPT Sampler	5 10 14	24
							-188.4		

175
180
185
190
195

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-191.9		
				100	57		SPT Sampler	4 5 14	19
							-193.4		
							Advanced Boring w/ tricone roller bit		
							-196.9		
				100	58		SPT Sampler	7 17 22	39
							-198.4		
							Advanced Boring w/ tricone roller bit		
-201.9	208.5		SAND, clayey, mostly fine-grained quartz, some clay, trace shell, weak reaction with HCl, moist, gray-green (SC)				-201.9		
				80	59		SPT Sampler	23 43 46	89
							-203.4		
							Advanced Boring w/ tricone roller bit		
							-206.9		
				71	60		SPT Sampler	43 50/0.1'	
							-207.5		
							Advanced Boring w/ tricone roller bit		

195 200 205 210 215

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -208.4 Ft., little clay, no reaction with HCl				Advanced Boring w/ tricone roller bit		
							-211.9		
				49	61		SPT Sampler	34 50/0.4'	
							-212.8		
							Advanced Boring w/ tricone roller bit		
							-216.9		
				37	62		SPT Sampler	20 40 50/0.4'	90+
							-218.3		
							Advanced Boring w/ tricone roller bit		
							-221.9		
				42	63		SPT Sampler	14 32 50/0.4'	82+
							-223.3		
							Advanced Boring w/ tricone roller bit		
							-226.9		
				79	64		SPT Sampler	17 43 50/0.3'	93+
							-228.2		

215 220 225 230 235

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-231.9		
				70	65		SPT Sampler	17 39 50	89
							-233.4		
							Advanced Boring w/ tricone roller bit		
							-236.9		
				80	66		SPT Sampler	14 31 50	81
							-238.4		
							Advanced Boring w/ tricone roller bit		
							-241.9		
				84	67		SPT Sampler	12 36 50/0.3'	86+
-243.2	249.8						-243.2		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
5	91.0/92.5	CL
20	113.5/115.0	SC*
42	148.5/150.0	SM*
57	198.5/200.0	CH
62	223.5/224.9	SC

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.

(Continued)

Boring Designation CP02-LKBPP-CB-002

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 850,779 Y = 590,356	6.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE

*Lab visual classification based on gradation curve. No Atterberg limits.

3. Additional Laboratory Testing

10	Moisture Content
5	Moisture Content
5	Specific Gravity
13	Specific Gravity
42	Moisture Content
42	Specific Gravity
57	Moisture Content
62	Moisture Content
62	Specific Gravity
65	Moisture Content

255
260
265
270
275

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 14 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional		9. SIZE AND TYPE OF BIT: See Remarks	
2. BORING DESIGNATION: CP02-LKBPP-CB-004	LOCATION COORDINATES: X = 849,161 Y = 577,127	10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
3. DRILLING AGENCY: Law Engineering	CONTRACTOR FILE NO.: 40521-1-8482-15	11. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	☒ AUTO HAMMER ☐ MANUAL HAMMER
4. NAME OF DRILLER: Ken Bunnell		12. TOTAL SAMPLES	DISTURBED: 54 / UNDISTURBED (UD): 1
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	13. TOTAL NUMBER CORE BOXES: 15	
		14. ELEVATION GROUND WATER: 4.4 Ft.	
		15. DATE BORING	STARTED: 09-13-02 / COMPLETED: 09-28-02
6. THICKNESS OF OVERBURDEN: 9.0 Ft.		16. ELEVATION TOP OF BORING: 7.9 Ft.	
7. DEPTH DRILLED INTO ROCK: 100.0 Ft.		17. TOTAL RECOVERY FOR BORING: 76 %	
8. TOTAL DEPTH OF BORING: 250.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Nabil Hmeidi, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
7.9	0.0						7.9		
		Slightly Weathered	Limestone, moderately hard, slightly weathered, fine-grained, some dissolutioned fine-grained quartz, light tan	50	1		SPT Sampler	10 17 20	37
							6.4 Advanced Boring w/ tricone roller bit		
							4.4		
				10	2		SPT Sampler	7 7 1	8
							2.9 Advanced Boring w/ tricone roller bit		
					3		-0.6 -0.9 SPT Sampler 50/0.3' -1.1 Advanced Boring		
-1.1	9.0	Moderately Weathered	Limestone, hard, moderately weathered, pitted, fossiliferous; thin seams of silty sand	85	BOX 2	RQD 55	4 x 5-1/2" Diamond Set Bit DT = 47 mins HP = 300 psi		
							-6.1		
				65	BOX 2	RQD 53	4 x 5-1/2" Diamond Set Bit DT = 51 mins HP = 300 psi		

0 5 10 15

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -7.1 Ft., slightly weathered, silty sand-filled cavities						
			From El. -9.6 to -11.1 Ft., dissolutioned	65	BOX 3	RQD 53	4 x 5-1/2" Diamond Set Bit DT = 51 mins HP = 300 psi		
							-11.1		
				80	BOX 3	RQD 70	4 x 5-1/2" Diamond Set Bit DT = 61 mins HP = 300 psi		
							-16.1		
			At El. -16.1 Ft., highly weathered, vuggy, calcite replacement	85	BOX 4	RQD 60	4 x 5-1/2" Diamond Set Bit DT = 71 mins HP = 300 psi		
							-21.1		
			At El. -21.1 Ft., moderately weathered, pitted	90	BOX 4	RQD 85	4 x 5-1/2" Diamond Set Bit DT = 79 mins HP = 300 psi		
-26.1	34.0						-26.1		
			Limestone, moderately hard, slightly weathered	95		RQD 70	4 x 5-1/2" Diamond Set Bit DT = 82 mins HP = 300 psi		

Slightly Weathered

Highly Weathered

Moderately Weathered

15 20 25 30 35

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 3 OF 14 SHEETS
	Jacksonville District		
PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	ELEVATION TOP OF BORING		
X = 849,161 Y = 577,127	7.9 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				95		RQD 70	4 x 5-1/2" Diamond Set Bit DT = 82 mins HP = 300 psi		
-31.1	39.0		Limestone, hard		BOX 5		-31.1		
		Slightly Weathered		80		RQD 55	4 x 5-1/2" Diamond Set Bit DT = 62 mins HP = 300 psi		
			From El. -35.1 to -35.6 Ft., --Void-- Note: Advanced 6-foot core to adjust rod for subsequent runs						
-37.1	45.0		Limestone, moderately hard, moderately weathered, some dissolutioned fine-grained quartz; few shell				-37.1		
		Moderately Weathered		90	BOX 6 BOX 5	RQD 66	4 x 5-1/2" Diamond Set Bit DT = 80 mins HP = 300 psi		
-42.1	50.0		Limestone, hard, slightly weathered, silty sand-filled cavities, fossiliferous				-42.1		
		Slightly Weathered		95	BOX 1	RQD 7	4 x 5-1/2" Diamond Set Bit DT = 85 mins HP = 300 psi		
							-47.1		

35 40 45 50 55

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(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 849,161 Y = 577,127	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Slightly Weathered		75	BOX 5	RQD 60	4 x 5-1/2" Diamond Set Bit DT = 42 mins HP = 100 psi		
-52.1	60.0		Limestone, moderately hard, moderately weathered, vuggy, fine quartz-filled cavities				-52.1		
		Moderately Weathered		30	BOX 4	RQD 20	4 x 5-1/2" Diamond Set Bit DT = 46 mins HP = 100 psi		
-57.1	65.0		Limestone, hard, slightly weathered, pitted, fine silty sand-filled cavities				-57.1		
		Slightly Weathered		70	BOX 6	RQD 35	4 x 5-1/2" Diamond Set Bit DT = 78 mins HP = 100 psi		
			At El. -62.1 Ft., moderately weathered, vuggy, fine sand-filled cavities				-62.1		
		Moderately Weathered		70	BOX 1	RQD 35	4 x 5-1/2" Diamond Set Bit DT = 82 mins HP = 100 psi		
			At El. -66.1 Ft., green-gray						
-67.1	75.0						-67.1		

55 60 65 70 75

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 5 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Highly Weathered	Limestone, moderately hard, highly weathered, pitted, dissolutioned silty quartz sand, few shell, light gray	10	BOX 7	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 86 mins HP = 100 psi		
							-72.1		
		Moderately Weathered	At El. -72.1 Ft., moderately weathered, some fine-grained quartz, light tan to gray	40	4		SPT Sampler	2 9 12	21
							-73.6		
				80	5		SPT Sampler	8 15 16	31
							-75.1		
				85	6		SPT Sampler	12 11 13	24
-76.6	84.5						-76.6		
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, trace shell, weak reaction with HCl, moist, few thin limestone seams (Top of the Tamiami Formation), gray (SP-SM)	100	7		SPT Sampler	2 3 10	13
							-78.1		
				100	8		SPT Sampler	2 3 3	6
-79.6	87.5						-79.6		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace fine-grained shell, weak reaction with HCl, wet, occasional thin limestone seams, green-gray (SM)	30	9		SPT Sampler	WOH 4 4	8
							-81.1		
				60	10		SPT Sampler	1 3 5	8
							-82.6		
				40	11		SPT Sampler	1 1 2	3
							-84.1		
				70	12		SPT Sampler	WOH 3 3	6
							-85.6		
				100	13		SPT Sampler	2 2 5	7
							-87.1		

75 80 85 90 95

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 6 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 849,161 Y = 577,127	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
			30	14		SPT Sampler	WOH / WOH / 1	1
						-88.6		
			100	15		SPT Sampler	WOH / 2 / 4	6
						-90.1		
			100	16		SPT Sampler	WOH / WOH / 2	2
		At El. -91.6 Ft., little silt				-91.6		
			10	17		SPT Sampler	WOH / WOH / 1	1
-93.1	101.0					-93.1		
		SAND, poorly-graded with clay, mostly subrounded fine-grained quartz, few clay, weak reaction with HCl, wet, gray-green (SP-SC)	50	18		SPT Sampler	WOH / 2 / 5	7
						-94.6		
			100	19		SPT Sampler	2 / 3 / 5	8
						-96.1		
			100	20		SPT Sampler	1 / 2 / 5	7
						-97.6		
			30	21		SPT Sampler	WOH / 1 / 3	4
						-99.1		
			100	22		SPT Sampler	1 / WOH / 3	3
						-100.6		
			90	23		SPT Sampler	WOH / WOH / WOH	0
						-102.1		
					UD1	Shelby		
-104.1	112.0					-104.1		
		SAND, clayey, mostly subrounded fine-grained quartz, little clay, few silt, trace shell, weak reaction with HCl, wet, weak cementation, gray-green (SC)	30	24		SPT Sampler	WOH / WOH / 1	1
						-105.6		
			100	25		SPT Sampler	WOH / 2 / 4	6
						-107.1		

95 100 105 110 115

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 7 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.3 FT.	N-VALUE
				85	26		SPT Sampler	WOH WOH 1	1
							-108.6		
				100	27		SPT Sampler	WOH 2 3	5
							-110.1		
				100	28		SPT Sampler	WOH 1 3	4
							-111.6		
				100	29		SPT Sampler	1 1 4	5
							-113.1		
				95	30		SPT Sampler	WOH WOH 4	4
							-114.6		
				100	31		SPT Sampler	2 3 8	11
							-116.1		
			From El. -116.1 to -117.6 Ft., trace limestone fragments	100	32		SPT Sampler	2 3 10	13
-117.6	125.5						-117.6		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace clay, trace shell, strong reaction with HCl, moist, thin limestone fragments, green-gray (SM)	100	33		SPT Sampler	WOH 7 22	29
-119.1	127.0						-119.1		
			Limestone, moderately hard, highly weathered, fine-grained, pitted, trace shell (Top of Gray Limestone Formation), light tan	51	34		-119.7 SPT Sampler	31	
							-120.1 Advanced Boring w/ tricone roller bit	(50/0.1")	
			At El. -120.1 Ft., vuggy, few shand seams; fossiliferous		BOX 9				
					BOX 8				
			At El. -121.6 Ft., light gray	75		RQD 70	4 x 5-1/2" Diamond Set Bit DT = 41 mins HP = 300 psi		
		Highly Weathered					-125.1		
			At El. -125.1 Ft., pitted, fine-grained sand filled cavities		BOX 7				
				95		RQD 80	4 x 5-1/2" Diamond Set Bit DT = 50 mins HP = 100 psi		

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Highly Weathered		95	BOX 3	RQD 80	4 x 5-1/2" Diamond Set Bit DT = 50 mins HP = 100 psi		
-130.1	138.0		Limestone, hard, slightly weathered, porous, gray				-130.1		
				100	BOX 9	RQD 100	4 x 5-1/2" Diamond Set Bit DT = 2 mins HP = 100 psi		
							-134.1		
				100	BOX 9	RQD 80	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 100 psi		
-136.1	144.0		Limestone, soft, with thin sand seams		BOX 5		-139.1		
		Slightly Weathered	At El. -139.1 Ft., moderately hard, pitted, with thin sand seams	100	BOX 10	RQD 100	4 x 5-1/2" Diamond Set Bit DT = 5 mins HP = 100 psi		
							-144.1		
				60	BOX 10	RQD 20	4 x 5-1/2" Diamond Set Bit DT = 1 mins HP = 100 psi		

135 140 145 150 155

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(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-149.1	157.0	Slightly Weathered		60	BOX 6	RQD 20	4 x 5-1/2" Diamond Set Bit DT = 1 mins HP = 100 psi -149.1		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, weak reaction with HCl, moist, gray (SM)	50	35		SPT Sampler -150.6	5 24 29	53
				100	36		SPT Sampler -152.1	WOH 17 23	40
							Advanced Boring w/ tricone roller bit -155.6		
			At El. -155.6 Ft., some silt	75	37		SPT Sampler -157.1	2 3 2	5
							Advanced Boring w/ tricone roller bit -160.6		
				50	38		SPT Sampler -162.1	28 39 40	79
							Advanced Boring w/ tricone roller bit -165.6		
			At El. -165.6 Ft., dark gray	75	39		SPT Sampler -167.1	3 31 48	79

155 160 165 170 175

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(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-170.6		
				100	40		SPT Sampler	WOH 2 4	6
							-172.1		
							Advanced Boring w/ tricone roller bit		
							-175.6		
				100	41		SPT Sampler	1 1 8	9
							-177.1		
							Advanced Boring w/ tricone roller bit		
							-180.6		
			At El. -180.6 Ft., (Top of Hawthorne Formation)	50	42		SPT Sampler	7 21 18	39
							-182.1		
							Advanced Boring w/ tricone roller bit		
							-185.6		
			At El. -185.6 Ft., little silt	100	43		SPT Sampler	1 3 6	9
							-187.1		

175 180 185 190 195

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORED	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-190.6		
			At El. -190.6 Ft., some silt	75	44		SPT Sampler	17 45 50	95
							-192.1		
							Advanced Boring w/ tricone roller bit		
							-195.6		
			At El. -195.6 Ft., little silt	100	45		SPT Sampler	5 25 36	61
							-197.1		
							Advanced Boring w/ tricone roller bit		
-200.6	208.5						-200.6		
			SAND, poorly-graded with clay, mostly subrounded fine-grained quartz, few clay, weak reaction with HCl, wet, moderate cementation, gray-green (SP-SC)	90	46		SPT Sampler	36 50/0.3'	
							-201.4		
							Advanced Boring w/ tricone roller bit		
							-205.6		
				108	47		-206.0 SPT Sampler	50/0.4'	
							Advanced Boring w/ tricone roller bit		

195 200 205 210 215

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-210.6		
				86	48		SPT Sampler	42 50/0.4'	
							-211.5		
							Advanced Boring w/ tricone roller bit		
							-215.6		
				100	49		SPT Sampler	19 32 50	82
							-217.1		
							Advanced Boring w/ tricone roller bit		
							-220.6		
				80	50		SPT Sampler	26 45 50/0.4'	95+
							-222.0		
							Advanced Boring w/ tricone roller bit		
							-225.6		
				31	51		SPT Sampler	31 50	

215 220 225 230 235

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				31	51		SPT Sampler		
							-228.5 Advanced Boring w/ tricone roller bit		
-230.6	238.5						-230.6		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, no reaction with HCl, wet (SC)	100	52		SPT Sampler	13 25 41	66
							-232.1 Advanced Boring w/ tricone roller bit		
							-235.6		
				100	53		SPT Sampler	8 23 39	62
							-237.1 Advanced Boring w/ tricone roller bit		
							-240.6		
				100	54		SPT Sampler	11 20 37	57
-242.1	250.0						-242.1		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
10	89.0/90.5	SM*
29	119.5/121.0	SC*
38	168.5/170.0	SM*
42	188.5/190.0	SM

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.

(Continued)

Boring Designation CP02-LKBPP-CB-004

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 849,161 Y = 577,127	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			49 223.5/225.0 SC*						

*Lab visual classification based on gradation curve. No Atterberg limits.

3. Additional Laboratory Testing

10 Moisture Content
29 Moisture Content
29 Specific Gravity
Specific Gravity
38 Moisture Content
42 Moisture Content
49 Moisture Content
49 Specific Gravity

255
260
265
270
275

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	South Atlantic	Jacksonville District	1 OF 12 SHEETS

1. PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP02-LKBPP-CB-005	LOCATION COORDINATES: X = 857,354 Y = 570,503	11. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	☒ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Law Engineering	CONTRACTOR FILE NO.: 40521-1-8482-15	12. TOTAL SAMPLES	DISTURBED: 52 / UNDISTURBED (UD): 1
4. NAME OF DRILLER: David Johns, Jr.		13. TOTAL NUMBER CORE BOXES: 7	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER: 4.9 Ft.
		15. DATE BORING	STARTED: 07-15-02 / COMPLETED: 08-02-02
6. THICKNESS OF OVERBURDEN: 70.0 Ft.		16. ELEVATION TOP OF BORING: 9.4 Ft.	
7. DEPTH DRILLED INTO ROCK: 60.0 Ft.		17. TOTAL RECOVERY FOR BORING: 77 %	
8. TOTAL DEPTH OF BORING: 210.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Jeff Samuels, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							9.4		
			At El. 9.4 Ft., Precut Reference Boring to 70.0 Feet						
							Advanced Boring w/ tricone roller bit		

0
5
10
15

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JUN 02

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

15
20
25
30
35

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 3 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

35
40
45
50
55

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORED	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
-60.6	70.0						-60.6		
		Slightly Weathered	Limestone, hard, slightly weathered, fine-grained, porous, fossiliferous, tan-white	38	BOX 1	RQD 57	4 x 5-1/2" Diamond Set Bit DT = 47 mins HP = 150 psi		
							-65.6		

55 60 65 70 75

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 5 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				82	BOX 7	RQD 61	4 x 5-1/2" Diamond Set Bit DT = 41 mins HP = 150 psi		
							-70.6		
			At El. -70.6 Ft., light tan-white	82	BOX 2	RQD 70	4 x 5-1/2" Diamond Set Bit DT = 58 mins HP = 150 psi		
							-75.6		
			At El. -78.1 Ft., with cemented fine-grained quartz sand	80	BOX 8	RQD 55	4 x 5-1/2" Diamond Set Bit DT = 42 mins HP = 150 psi		
							-80.6		
				50	BOX 3	RQD 42	4 x 5-1/2" Diamond Set Bit DT = 68 mins HP = 150 psi		
							-85.6		

Slightly Weathered

75 80 85 90 95

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 6 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -85.6 Ft., with calcite replacement, gray	49		RQD 49	4 x 5-1/2" Diamond Set Bit DT = 6 mins HP = 150 psi		
-90.6	100.0		Slightly Weathered				-90.6		
			SAND, poorly-graded, mostly subrounded fine-grained quartz, trace silt, weak reaction with HCl, moist, weak cementation, (Top of Tamiami Formation), gray-green (SP)		BOX 1				
-93.6	103.0			75	BOX 1	RQD 50	4 x 5-1/2" Diamond Set Bit DT = 10 mins HP = 150 psi		
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, weak reaction with HCl, wet, gray-green (SP-SM)				-95.6		
-95.6	105.0		SAND, silty, mostly subrounded fine-grained quartz, little silt, trace shell, weak reaction with HCl, moist, gray-green (SM)	100	1		SPT Sampler	3 4 5	9
							-97.1		
			At El. -97.6 Ft., few fine-grained shell	100	2		SPT Sampler	4 3 5	8
							-98.6		
				100	3		SPT Sampler	3 4 5	9
							-100.1		
				100	4		SPT Sampler	2 5 4	9
							-101.6		
				100	5		SPT Sampler	3 5 4	9
							-103.1		
				100	UD1	UD1	Shelby		
							-105.1		
				100	6		SPT Sampler	2	

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 7 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-106.6	116.0			100	6		SPT Sampler	6 11	17
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, trace shell, no reaction with HCl, moist, gray-green (SC)	100	7		SPT Sampler	3 2 6	8
				100	8		SPT Sampler	4 5 7	12
				100	9		SPT Sampler	7 9 16	25
				50	10		SPT Sampler	6 6 7	13
				35	11		SPT Sampler	2 6 5	11
							Overwashed		
			At El. -115.1 Ft., some clay	100	12		SPT Sampler	3 4 8	12
			At El. -116.6 Ft., dark green	70	13		SPT Sampler	WOR 3 4	7
				90	14		SPT Sampler	3 8 16	24
			At El. -119.6 Ft., little clay	50	15		SPT Sampler	WOR 5 10	15
				65	16		SPT Sampler	7 12 9	21
				70	17		SPT Sampler	4 16 19	35
				70	18		SPT Sampler	6 16 21	37

-106.6 -108.1 -109.6 -111.1 -112.6 -114.1 -115.1 -116.6 -118.1 -119.6 -121.1 -122.6 -124.1 -125.6

115 120 125 130 135

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORE	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				50	19		SPT Sampler	7 11 18	29
							-127.1		
				50	20		SPT Sampler	9 14 21	35
							-128.6		
				74	21		SPT Sampler	15 25 50/0.4'	75+
							-130.0		
			At El. -130.1 Ft., thin limestone seam				-130.1 Advanced Boring		
				85	22		SPT Sampler	36 32 25	57
							-131.6		
			At El. -131.6 Ft., trace fine-grained shell, tan-gray	70	23		SPT Sampler	6 34 36	70
							-133.1		
				85	24		SPT Sampler	7 13 13	26
							-134.6		
				70	25		SPT Sampler	7 10 23	33
							-136.1		
				0	26		-136.4 SPT Sampler	50/0.3'	
-136.6	146.0						-136.6 Advanced Boring		
		Slightly Weathered	Limestone, hard, slightly weathered, fine-grained, porous, fossiliferous with calcite replacement, trace silt (Top of Gray Limestone Formation), green-gray	89	BOX 5 BOX 10	RQD 70	4 x 5-1/2" Diamond Set Bit DT = 10 mins HP = 88 psi		
							-141.6		
				100	BOX 10 BOX 2	RQD 89	4 x 5-1/2" Diamond Set Bit DT = 20 mins HP = 100 psi		

135 140 145 150 155

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100		RQD 89	4 x 5-1/2" Diamond Set Bit DT = 20 mins HP = 100 psi		
							-146.6		
				81	BOX 11	RQD 68	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 100 psi		
							-151.6		
				59	BOX 11	RQD 46	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 100 psi		
-156.6	166.0		Slightly Weathered				-156.6		
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few fine-grained shell, few silt, gray-tan (SP-SM)	0	BOX 11		4 x 5-1/2" Diamond Set Bit DT = 3 mins HP = 100 psi		
					BOX 7		-161.6		
			At El. -161.6 Ft., trace shell, weak cementation	100	27		SPT Sampler	13 16 15	31
-163.1	172.5						-163.1		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, weak reaction with HCl, moist, weak cementation, gray-tan (SM)	100	28		SPT Sampler	WOR WOR 19	19
							-164.6		
			At El. -165.1 Ft., few fine-grained shell, gray		29		SPT Sampler	11 18	

155
160
165
170
175

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(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
					29		-166.1 SPT Sampler	26	44
				90	30		SPT Sampler	WOR 36 50/0.4'	86+
			At El. -167.1 Ft., weak cementation				-167.5		
					31		-167.6 Advanced Boring -168.0 SPT Sampler	50/0.4'	
			At El. -168.6 Ft., discontinue cementation, gray-green				Advanced Boring w/ tricone roller bit -169.1		
				90	32		SPT Sampler -170.6	6 17 21	38
				100	33		SPT Sampler -172.1	WOR WOR 33	33
				100	34		SPT Sampler -173.6	11 28 31	59
				80	35		SPT Sampler -175.1	9 16 22	38
-176.1	185.5			100	36		SPT Sampler -176.6	5 10 21	31
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, little silt, no reaction with HCl, moist, (Top of Hawthorne Formation), gray-green (SC)	100	37		SPT Sampler -178.1	WOR 4 12	16
				100	38		SPT Sampler -179.6	8 13 35	48
				100	39		SPT Sampler -181.1	WOR 5 7	12
				100	40		SPT Sampler -182.6	2 7 35	42
-183.6	193.0		At El. -183.2 Ft., some clay	100	41		SPT Sampler -184.1	7 11 41	52
-184.1	193.5		SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, no reaction with HCl, moist, gray (SP-SM)						
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, few silt, no reaction with HCl, moist, gray-green (SC)	100	42		SPT Sampler -185.6	11 10 6	16

(Continued)

Boring Designation CP02-LKBPP-CB-005

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	43		SPT Sampler	5 5 18	23
							-187.1		
				100			Overwashed		
							-188.6		
				100	44		SPT Sampler	2 4 10	14
							-190.1		
				100	45		SPT Sampler	2 2 5	7
							-191.6		
				100	46		SPT Sampler	WOR 2 3	5
							-193.1		
				100	47		SPT Sampler	WOR 1 3	4
							-194.6		
				100	48		SPT Sampler	WOR 4 8	12
							-196.1		
				100	49		SPT Sampler	WOR WOR 5	5
							-197.6		
				100	50		SPT Sampler	WOR 2 5	7
							-199.1		
				100	51		SPT Sampler	WOR WOR 2	2
-200.6	210.0						-200.6		

195
200
205
210
215

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
	/70.0	SM*
13	126.0/127.5	SC
44	198.0/199.5	SM

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.
DT = Drill Time.
HP = Hydraulic Pressure.

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 12 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,354 Y = 570,503	9.4 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits. 3. Additional Laboratory Testing Moisture Content Specific Gravity 13 Moisture Content 13 Specific Gravity Specific Gravity 44 Moisture Content 44 Specific Gravity						

215
220
225
230
235

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 14 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP02-LKBPP-CB-006	LOCATION COORDINATES: X = 862,077 Y = 581,134	11. MANUFACTURER'S DESIGNATION OF DRILL: CME-75	☒ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Law Engineering	CONTRACTOR FILE NO.: 40521-1-8482-15	12. TOTAL SAMPLES	DISTURBED: 57 / UNDISTURBED (UD): 3
4. NAME OF DRILLER: David Johns, Jr.		13. TOTAL NUMBER CORE BOXES: 2	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER:
		15. DATE BORING	STARTED: 09-14-02 / COMPLETED: 09-27-02
6. THICKNESS OF OVERBURDEN: 0.0 Ft.		16. ELEVATION TOP OF BORING: 4.9 Ft.	
7. DEPTH DRILLED INTO ROCK: 0.0 Ft.		17. TOTAL RECOVERY FOR BORING: 77 %	
8. TOTAL DEPTH OF BORING: 250.5 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Nabil Hmeidi, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
							4.9		
			At El. 4.9 Ft., Precut Reference Boring to 100.0 Feet						
							Advanced Boring w/ tricone roller bit		

0
5
10
15

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

15
20
25
30
35

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 3 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

35
40
45
50
55

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

55
60
65
70
75

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 862,077 Y = 581,134	ELEVATION TOP OF BORING: 4.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		

75
80
85
90
95

(Continued)

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Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 6 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 862,077 Y = 581,134	ELEVATION TOP OF BORING: 4.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
-95.1	100.0						-95.1		
			Limestone, soft, slightly weathered, fine-grained, few fine-grained shell, light tan	30	1		SPT Sampler	4 12 14	26
							-96.6		
				60	2		SPT Sampler	11 12 15	27
							-98.1		
				50	3		SPT Sampler	9 10 6	16
							-99.6		
				50	4		SPT Sampler	8 10 13	23
							-101.1		
				60	5		SPT Sampler	32 17 10	27
							-102.6		
			At El. -102.6 Ft., fine grained quartz sand seam (4" thick)	60	6		SPT Sampler	4 8 10	18
							-104.1		
				60	7		SPT Sampler	11 10 9	19
							-105.6		
				30	8		SPT Sampler	6 8 10	18
							-107.1		
				60	9		SPT Sampler	11 11 18	29
							-108.6		
			At El. -109.1 Ft., little dissolutioned silty sand	90	10		SPT Sampler	5 5 4	9
							-110.1		

Slightly Weathered

95 100 105 110 115

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 7 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				90	11		SPT Sampler	4 / 10 / 18	28
							-111.6		
				10	12		SPT Sampler	9 / 9 / 10	19
-113.1	118.0	Slightly Weathered					-113.1		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace shell, weak reaction with HCl, moist, with few limestone seams (Top of Tamiami Formation), green-gray (SM)	100	13		SPT Sampler	6 / 7 / 12	19
							-114.6		
				100	14		SPT Sampler	1 / 2 / 2	4
							-116.1		
			At El. -116.1 Ft., trace silt	50	15		SPT Sampler	1 / 1 / 2	3
							-117.6		
				100	16		SPT Sampler	2 / 5 / 10	15
							-119.1		
				0	UD1	UD1	Shelby		
							-121.1		
				100	17		SPT Sampler	2 / 2 / 6	8
			At El. -122.1 Ft., weak cementation				-122.6		
				100	18		SPT Sampler	9 / 16 / 16	32
							-124.1		
				100	19		SPT Sampler	2 / 2 / 8	10
							-125.6		
			At El. -126.1 Ft., moderate cementation	0	UD2	UD2	Shelby		
							-127.6		
				100	20		SPT Sampler	9 / 15 / 17	32
							-129.1		
				50	21		SPT Sampler	2 / 4	

115 120 125 130 135

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 8 OF 14 SHEETS
PROJECT Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88	
LOCATION COORDINATES X = 862,077 Y = 581,134	ELEVATION TOP OF BORING 4.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORE	REMARKS	BLOWS/0.5 FT.	N-VALUE
				50	21		-130.6 SPT Sampler	4	8
				100	22		SPT Sampler -132.1	3 6 15	21
			At El. -132.1 Ft., few clay	100	23		SPT Sampler -133.6	3 2 3	5
				100	24		SPT Sampler -135.1	4 12 18	30
				0	25		SPT Sampler -136.6	1 1 1	2
				20	UD3	UD3	Shelby -138.6		
			At El. -139.6 Ft., trace shell, weak cementation	100	26		SPT Sampler -140.1	4 6 13	19
				100	27		SPT Sampler -141.6	11 10 16	26
				100	28		SPT Sampler -143.1	9 17 23	40
				80	29		SPT Sampler -144.6	10 14 31	45
			At El. -144.6 Ft., little shell, brownish-gray	60	30		SPT Sampler -146.1	11 16 21	37
			At El. -146.1 Ft., gray	96	31		SPT Sampler -147.4	19 30 50/0.3'	80+
							-147.6 Advanced Boring		
				100	32		SPT Sampler -149.1	12 15 19	34
			At El. -149.1 Ft., trace shell	75	33		SPT Sampler	10 12	

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				75	33		-150.6 SPT Sampler	19	31
				131	34		SPT Sampler	26 48/0.4'	
							-151.5 Advanced Boring w/ tricone roller bit	50/-0.1'	98+
-152.1	157.0						-152.1		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, little fine-grained shell, few silt, weak reaction with HCl, moist, weak cementation, gray (SC)	100	35		SPT Sampler	20 15 16	31
			At El. -153.6 Ft., moderate cementation				-153.6		
				85	36		SPT Sampler	16 30 50/0.4'	80+
							-155.0 Advanced Boring w/ tricone roller bit		
-159.1	164.0						-159.1		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, few clay, trace shell, weak reaction with HCl, wet, moderate cementation, gray (SM)	100	37		SPT Sampler	14 13 13	26
							-160.6 Advanced Boring w/ tricone roller bit		
							-164.1		
				100	38		SPT Sampler	26 32 36	68
							-165.6 Advanced Boring w/ tricone roller bit		
							-169.1		
			At El. -169.1 Ft., few fine-grained shell, tan-gray	38	39		SPT Sampler	3 6	

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				38	39		-170.6 SPT Sampler	4	10
							Advanced Boring w/ tricone roller bit		
			At El. -174.1 Ft., trace shell, green-gray				-174.1		
				100	40		SPT Sampler	6 31 41	72
							-175.6 Advanced Boring w/ tricone roller bit		
-179.1	184.0						-179.1		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, no reaction with HCl, moist, (Top of Hawthorne Formation), dark gray (SC)	100	41		SPT Sampler	4 9 13	22
							-180.6 Advanced Boring w/ tricone roller bit		
			At El. -183.1 Ft., some clay, gray-green				-184.1		
				100	42		SPT Sampler	1 0 5	5
							-185.6 Advanced Boring w/ tricone roller bit		
							-189.1		
				100	43		SPT Sampler	WOR WOR	

175 180 185 190 195

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
				100	43		-190.6 SPT Sampler	WOR	0	195
							Advanced Boring w/ tricone roller bit -194.1			
				100	44		SPT Sampler -195.6	WOR / WOR / WOR	0	200
							Advanced Boring w/ tricone roller bit -199.1			
				100	45		SPT Sampler -200.6	WOR / 1 / 5	6	205
							Advanced Boring w/ tricone roller bit -204.1			
				100	46		SPT Sampler -205.6	WOR / WOR / WOR	0	210
							Advanced Boring w/ tricone roller bit -209.1			
				100	47		SPT Sampler	5 / 11		215

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
				100	47		-210.6 SPT Sampler	19	30	215
			At El. -212.1 Ft., no reaction with HCl, moist, gray				Advanced Boring w/ tricone roller bit -214.1			
				100	48		SPT Sampler -215.6	2 1 4	5	220
							Advanced Boring w/ tricone roller bit -219.1			
			At El. -220.1 Ft., little clay, trace shell	100	49		SPT Sampler -220.6	9 17 39	56	225
-222.1	227.0		SAND, poorly-graded with clay, mostly subrounded fine-grained quartz, trace clay, no reaction with HCl, moist, gray (SP-SC)				Advanced Boring w/ tricone roller bit -224.1			
				90	50		SPT Sampler -224.9	40 50/0.3'		230
							Advanced Boring w/ tricone roller bit -229.1			
			At El. -229.6 Ft., trace shell	100	51		SPT Sampler -229.9	14 50/0.3'		235

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
-234.1	239.0						-234.1		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, trace shell, no reaction with HCl, wet, gray (SC)	72	52		SPT Sampler	34 50/0.3'	
							-234.9		
							Advanced Boring w/ tricone roller bit		
							-239.1		
				100	53		SPT Sampler	23 36 50	86
							-240.6		
							Advanced Boring w/ tricone roller bit		
							-244.1		
				100	54		SPT Sampler	10 27 34	61
-245.6	250.5						-245.6		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
14	119.5/121.0	SM*
UD1	/100.0	SM*
39	174.0/175.5	SM*

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.

(Continued)

Boring Designation CP02-LKBPP-CB-006

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 862,077 Y = 581,134	4.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			46 209.0/210.5 SC						
			*Lab visual classification based on gradation curve. No Atterberg limits.						
			3. Additional Laboratory Testing						
			14 Moisture Content UD1 Moisture Content UD1 Specific Gravity 39 Moisture Content 39 Specific Gravity 46 Moisture Content						

255
260
265
270
275

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Boring Designation CP02-LKBPP-CB-007

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 14 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional	9. SIZE AND TYPE OF BIT	See Remarks
		10. COORDINATE SYSTEM/DATUM	HORIZONTAL: State Plane, FLE (U.S. Ft.) / NAD83; VERTICAL: NAVD88
2. BORING DESIGNATION	CP02-LKBPP-CB-007	LOCATION COORDINATES	X = 836,331 Y = 566,508
11. MANUFACTURER'S DESIGNATION OF DRILL	CME-55	☒ AUTO HAMMER ☐ MANUAL HAMMER	
3. DRILLING AGENCY	Law Engineering	CONTRACTOR FILE NO.	40521-1-8482-15
12. TOTAL SAMPLES	DISTURBED: 71	UNDISTURBED (UD): 0	
4. NAME OF DRILLER	David Johns, Jr.	13. TOTAL NUMBER CORE BOXES	12
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	
14. ELEVATION GROUND WATER	7.5 Ft.		
15. DATE BORING	STARTED: 09-28-02	COMPLETED: 10-10-02	
6. THICKNESS OF OVERBURDEN	10.0 Ft.	16. ELEVATION TOP OF BORING	10.5 Ft.
7. DEPTH DRILLED INTO ROCK	76.5 Ft.	17. TOTAL RECOVERY FOR BORING	68 %
8. TOTAL DEPTH OF BORING	250.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR	Jeremy Bernamer, Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
10.5	0.0						10.5		
		Highly Weathered	Limestone, highly weathered, fine-grained, dissolutioned silty sand seams, light gray	30	1		SPT Sampler	6 / 14 / 8	22
							9.0 Advanced Boring w/ tricone roller bit		
							7.0		
				30	2		SPT Sampler	3 / 3 / 5	8
							5.5 Advanced Boring w/ tricone roller bit		
							2.0		
				60	3		SPT Sampler	15 / 32 / 50/0.3'	82+
0.5	10.0						0.8 Advanced Boring 0.5		
		Slightly Weathered	Limestone, hard, slightly weathered, fractured, tan	40	BOX 2 / BOX 2	RQD 10	4 x 5-1/2" Diamond Set Bit DT = 35 mins HP = 300 psi DFR = 100 %		
							-4.5		

0 5 10 15

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -4.5 Ft., pitted, fossiliferous	50	BOX 3	RQD 40	4 x 5-1/2" Diamond Set Bit DT = 9 mins HP = 300 psi DFR = 100 %		
			Slightly Weathered				-9.5		
				75	BOX 3	RQD 60	4 x 5-1/2" Diamond Set Bit DT = 17 mins HP = 300 psi DFR = 100 %		
			At El. -14.5 Ft., moderately weathered, tan-gray				-14.5		
				50	BOX 4	RQD 30	4 x 5-1/2" Diamond Set Bit DT = 9 mins HP = 300 psi DFR = 100 %		
			Moderately Weathered				-19.5		
			At El. -19.5 Ft., tan-brown	40	BOX 4	RQD 20	4 x 5-1/2" Diamond Set Bit DT = 5 mins HP = 300 psi DFR = 100 %		
							-24.5		

15 20 25 30 35

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(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 3 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Slightly Weathered	At El. -24.5 Ft., slightly weathered, vuggy, silty sand-filled cavities, tan	70	BOX 5	RQD 50	4 x 5-1/2" Diamond Set Bit DT = 10 mins HP = 300 psi DFR = 100 %		
-29.5	40.0						-29.5		
		Unweathered	Limestone, soft, unweathered, porous	60		RQD 20	4 x 5-1/2" Diamond Set Bit DT = 11 mins HP = 300 psi DFR = 100 %		
-34.5	45.0						-34.5		
		Slightly Weathered	Limestone, hard, slightly weathered, fossiliferous	20	BOX 6 BOX 5	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 55 mins HP = 300 psi DFR = 100 %		
							-39.5		
				60	BOX 1	RQD 31	4 x 5-1/2" Diamond Set Bit DT = 11 mins HP = 300 psi DFR = 100 %		
							-44.5		

35 40 45 50 55

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -44.5 Ft., unweathered, vuggy, silty sand-filled cavities	60	BOX 5	RQD 31	4 x 5-1/2" Diamond Set Bit DT = 15 mins HP = 300 psi DFR = 100 %		
							-49.5		
			At El. -49.5 Ft., pitted	15	BOX 4	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 300 psi DFR = 100 %		
							-54.5		
			At El. -54.5 Ft., porous, gray	40	BOX 6	RQD 20	4 x 5-1/2" Diamond Set Bit DT = 11 mins HP = 300 psi DFR = 100 %		
							-59.5		
			At El. -59.5 Ft., slightly weathered	50	BOX 1	RQD 10	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 300 psi DFR = 100 %		
-64.5	75.0						-64.5		

Unweathered

Slightly Weathered

55 60 65 70 75

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 5 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Unweathered	Limestone, soft, unweathered, sand seams	20	BOX 7	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 1 mins HP = 300 psi DFR = 100 %		
-69.5	80.0						-69.5		
			SAND, silty, mostly subrounded fine-grained quartz, some silt, weak reaction with HCl, moist, with thin limestone seams --Top of Tamiami Formation--, tan (SM)	100	4		SPT Sampler	1 3 3	6
							-71.0		
				100	5		SPT Sampler	5 6 13	19
-72.5	83.0						-72.5		
		Highly Weath.	Limestone, soft, highly weathered, fine-grained, dissolutioned with little shell, gray	75	6		SPT Sampler	9 12 16	28
-74.0	84.5						-74.0		
			SAND, silty, mostly subrounded fine to medium-grained quartz, some silt, little shell, weak reaction with HCl, with thin limestone seams (SM)	65	7		SPT Sampler	7 7 6	13
							-75.5		
			At El. -75.5 Ft., trace shell	60	8		SPT Sampler	6 10 13	23
							-77.0		
				60	9		SPT Sampler	8 9 12	21
							-78.5		
			At El. -78.5 Ft., trace phosphate, moderate cementation	100	10		SPT Sampler	4 11 18	29
							-80.0		
				90	11		SPT Sampler	9 10 9	19
							-81.5		
				100	12		SPT Sampler	4 8 11	19
							-83.0		
			At El. -83.0 Ft., few clay, weak cementation	100	13		SPT Sampler	4 6 10	16
-84.5	95.0						-84.5		

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)

INSTALLATION: Jacksonville District

SHEET 6 OF 14 SHEETS

PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project

COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) | HORIZONTAL: NAD83 | VERTICAL: NAVD88

LOCATION COORDINATES: X = 836,331 Y = 566,508

ELEVATION TOP OF BORING: 10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
									95
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, few silt, weak reaction with HCl, moist (SC)	100	14		SPT Sampler	1 3 5	8
							-86.0		
				100	15		SPT Sampler	5 13 23	36
							-87.5		
				0	16		SPT Sampler	3 2 4	6
							-89.0		
				100	17		SPT Sampler	2 6 10	16
-90.5	101.0						-90.5		100
			SAND, silty, mostly subrounded fine-grained quartz, little silt, few clay, weak reaction with HCl, moist, tan-gray (SM)	100	18		SPT Sampler	5 6 8	14
							-92.0		
				100	19		SPT Sampler	3 6 10	16
-93.5	104.0						-93.5		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, few silt, weak reaction with HCl, moist, gray (SC)	100	20		SPT Sampler	3 5 14	19
							-95.0		105
				100	21		SPT Sampler	3 7 9	16
							-96.5		
			At El. -96.5 Ft., green-gray	100	22		SPT Sampler	WOH 2 3	5
							-98.0		
				100	23		SPT Sampler	WOH WOH 5	5
							-99.5		110
							Overwashed		
							-101.0		
			At El. -101.0 Ft., some clay	100	25		SPT Sampler	WOH WOH 3	3
							-102.5		
				100	26		SPT Sampler	WOR WOH 3	3
							-104.0		
				100	27		SPT Sampler	WOH	
									115

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)

INSTALLATION: Jacksonville District

SHEET 7 OF 14 SHEETS

PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project

COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) | HORIZONTAL: NAD83 | VERTICAL: NAVD88

LOCATION COORDINATES: X = 836,331 Y = 566,508

ELEVATION TOP OF BORING: 10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CR	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	27		SPT Sampler	1 4	5
							-105.5		
				100	28		SPT Sampler	WOR WOR WOR	0
			At El. -107.0 Ft., trace shell				-107.0		
				100	29		SPT Sampler	3 8 10	18
							-108.5		
				100	30		SPT Sampler	4 6 18	24
							-110.0		
				100	31		SPT Sampler	WOH 6 18	24
-111.5	122.0						-111.5		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, weak reaction with HCl, moist, with limestone seams, gray (SM)	100	32		SPT Sampler	WOR WOR 13	13
							-113.0		
				80	33		SPT Sampler	WOR 15 27	42
							-114.5		
				83	34		SPT Sampler	27 50 50/0.1'	100+
							-115.6		
-116.0	126.5						-116.0 Advanced Boring w/		
			Limestone, (Top of Gray Limestone Formation)	0	BOX 8 Core Run 15	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 2 mins		
							-119.5		
				0	BOX 8 Core Run 16	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 3 mins HP = 100 psi		
-122.5	133.0						-122.5		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, little fine to medium-grained shell, weak reaction with HCl, moist, gray (SM)	65	35		SPT Sampler	13 12 27	39
							-124.0		
			At El. -124.0 Ft., trace shell	100	36		SPT Sampler	11	

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Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -125.5 Ft., little shell	100	36		SPT Sampler -125.5	11 / 16	27
			At El. -127.0 Ft., few shell	100	37		SPT Sampler -127.0	6 / 10 / 14	24
				85	38		SPT Sampler -128.5	12 / 13 / 13	26
			At El. -130.0 Ft., trace shell, limestone seam	100	39		SPT Sampler -130.0	9 / 13 / 16	29
			At El. -131.5 Ft., few clay	100	40		SPT Sampler -131.5	15 / 7 / 50	57
-133.0	143.5			100	41		SPT Sampler -133.0	47 / 45 / 35	80
-134.5	145.0	Sl. Weathered	Limestone, soft, slightly weathered, fine-grained, fractured, gray	60	42		SPT Sampler -134.5	8 / 8 / 22	30
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace shell, weak reaction with HCl, moist, weak cementation, with limestone seams, gray (SM)	75	43		SPT Sampler -136.0	19 / 13 / 15	28
				100	44		SPT Sampler -137.5	9 / 12 / 27	39
				95	45		SPT Sampler -139.0	12 / 20 / 11	31
				100	46		SPT Sampler -140.5	9 / 11 / 22	33
				100	47		SPT Sampler -142.0	WOR / WOR / WOR	0
-143.5	154.0			50	48		SPT Sampler -143.5	6 / 12 / 18	30
		Sl. Wea.	Limestone, soft, slightly weathered, fine-grained, fractured, gray	100	49		SPT Sampler	5 / 10	

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 9 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-145.0	155.5			100	49		-145.0 SPT Sampler	10	20
			SAND, silty, mostly subrounded fine-grained quartz, little silt, few clay, trace shell, weak reaction with HCl, moist, tan (SM)	66	50		SPT Sampler	9 13 18	31
							-146.5		
				100	51		SPT Sampler	12 46 50	96
			At El. -148.0 Ft., gray-tan				-148.0		
				100	52		SPT Sampler	20 36 35	71
							-149.5		
							Advanced Boring w/ tricone roller bit		
							-153.0		
				80	53		SPT Sampler	18 30 33	63
							-154.5		
							Advanced Boring w/ tricone roller bit		
-158.0	168.5						-158.0		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, trace shell, weak reaction with HCl, moist, gray-green (SC)	100	54		SPT Sampler	11 17 27	44
							-159.5		
							Advanced Boring w/ tricone roller bit		
							-163.0		
				90	55		SPT Sampler	9 10 20	30
							-164.5		

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-168.0		
				100	56		SPT Sampler	11 39 46	85
							-169.5		
							Advanced Boring w/ tricone roller bit		
							-173.0		
				100	57		SPT Sampler	WOH 1 2	3
							-174.5		
							Advanced Boring w/ tricone roller bit		
-178.0	188.5						-178.0		
			CLAY, fat, high plasticity, firm, trace fine-grained quartz, no reaction with HCl, moist, --Top of Hawthorn Formation--, dark gray-green (CH)	100	58		SPT Sampler	3 3 8	11
							-179.5		
							Advanced Boring w/ tricone roller bit		
							-183.0		
				100	59		SPT Sampler	3 4 11	15
							-184.5		

175 180 185 190 195

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 11 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-188.0		
			At El. -188.0 Ft., soft	100	60		SPT Sampler	WOR 1 2	3
							-189.5		
							Advanced Boring w/ tricone roller bit		
-193.0	203.5						-193.0		
			SAND, clayey, mostly subrounded fine-grained quartz, some clay, trace shell, no reaction with HCl, moist, gray-green (SC)	100	61		SPT Sampler	10 16 20	36
							-194.5		
							Advanced Boring w/ tricone roller bit		
							-198.0		
			At El. -198.0 Ft., dark gray	75	62		SPT Sampler	19 50	
							-199.0		
							Advanced Boring w/		
							-203.0		
				45	63		SPT Sampler	9 11 19	30
							-204.5		

195 200 205 210 215

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 12 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-208.0		
			At El. -208.0 Ft., gray-green	106	64		SPT Sampler	27 47 50/0.4'	97+
							-209.4		
							Advanced Boring w/ tricone roller bit		
							-213.0		
				100	65		SPT Sampler	25 35 41	76
							-214.5		
							Advanced Boring w/ tricone roller bit		
							-218.0		
				100	66		SPT Sampler	9 16 26	42
							-219.5		
							Advanced Boring w/ tricone roller bit		
							-223.0		
				100	67		SPT Sampler	10 15 22	37
							-224.5		

215 220 225 230 235

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-228.0		
				100	68		SPT Sampler	WOR 13 21	34
							-229.5		
							Advanced Boring w/ tricone roller bit		
							-233.0		
				100	69		SPT Sampler	15 30 40	70
							-234.5		
							Advanced Boring w/ tricone roller bit		
							-238.0		
				100	70		SPT Sampler	8 17 21	38
-239.5	250.0						-239.5		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
18	101.0/102.5	SM

3. Additional Laboratory Testing

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

(Continued)

Boring Designation CP02-LKBPP-CB-007

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 836,331 Y = 566,508	10.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			18 Moisture Content						

255
260
265
270
275

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG

DIVISION	South Atlantic
INSTALLATION	Jacksonville District
SHEET	1 OF 14 SHEETS
1. PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional
2. BORING DESIGNATION	CP02-LKBPP-CB-008
LOCATION COORDINATES	X = 846,324 Y = 566,527
3. DRILLING AGENCY	Law Engineering
CONTRACTOR FILE NO.	40521-1-8482-15
4. NAME OF DRILLER	David Johns, Jr.
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	10.0 Ft.
7. DEPTH DRILLED INTO ROCK	72.0 Ft.
8. TOTAL DEPTH OF BORING	250.0 Ft.
9. SIZE AND TYPE OF BIT	See Remarks
10. COORDINATE SYSTEM/DATUM	State Plane, FLE (U.S. Ft.)
HORIZONTAL	NAD83
VERTICAL	NAVD88
11. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
	☒ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED 72 / UNDISTURBED (UD) 0
13. TOTAL NUMBER CORE BOXES	11
14. ELEVATION GROUND WATER	3.8 Ft.
15. DATE BORING	STARTED 10-12-02 / COMPLETED 10-24-02
16. ELEVATION TOP OF BORING	8.3 Ft.
17. TOTAL RECOVERY FOR BORING	77 %
18. SIGNATURE AND TITLE OF INSPECTOR	Kevin Levnor, Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
8.3	0.0						8.3		
			Limestone, moderately hard, highly weathered, fine-grained, with sand seams, light tan	103	1		SPT Sampler	14 13 8	21
							6.8 Advanced Boring w/		
			At El. 4.8 Ft., tan to brown	33	2		4.8 SPT Sampler	2 2 1	3
							3.3 Advanced Boring w/		
			At El. -0.2 Ft., silty sand seams, dark gray	67	3		-0.2 SPT Sampler	3 5 50	55
			At El. -1.7 Ft., slightly weathered, porous, gray to tan	86	BOX 2 BOX 2	RQD 25	-1.7 4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 250 psi		
			At El. -4.7 Ft., pitted, tan	100		RQD 97	-4.7 4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 300 psi		

Highly Weathered

Slightly Weathered

0 5 10 15

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -8.7 Ft., fossiliferous	100		RQD 97	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 300 psi		
			At El. -9.7 Ft., medium-grained, light tan				-9.7		
		Slightly Weathered		88		RQD 77	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 300 psi		
-13.7	22.0		Limestone, hard, fine-grained		BOX 3		-13.7		
				100		RQD 63	4 x 5-1/2" Diamond Set Bit DT = 12 mins HP = 300 psi		
			At El. -18.7 Ft., moderately weathered				-18.7		
		Moderately Weathered		100		RQD 60	4 x 5-1/2" Diamond Set Bit DT = 6 mins HP = 300 psi		
			At El. -22.7 Ft., gray		BOX 4		-23.7		
		Slightly Weathered	At El. -23.7 Ft., slightly weathered, porous, light tan	100		RQD 62	4 x 5-1/2" Diamond Set Bit DT = 6 mins HP = 300 psi		

15 20 25 30 35

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(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 3 OF 14 SHEETS
	Jacksonville District		
PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	ELEVATION TOP OF BORING		
X = 846,324 Y = 566,527	8.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100		RQD 62	4 x 5-1/2" Diamond Set Bit DT = 6 mins HP = 300 psi		
-28.7	37.0		Limestone, moderately hard				-28.7		
				55		RQD 32	4 x 5-1/2" Diamond Set Bit DT = 11 mins HP = 300 psi		
							-33.7		
			Slightly Weathered	80		RQD 35	4 x 5-1/2" Diamond Set Bit DT = 7 mins HP = 300 psi		
			From El. -36.7 to -37.7 Ft., sandy clay seam				-38.7		
				60	BOX 6 BOX 5 BOX 6	RQD 37	4 x 5-1/2" Diamond Set Bit DT = 12 mins HP = 300 psi		
							-43.7		
				67	BOX 1	RQD 43	4 x 5-1/2" Diamond Set Bit DT = 5 mins HP = 300 psi		

35 40 45 50 55

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 4 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				67		RQD 43	4 x 5-1/2" Diamond Set Bit DT = 5 mins HP = 300 psi		
-48.7	57.0		Limestone, hard				-48.7		
			Slightly Weathered	70	BOX 7	RQD 38	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 300 psi		
			At El. -52.7 Ft., moderately weathered						
-53.7	62.0		Limestone, moderately hard, pitted, fractured, light tan to gray				-53.7		
			Moderately Weathered	55	BOX 7	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 32 mins HP = 300 psi		
			At El. -58.7 Ft., soft, slightly weathered, porous, light tan				-58.7		
			Slightly Weathered	40	BOX 6	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 6 mins HP = 300 psi		
							-63.7		
				33	BOX 1	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 26 mins HP = 300 psi		

55
60
65
70
75

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)

INSTALLATION Jacksonville District		**SHEET** 5 **OF** 14 **SHEETS**
PROJECT Lake Belt In-Ground Reservoir Technology Pilot Project	**COORDINATE SYSTEM/DATUM** State Plane, FLE (U.S. Ft.) / **HORIZONTAL** NAD83 / **VERTICAL** NAVD88	
LOCATION COORDINATES X = 846,324 Y = 566,527	**ELEVATION TOP OF BORING** 8.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				33	BOX 8	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 26 mins HP = 300 psi		
			At El. -68.7 Ft., with sand seams, tan				-68.7		
				8	BOX 7	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 18 mins HP = 300 psi		
			At El. -73.7 Ft., dissolutioned, with silty sand seams				-73.7		
				67	4		SPT Sampler	12 5 20	25
							-75.2		
				0			Overwashed		
							-76.7		
				33	5		SPT Sampler	11 14 17	31
							-78.2		
				44	6		SPT Sampler	8 9 7	16
			At El. -79.7 Ft., little shell				-79.7		
				44	7		SPT Sampler	3 5 5	10
							-81.2		
				72	8		SPT Sampler	8 9 8	17
							-82.7		
				39	9		SPT Sampler	3 8 10	18
							-84.2		
				33	10		SPT Sampler	5 7 6	13
							-85.7		
				39	11		SPT Sampler	1 2	

Slightly Weathered

75 80 85 90 95

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 6 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-87.2	95.5			39	11		-87.2 SPT Sampler	8	10
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, few shell, weak reaction with HCl, wet, weak cementation, (Top of Tamiami Formation), gray (SP-SM)	0	12		SPT Sampler -88.7	1 2 5	7
				0	13		SPT Sampler -90.2	2 4 4	8
			From El. -90.2 to -93.2 Ft., trace silt, trace shell	100	14		SPT Sampler -91.7	4 11 30	41
				100	15		SPT Sampler -93.2	4 7 19	26
			From El. -93.2 to -96.2 Ft., gray to light gray	100	16		SPT Sampler -94.7	12 23 33	56
				100	17		SPT Sampler -96.2	8 12 22	34
			From El. -96.2 to -97.7 Ft., gray	100	18		SPT Sampler -97.7	13 25 31	56
-97.7	106.0		SAND, silty, mostly subrounded fine-grained quartz, little silt, trace fine-grained shell, weak reaction with HCl, wet, weak cementation, gray (SM)	95	19		SPT Sampler -99.1	13 27 50/0.4'	77+
							-99.2 Advanced Boring		
				67	20		SPT Sampler -100.7	18 31 46	77
				78	21		SPT Sampler -102.2	12 33 38	71
			At El. -102.7 Ft., discontinue cementation	78	22		SPT Sampler -103.7	16 22 29	51
				100	23		SPT Sampler -105.2	22 45 50	95
				67	24		SPT Sampler -106.7	2 21 49	70

95 100 105 110 115

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 7 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 846,324 Y = 566,527	ELEVATION TOP OF BORING: 8.3 Ft.	

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
			83	25		SPT Sampler	16 / 25 / 50	75
						-108.2		
			100	26		SPT Sampler	24 / 31 / 40	71
						-109.7		
			100	27		SPT Sampler	13 / 20 / 19	39
						-111.2		
			89	28		SPT Sampler	19 / 36 / 28	64
-112.7	121.0					-112.7		
		SAND, clayey, mostly subrounded fine-grained quartz, some clay, few silt, no reaction with HCl, moist, gray-green (SC)	33	29		SPT Sampler	WOR / WOR / 5	5
						-114.2		
			67	30		SPT Sampler	4 / 1 / 2	3
		From El. -115.7 to -118.7 Ft., little silt				-115.7		
			85	31		SPT Sampler	WOR / WOR / WOR	0
						-117.2		
			80	32		SPT Sampler	WOR / WOR / 1	1
-118.7	127.0					-118.7		
		CLAY, lean, low plasticity, very soft, some subrounded fine-grained quartz, no reaction with HCl, moist, greenish-gray (CL)	100	33		SPT Sampler	WOR / WOR / WOR	0
		At El. -120.2 Ft., trace shell				-120.2		
			100	34		SPT Sampler	7 / 17 / 25	42
						-121.7		
			50	35		SPT Sampler	5 / 19 / 28	47
		At El. -123.2 Ft., firm, little fine-grained shell				-123.2		
			67	36		SPT Sampler	3 / 17 / 50	67
		At El. -124.7 Ft., soft				-124.7		
			67	37		SPT Sampler	WOR / WOR / 17	17
		At El. -126.2 Ft., some fine to				-126.2		
			152	38		-126.5 SPT Sampler	50/0.3'	

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 8 OF 14 SHEETS
	Jacksonville District		
PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	ELEVATION TOP OF BORING		
X = 846,324 Y = 566,527	8.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			medium-grained shell, moderate cementation				-127.7 Advanced Boring w/		
			At El. -127.7 Ft., discontinue shell	150	39		-128.0 SPT Sampler	50/0.3'	
-129.2	137.5						Advanced Boring w/ -129.2		
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, strong reaction with HCl, moist, weak cementation, light gray (SP-SM)	100	40		SPT Sampler -130.7	12 13 8	21
			At El. -130.7 Ft., moderate cementation	100	41		SPT Sampler -132.2	7 18 18	36
			At El. -132.2 Ft., weak cementation	100	42		SPT Sampler -133.7	19 16 19	35
-133.7	142.0		SAND, silty, mostly subrounded fine-grained quartz, little silt, weak reaction with HCl, moist, light greenish-gray (SM)	100	43		SPT Sampler -135.2	WOR WOR WOR	0
			At El. -135.2 Ft., moderate cementation	94	44		SPT Sampler -136.7	14 20 22	42
-136.7	145.0		CLAY, lean, medium plasticity, very soft, some fine-grained shell, gray (CL)	67	45		SPT Sampler -138.2	WOR WOR 19	19
-138.2	146.5		SAND, silty, some subrounded fine-grained quartz, some fine to medium-grained shell, little silt, weak reaction with HCl, moist, moderate cementation, gray (SM)	106	46		SPT Sampler -139.6	10 13 50/0.4'	63+
			At El. -139.7 Ft., little shell, strong cementation, dark gray	0	47		-139.7 Advanced Boring 50/0.3' -140.0 SPT Sampler		
			At El. -141.2 Ft., few clay, moderate cementation, light gray	100	48		Advanced Boring w/ -141.2 SPT Sampler -142.7	28 26 25	51
			At El. -142.7 Ft., trace shell	94	49		SPT Sampler -144.2	20 17 27	44
				89	50		SPT Sampler -145.7	13 17 17	34
				89	51		SPT Sampler	10 13	

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 9 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 846,324 Y = 566,527	ELEVATION TOP OF BORING: 8.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
				89	51		-147.2 SPT Sampler	17	30
			At El. -147.2 Ft., little silt, gray	94	52		SPT Sampler	8 9 7	16
							-148.7		
				89	53		SPT Sampler	7 12 15	27
							-150.2		
				100	54		SPT Sampler	7 12 16	28
							-151.7		
							Advanced Boring w/		
							-155.2		
			At El. -155.2 Ft., weak cementation	85	55		SPT Sampler	20 21 22	43
							-156.7		
							Advanced Boring w/		
							-160.2		
			At El. -160.2 Ft., discontinue cementation	100	56		SPT Sampler	5 7 12	19
							-161.7		
							Advanced Boring w/		
							-165.2		
-165.2	173.5		SAND, clayey, mostly subrounded fine-grained quartz, some clay, little shell, trace silt, weak reaction with HCl, moist, weak cementation, gray (SC)	100	57		SPT Sampler	5 8 28	36
							-166.7		

155 160 165 170 175

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(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)

INSTALLATION	SHEET / OF
Jacksonville District	SHEET 10 OF 14 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
							Advanced Boring w/		
							-170.2		
			At El. -170.2 Ft., light gray	100	58		SPT Sampler	20 21 44	65
							-171.7		
							Advanced Boring w/		
-175.2	183.5						-175.2		
			SAND, silty, mostly subrounded fine-grained quartz, some silt, trace shell, weak reaction with HCl, moist, greenish-gray (SM)	100	59		SPT Sampler	5 18 43	61
							-176.7		
							Advanced Boring w/		
							-180.2		
			At El. -180.2 Ft., little clay, discontinue shell	100	60		SPT Sampler	3 8 17	25
							-181.7		
							Advanced Boring w/		
-185.2	193.5						-185.2		
			SAND, clayey, mostly subrounded fine-grained quartz, some clay, few silt, no reaction with HCl, moist, (Top of Hawthorne Formation), greenish-gray (SC)	95	61		SPT Sampler	WOR WOR WOR	0
							-186.7		

175 180 185 190 195

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 11 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 846,324 Y = 566,527	ELEVATION TOP OF BORING: 8.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
							Advanced Boring w/		
							-190.2		
				100	62		SPT Sampler	2 3 7	10
							-191.7		
							Advanced Boring w/		
-195.2	203.5		CLAY, lean, medium plasticity, very soft, some fine-grained quartz, few silt, no reaction with HCl, moist, green-gray (CL)				-195.2		
				100	63		SPT Sampler	WOR WOR WOR	0
							-196.7		
							Advanced Boring w/		
-200.2	208.5		SAND, clayey, mostly subrounded fine-grained quartz, some clay, no reaction with HCl, moist, greenish-gray (SC)				-200.2		
				100	64		SPT Sampler	5 25 19	44
							-201.7		
							Advanced Boring w/		
			At El. -205.2 Ft., trace silt				-205.2		
				150	65		SPT Sampler	55 100	
							-206.2		

195 200 205 210 215

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 12 OF 14 SHEETS
	Jacksonville District		
PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	ELEVATION TOP OF BORING		
X = 846,324 Y = 566,527	8.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/		
-210.2	218.5						-210.2		
			SAND, poorly-graded with silt, mostly subrounded fine-grained quartz, few silt, trace clay, trace shell, weak reaction with HCl, moist, gray (SP-SM)	150	66		SPT Sampler	67 / 80	
							-211.2		
							Advanced Boring w/		
							-215.2		
			At El. -215.2 Ft., discontinue shell	150	67		SPT Sampler	50 / 82	
							-216.2		
							Advanced Boring w/		
							-220.2		
				100	68		SPT Sampler	27 / 38 / 40	78
							-221.7		
							Advanced Boring w/		
							-225.2		
				200	69		SPT Sampler	75 / 50/0.3'	
							-226.0		
							Advanced Boring w/		

215 220 225 230 235

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE NO.	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/		
							-230.2		
				100	70		SPT Sampler	23 / 35 / 44	79
							-231.7		
							Advanced Boring w/		
							-235.2		
				100	71		SPT Sampler	9 / 29 / 50	79
							-236.7		
							Advanced Boring w/		
							-240.2		
				100	72		SPT Sampler	15 / 33 / 50	83
-241.7	250.0						-241.7		

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
16	101.5/103.0	SP-SM*
36	131.5/133.0	SC
37	133.0/134.5	SC
58	178.5/180.0	SM

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOR = Weight of Rods.
DT = Drill Time.
HP = Hydraulic Pressure.

(Continued)

Boring Designation CP02-LKBPP-CB-008

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 846,324 Y = 566,527	8.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE

65	213.5/214.5	SC
69	233.5/234.3	SC*

*Lab visual classification based on gradation curve. No Atterberg limits.

3. Additional Laboratory Testing

16	Moisture Content
36	Moisture Content
37	Moisture Content
37	Specific Gravity
58	Moisture Content
58	Specific Gravity
65	Moisture Content
65	Specific Gravity
69	Moisture Content

255
260
265
270
275

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG

DIVISION	South Atlantic
INSTALLATION	Jacksonville District
SHEET	1 OF 14 SHEETS
1. PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional
2. BORING DESIGNATION	CP02-LKBPP-CB-009
LOCATION COORDINATES	X = 857,039 Y = 561,475
3. DRILLING AGENCY	Law Engineering
CONTRACTOR FILE NO.	40521-1-8482-15
4. NAME OF DRILLER	David Kirby
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	34.0 Ft.
7. DEPTH DRILLED INTO ROCK	39.8 Ft.
8. TOTAL DEPTH OF BORING	249.9 Ft.
9. SIZE AND TYPE OF BIT	See Remarks
10. COORDINATE SYSTEM/DATUM	State Plane, FLE (U.S. Ft.)
HORIZONTAL	NAD83
VERTICAL	NAVD88
11. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
	☒ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED 73 / UNDISTURBED (UD) 0
13. TOTAL NUMBER CORE BOXES	0
14. ELEVATION GROUND WATER	4.9 Ft.
15. DATE BORING	STARTED 09-27-02 / COMPLETED 10-09-02
16. ELEVATION TOP OF BORING	7.9 Ft.
17. TOTAL RECOVERY FOR BORING	83 %
18. SIGNATURE AND TITLE OF INSPECTOR	Jeremy Bemamer, Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
7.9	0.0						7.9		
			Limestone, moderately hard, highly weathered, fine-grained, with silty sand seams, tan-brown	75	1		SPT Sampler	29 26 19	45
							6.4 Advanced Boring w/ tricone roller bit		
				70	2		SPT Sampler	11 13 11	24
							2.4 Advanced Boring w/ tricone roller bit		
			At El. -1.1 Ft., light tan	50	3		SPT Sampler	14 17 17	34
							-2.6 Advanced Boring w/ tricone roller bit		
				90	4		-6.1 SPT Sampler	9 9	

Highly Weathered

0 5 10 15

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)

INSTALLATION	SHEET
Jacksonville District	2 OF 14 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				90	4		-7.6 SPT Sampler	14	23
							Advanced Boring w/ tricone roller bit		
							-11.1		
				100	5		SPT Sampler	10 15 19	34
							-12.6		
							Advanced Boring w/ tricone roller bit		
							-16.1		
			At El. -16.1 Ft., fossiliferous	100	6		SPT Sampler	18 32 48	80
							-17.6		
							Advanced Boring w/ tricone roller bit		
							-21.1		
				75	7		SPT Sampler	11 7 12	19
							-22.6		
							Advanced Boring w/ tricone roller bit		
							-25.6		
				0	8		-25.8 SPT Sampler	50/0.2"	
-26.1	34.0						-26.1 Advanced Boring		
			Limestone, hard, slightly weathered, pitted, tan	80	BOX 4	RQD 75	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 200 psi		

Highly Weathered

(Continued)

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							DFR = 100 %		
				80	BOX 4	RQD 75	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 200 psi DFR = 100 %		
					BOX 5		-31.1		
			At El. -31.1 Ft., vuggy	100		RQD 100	4 x 5-1/2" Diamond Set Bit DT = 8 mins HP = 200 psi DFR = 100 %		
							-36.1		
			At El. -36.1 Ft., pitted	90		RQD 70	4 x 5-1/2" Diamond Set Bit DT = 10 mins HP = 200 psi DFR = 0 %		
					BOX 6		-41.1		
			At El. -41.1 Ft., vuggy	80	BOX 5	RQD 60	4 x 5-1/2" Diamond Set Bit DT = 3 mins HP = 200 psi DFR = 100 %		
					BOX 1		-46.1		
-46.1	54.0		SAND, poorly-graded, mostly subrounded fine-grained quartz, strong reaction with HCl, moist, occasional thin limestone seam, tan	50	9		SPT Sampler	3 / 3	

Slightly Weathered

35 40 45 50 55

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		(SP)	50	9		-47.6 SPT Sampler	3	6
						Advanced Boring w/ tricone roller bit		
						-51.1		
		At El. -51.1 Ft., trace clay	40	10		SPT Sampler	4 6 3	9
						-52.6		
						Advanced Boring w/ tricone roller bit		
-56.1	64.0					-56.1		
		Limestone, moderately hard, decomposed, tan	40	11		SPT Sampler	23 7 9	16
						-57.6		
						Advanced Boring w/ tricone roller bit		
						-61.1		
		At El. -61.1 Ft., trace clay	85	12		SPT Sampler	21 27 5	32
						-62.6		
						Advanced Boring w/ tricone roller bit		
						-66.1		
			65	13		SPT Sampler	4 21	

55 60 65 70 75

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
			65	13		-67.6 SPT Sampler	44	65
						Advanced Boring w/ tricone roller bit		
-71.1	79.0					-71.1		
		Limestone, very hard, unweathered, fine-grained, vuggy, fossiliferous; silty sand-filled cavities, tan	29	14		-71.3 SPT Sampler	50/0.2"	
				BOX 7				
				BOX 2				
			104		RQD 62	4 x 5-1/2" Diamond Set Bit DT = 14 mins HP = 200 psi		
						-76.1		
		At El. -76.1 Ft., hard, slightly weathered	80		RQD 60	4 x 5-1/2" Diamond Set Bit DT = 5 mins HP = 200 psi		
				BOX 8				
						-81.1		
			80	BOX 3	RQD 40	4 x 5-1/2" Diamond Set Bit DT = 13 mins HP = 200 psi		
		From El. -85.6 to -86.1 Ft., cavity						
		At El. -86.1 Ft., gray				-86.1		
			30	BOX 3	RQD 0	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 200 psi		

Unweathered

Slightly Weathered

75 80 85 90 95

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 6 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-91.1	99.0	Slightly Weathered		30		RQD 0	4 x 5-1/2" Diamond Set Bit DT = 4 mins HP = 200 psi		
			SAND, silty, mostly subrounded fine-grained quartz, strong reaction with HCl, moist, occasional thin limestone seam (Top of Tamiami Formation), tan (SM)	40	15		-91.1 SPT Sampler	12 11 12	23
			At El. -93.6 Ft., gray		16		-92.6 SPT Sampler	15 15 18	33
			At El. -95.1 Ft., little shell, few clay, gray-green	50	17		-94.1 SPT Sampler	8 7 8	15
			At El. -96.6 Ft., weak cementation	90	18		-95.6 SPT Sampler	6 8 14	22
				90	19		-97.1 SPT Sampler	7 8 6	14
			At El. -100.1 Ft., moderate cementation	50	20		-98.6 SPT Sampler	5 6 9	15
				100	21		-100.1 SPT Sampler	15 8 20	28
				100	22		-101.6 SPT Sampler	7 10 10	20
				100	23		-103.1 SPT Sampler	8 10 21	31
			At El. -105.1 Ft., weak cementation, light gray	90	24		-104.6 SPT Sampler	19 15 18	33
			At El. -106.1 Ft., trace shell	75	25		-106.1 SPT Sampler	2 3	

95 100 105 110 115

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 7 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -107.6 Ft., discontinue shell	75	25		-107.6 SPT Sampler	2	5
				90	26		SPT Sampler	2 5 9	14
-109.1	117.0						-109.1		
			SAND, clayey, mostly subrounded fine-grained quartz, little clay, weak reaction with HCl, moist, weak cementation, gray (SC)	100	27		SPT Sampler	10 11 10	21
							-110.6		
				100	28		SPT Sampler	1 2 2	4
							-112.1		
				100	29		SPT Sampler	1 3 7	10
-113.6	121.5						-113.6		
			SAND, silty, mostly subrounded fine-grained quartz, little silt, trace clay, weak reaction with HCl, moist, weak cementation, gray (SM)	100	30		SPT Sampler	6 7 10	17
							-115.1		
				100	31		SPT Sampler	2 2 2	4
							-116.6		
				100	32		SPT Sampler	2 2 7	9
			At El. -118.1 Ft., trace shell				-118.1		
				100	33		SPT Sampler	2 5 11	16
							-119.6		
				100	34		SPT Sampler	4 5 8	13
							-121.1		
			At El. -122.1 Ft., moderate cementation	100	35		SPT Sampler	8 14 27	41
							-122.6		
				80	36		SPT Sampler	15 22 28	50
							-124.1		
			At El. -125.1 Ft., little shell, trace clay, weak cementation, green-gray	100	37		SPT Sampler	8 7 6	13
							-125.6		
				100	38		SPT Sampler	3 3 14	17
							-127.1		

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 8 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	39		SPT Sampler	3 3 5	8
							-128.6		
				80	40		SPT Sampler	3 7 16	23
							-130.1		
				100	41		SPT Sampler	9 28 39	67
							-131.6		
				33	42		SPT Sampler	3 10 13	23
							-133.1		
				100	43		SPT Sampler	3 6 18	24
							-134.6		
				100	44		SPT Sampler	5 7 14	21
							-136.1		
				100	45		SPT Sampler	1 1 1	2
			At El. -137.6 Ft., some shell, few clay				-137.6		
				100	46		SPT Sampler	5 19 15	34
							-139.1		
				100	47		SPT Sampler	14 15 45	60
							-140.6		
				100	48		SPT Sampler	20 30 24	54
			At El. -142.1 Ft., strong cementation				-142.1		
				60	49		SPT Sampler	7 50	
							-143.1		
							-143.6 Advanced Boring w/ tricone roller bit		
			At El. -143.6 Ft., some silt, moderate cementation, dark gray	70	50		SPT Sampler	19 21 15	36
							-145.1		
			At El. -145.1 Ft., strong cementation, gray-green	70	51		SPT Sampler	23 31 50	81
							-146.6		
				100	52		SPT Sampler	9	

135 140 145 150 155

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 9 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	52		SPT Sampler	15, 11	26
			-148.1						
			At El. -148.6 Ft., little shell, moderate cementation	100	53		SPT Sampler	13, 19, 37	56
			-149.6						
			At El. -150.1 Ft., trace shell	90	54		SPT Sampler	12, 10, 10	20
			-151.1						
				90	55		SPT Sampler	5, 14, 30	44
			-152.6						
							Advanced Boring w/ tricone roller bit		
			-156.1						
				100	56		SPT Sampler	7, 7, 15	22
			-157.6						
							Advanced Boring w/ tricone roller bit		
			-161.1						
			At El. -161.1 Ft., few clay	70	57		SPT Sampler	17, 30, 32	62
			-162.6						
							Advanced Boring w/ tricone roller bit		
			-166.1						
				100	58		SPT Sampler	4, 9	

155 160 165 170 175

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 10 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	58		-167.6 SPT Sampler	7	16
							Advanced Boring w/ tricone roller bit -171.1		
			At El. -171.1 Ft., discontinue cementation (Top of Hawthorne Formation), dark gray-green	85	59		SPT Sampler -172.5	14 / 40 / 50/0.4'	90+
							Advanced Boring w/ tricone roller bit -176.1		
				100	60		SPT Sampler -177.6	13 / 19 / 28	47
							Advanced Boring w/ tricone roller bit -181.1		
				100	61		SPT Sampler -182.6	12 / 12 / 14	26
							Advanced Boring w/ tricone roller bit -186.1		
				100	62		SPT Sampler	2 / 4	

175 180 185 190 195

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 11 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
				100	62		-187.6 SPT Sampler	7	11	195
							Advanced Boring w/ tricone roller bit			
							-191.1			
				100	63		SPT Sampler	3 6 4	10	200
							-192.6			
							Advanced Boring w/ tricone roller bit			
							-196.1			
				100	64		SPT Sampler	7 10 17	27	205
							-197.6			
							Advanced Boring w/ tricone roller bit			
							-201.1			
			At El. -202.1 Ft., little silt	100	65		SPT Sampler	11 33 50	83	210
							-202.6			
							Advanced Boring w/ tricone roller bit			
							-206.1			
			At El. -206.1 Ft., some silt, gray	100	66		SPT Sampler	8 21		215

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 12 OF 14 SHEETS
PROJECT: Lake Belt In-Ground Reservoir Technology Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88	
LOCATION COORDINATES: X = 857,039 Y = 561,475	ELEVATION TOP OF BORING: 7.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				100	66		-207.6 SPT Sampler	31	52
							Advanced Boring w/ tricone roller bit -211.1		
			At El. -211.1 Ft., gray-green	70	67		SPT Sampler -212.6	WOH / WOH / 37	37
							Advanced Boring w/ tricone roller bit -216.1		
				100	68		SPT Sampler -217.6	16 / 33 / 46	79
							Advanced Boring w/ tricone roller bit -221.1		
				30	69		SPT Sampler -222.1	28 / 50	
							Advanced Boring w/ tricone roller bit -226.1		
				38	70		SPT Sampler -227.0	30 / 50/0.4'	

215 220 225 230 235

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 13 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORE	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
							Advanced Boring w/ tricone roller bit		
							-231.1		
				33	71		SPT Sampler -232.0	22 / 50/0.4'	
							Advanced Boring w/ tricone roller bit		
							-236.1		
				87	72		SPT Sampler -237.0	39 / 50/0.4'	
							Advanced Boring w/ tricone roller bit		
							-241.1		
-242.0	249.9			98	73		SPT Sampler -242.0	11 / 29/0.4' / 48/-0.1'	77+

NOTES:

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

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
12	69.0/70.5	LS*
22	109.5/111.0	SM*
34	127.5/129.0	SM*
53	156.0/157.5	SM*

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

(Continued)

Boring Designation CP02-LKBPP-CB-009

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 14 OF 14 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
Lake Belt In-Ground Reservoir Technology Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 857,039 Y = 561,475	7.9 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits. 3. Additional Laboratory Testing 12 Moisture Content 22 Moisture Content 22 Specific Gravity 34 Moisture Content 53 Moisture Content						

255
260
265
270
275

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APPENDIX B

SUMMARY OF LABORATORY CLASSIFICATION TEST RESULTS

Lake Belt In-Ground Reservoir Project
Dade County, Miami, Florida
LAW Project No. 40521-1-8482-15

Boring No.	Sample No.	Depth (Feet)	Unified Soil Classification Symbol	* Fines Content From Sieve Analysis	Atterberg Limits (%)			Moisture Content (%)	Specific Gravity	Hydraulic Conductivity (cm/sec.)	Unconfined Compression Strength (tsf)
					LL	PL	PI				
CP01-LKBPP-CB-001 (CB-1)	C.R. # 7	41 - 46	L.S.								1172
	S-9	55 - 56.5	SP	6				12			
	UD-1	115.5 - 117.5	SC	30	22	10	12	9	2.60	$2.3 * 10^{-5}$	
	S-61	168.5 - 170	SM	48				13			
	S-75	189.5 - 191	SM	36	34	25	9	19	2.54		
CP01-LKBPP-CB-002 (CB-2)	C.R. # 1	70 - 75	L.S.								509
	S-5	91 - 92.5	SP					19			
	S-10	98.5 - 100	CL	53	24	16	8	12	2.69	$1.0 * 10^{-7}$	
	S-13	103 - 104.5	SC						2.68		
	S-20	113.5 - 115	SC	32						$2.8 * 10^{-6}$	
	S-42	148.5 - 150	SM	24	N.P.	N.P.	N.P.	15	2.72		
	S-57	198.5 - 200	CH	95	131	46	85	40			
	S-62	223.5 - 225	SC	17	33	30	3	21	2.66		
	S-65	238.5 - 240	SC		N.P.	N.P.	N.P.	15			
CP01-LKBPP-CB-004 (CB-4)	C.R. # 4	24 - 29	L.S.							$3.1 * 10^{-4}$	1022
	S-10	89-90.5	SM	14				17			
	S-29	119.5 - 121	SC	34				21	2.70		
	C.R. # 16	133 - 138	L.S.						2.73	$5.5 * 10^{-4}$	144
	S-38	168.5 - 170	SM	26				13			
	S-42	188.5 - 190	SM	49 -	44	25	19	20			
	S-49	223.5 - 225	SC	13				22	2.70		
CP01-LKBPP-CB-005 (CB-5)	UD-2	112.5 - 114.5	SM	26				14	2.66		
	S-13	126 - 127.5	SC	19	55	27	28	19	2.65		
	C.R. #9	151 - 156	L.S.						2.72	$4.4 * 10^{-4}$	249
	S-44	199.5 - 201	SM	40	45	27	18	16	2.71		

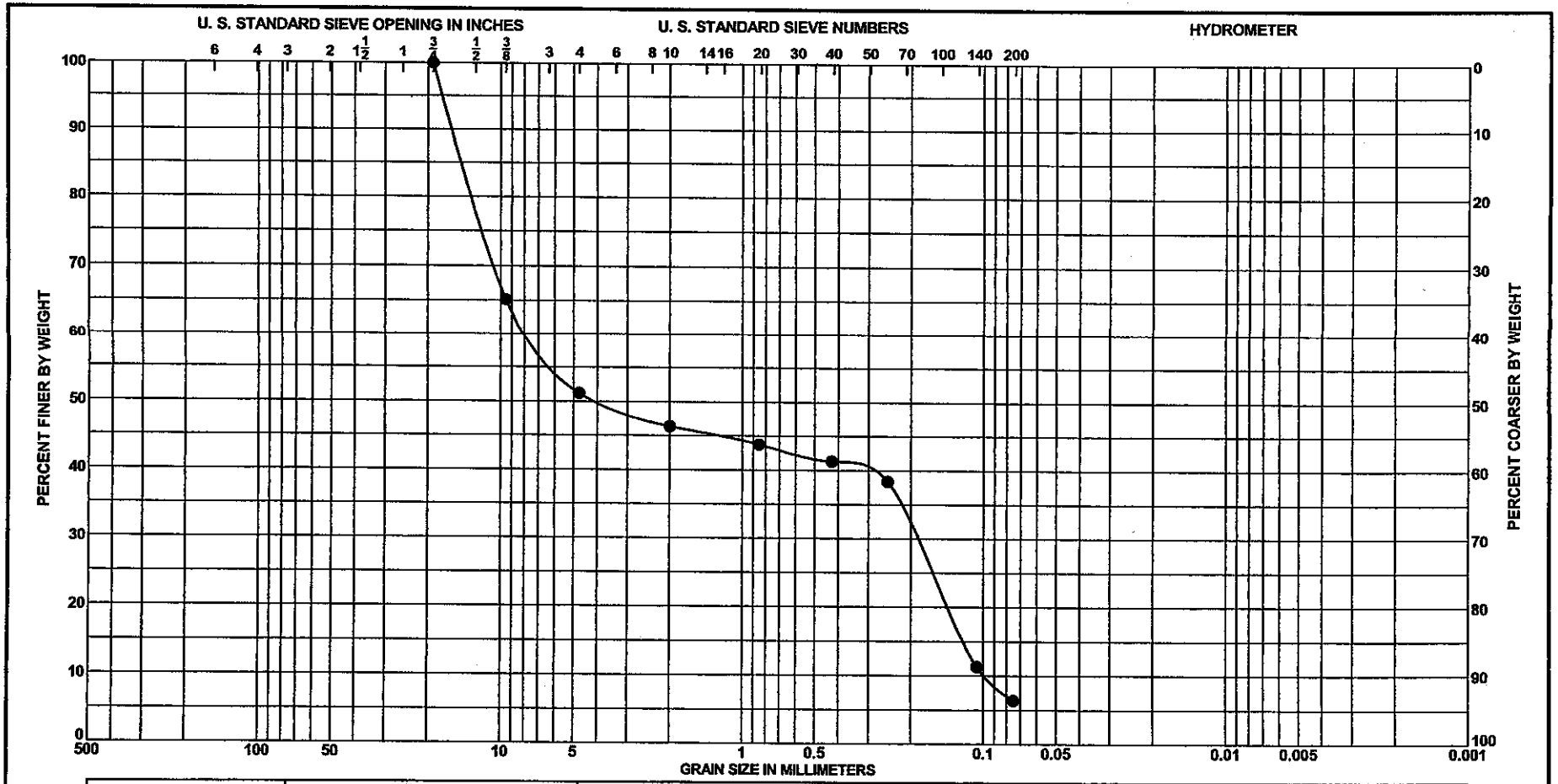
* see grain size distribtion curves in Appendix B for full gradation

SUMMARY OF LABORATORY CLASSIFICATION TEST RESULTS

Lake Belt In-Ground Reservoir Project
Dade County, Miami, Florida
LAW Project No. 40521-1-8482-15

Boring No.	Sample No.	Depth (Feet)	Unified Soil Classification Symbol	* Fines Content From Sieve Analysis	Atterberg Limits (%)			Moisture Content (%)	Specific Gravity	Hydraulic Conductivity (cm/sec.)	Unconfined Compression Strength (tsf)
					LL	PL	PI				
CP01-LKBPP-CB-006 (CB-6)	S-14	119.5 - 121	SM	34				19			
	UD-3	141.5 - 143.5	SM	20				17	2.64	$9.0 * 10^{-6}$	
	S-39	174 - 175.5	SM	38				16	2.67		
	S-46	209 - 210.5	SC	47	33	23	10	19			
CP01-LKBPP-CB-007 (CB-7)	S-18	101 - 102.5	SM	32	38	22	16	14			
	C.R. #9	50 - 55	L.S.							$7.3 * 10^{-4}$	531
CP01-LKBPP-CB-008 (CB-8)	C.R. #3	18 -23	L.S.								710
	C.R. #10	52 - 57	L.S.								1930
	S-15	100 - 101.5	SP-SM	10				14			
	S-35	130 - 131.5	SC	41	38	18	20	18		$2.2 * 10^{-7}$	
	S-36	131.5 - 133	SC	40	26	17	9	5	2.71		
	S-57	173.5 - 175	SM	45	21	20	1	11	2.74	$1.9 * 10^{-6}$	
	S-64	208.5 - 210	SC	32	73	21	52	16	2.66		
	S-68	228.5 - 230	SC	15				21			
CP01-LKBPP-CB-009 (CB-9)	S-12	69 - 70.5	L.S.	7	N.P.	N.P.	N.P.	12			
	C.R. #6	84 - 89	L.S.							$5.6 * 10^{-4}$	1026
	S-22	109.5 - 111	SM	22				17	2.72		
	S-34	127.5 - 129	SM	28				17			
	S-53	156 - 157.5	SM	21				17		$4.6 * 10^{-5}$	

* see grain size distribtion curves in Appendix B for full gradation



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 9	55.0 to 56.5 Ft.	SAND, poorly-graded, mostly				12.0			
		subrounded fine-grained quartz,							
		trace silt, seams of limestone,							
		strong reaction w/HCL, moist,							
		gray-brown (SP)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-001
BORING ELEV.	4.3 Ft., NAVD88
DATE	10/18/2002

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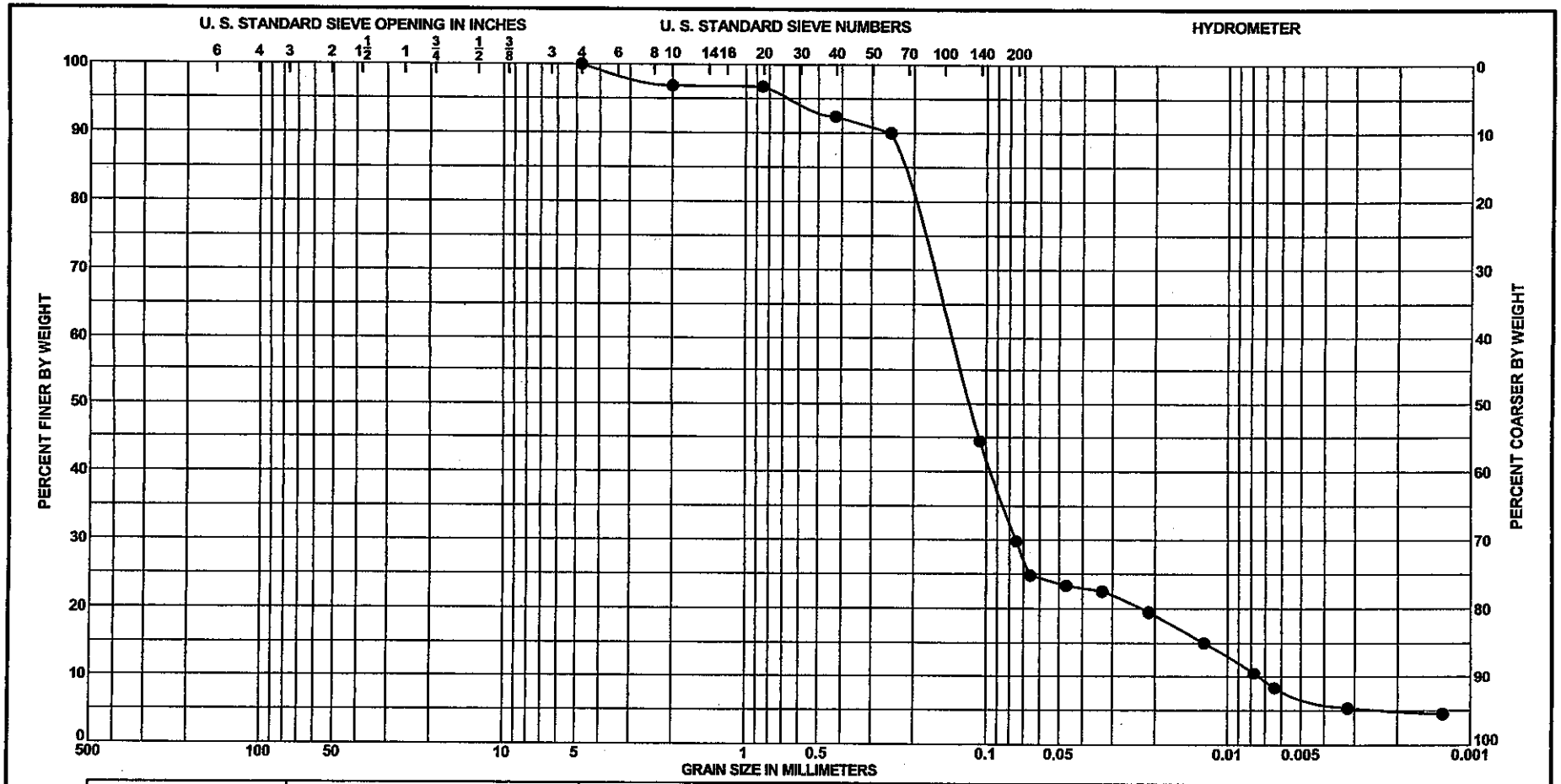

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● UD1	115.5 to 117.5 Ft.	SAND, clayey mostly		2.60		9.0	22	10	12
		subrounded fine-grained quartz,							
		little clay, trace medium-grained							
		shell, weak reaction w/HCL,							
		wet, gray-green (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-001
BORING ELEV.	4.3 Ft., NAVD88
DATE	10/18/2002

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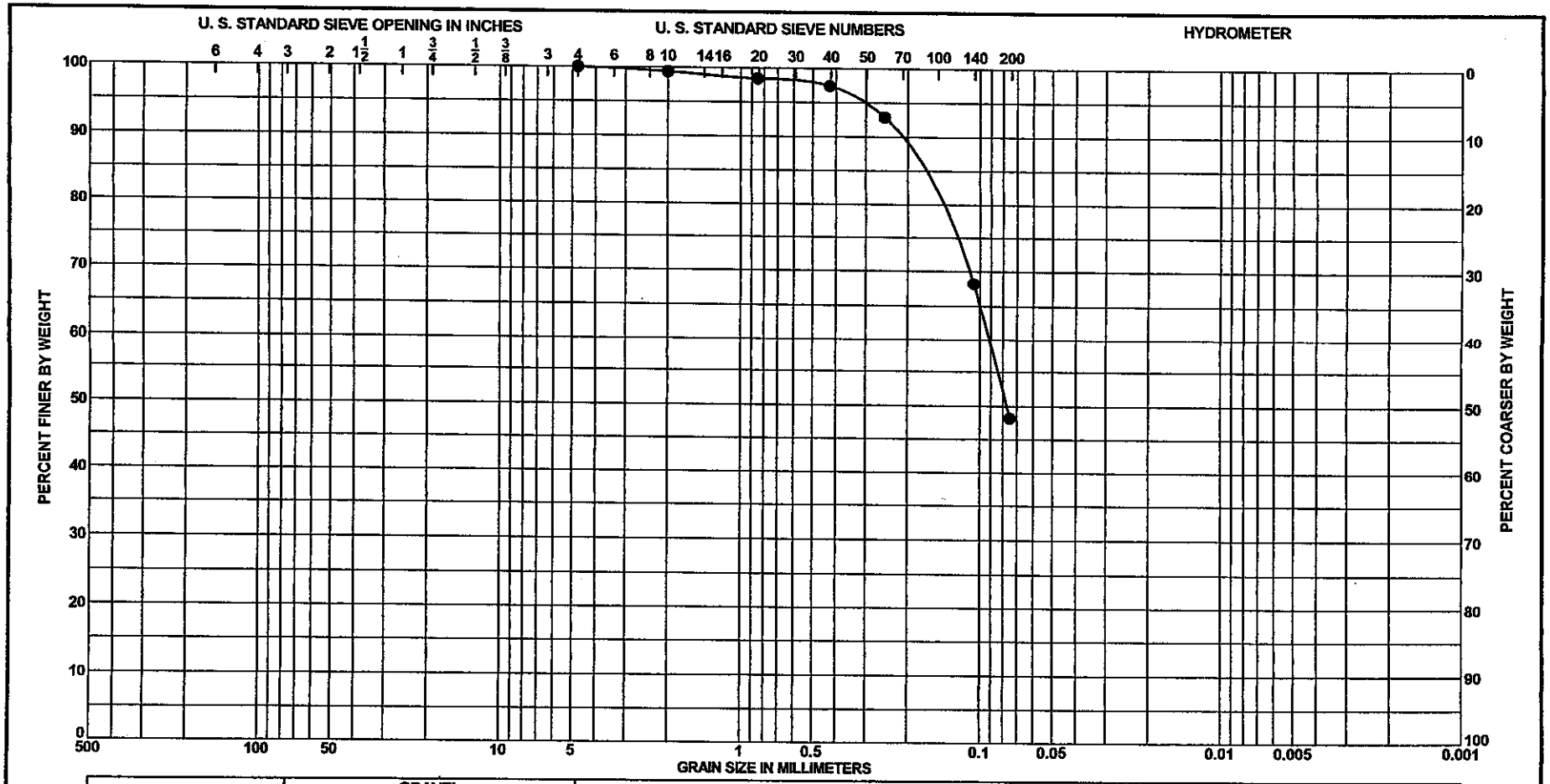

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 61	168.5 to 170.0 Ft.	SAND, silty, mostly subrounded				13.0			
		fine-grained quartz, little silt, few							
		clay, trace shell, weak reaction							
		w/HCL, wet, weak cementation							
		green-gray (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-001
BORING ELEV.	4.3 Ft., NAVD88
DATE	10/18/2002

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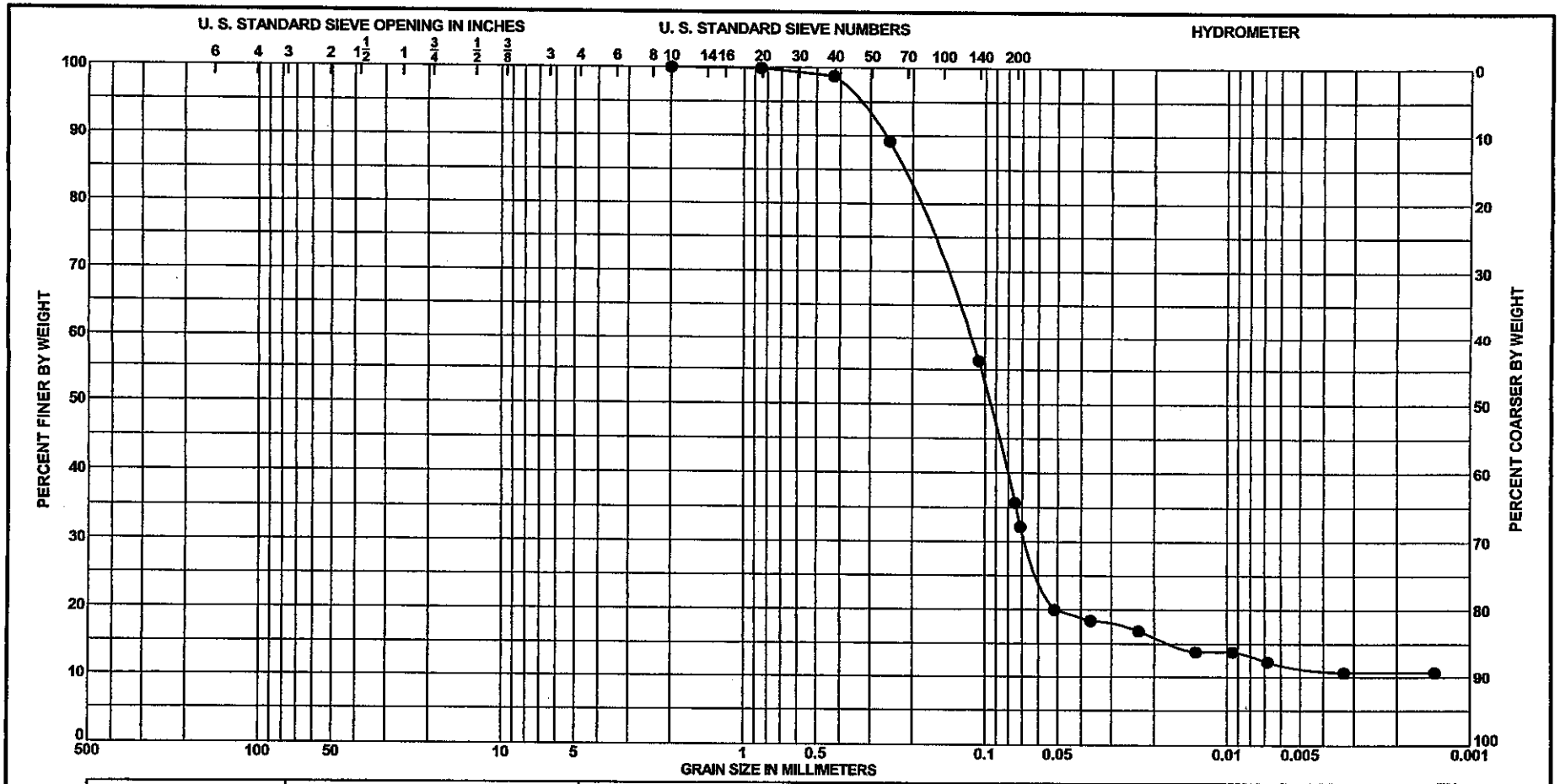

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 75	189.5 to 191.0 Ft.	SAND, silty mosty subrounded		2.54		19.0	34	25	9
		fine-grained quartz, little silt,							
		little clay, trace phosphate,							
		weak reaction w/HCL, dark							
		green (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-001
BORING ELEV.	4.3 Ft., NAVD88
DATE	10/18/2002

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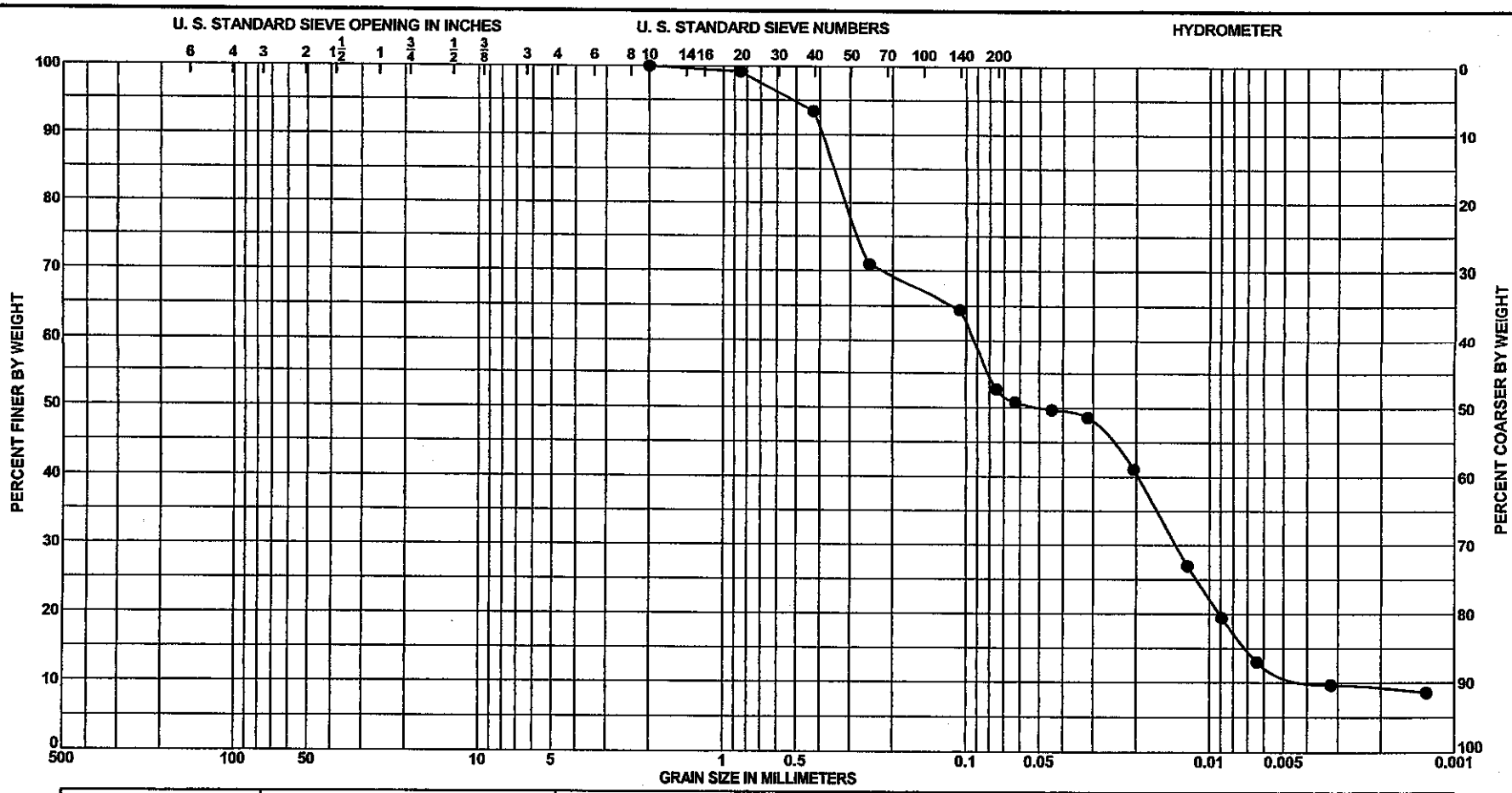

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 10	98.5 to 100.0 Ft.	CLAY, lean, low plasticity, firm,		2.69		12.0	24	16	8
		few silt, trace shell, no reaction							
		w/HCL, moist gray (CL)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-002
BORING ELEV.	6.6 Ft., NAVD88
DATE	

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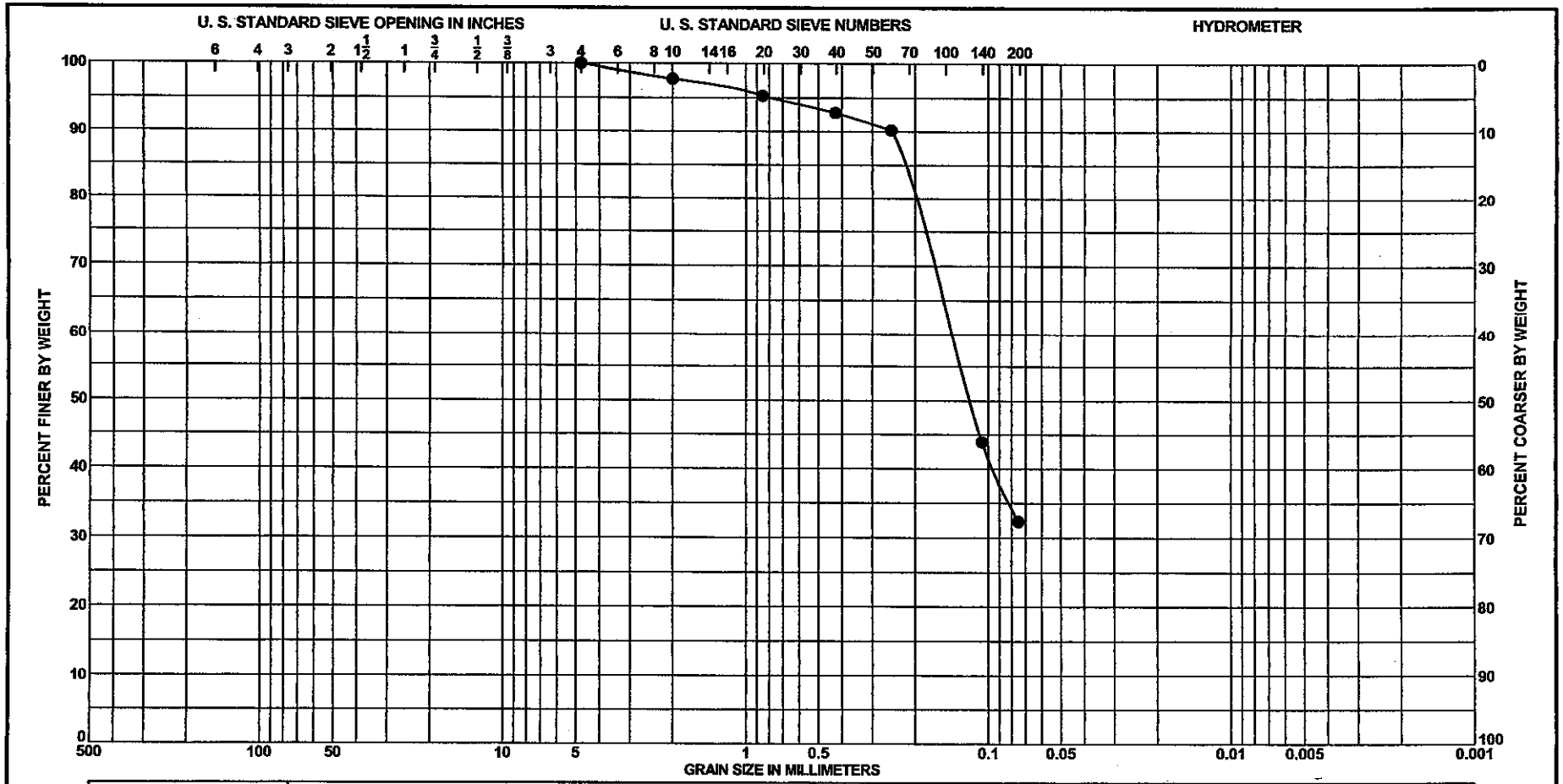

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 20	113.5 to 115.0 Ft.	SAND, clayey mostly							
		subrounded fine-grained quartz,							
		little clay, few silt, trace shell,							
		weak reaction w/HCL, wet, gray							
		(SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-002
BORING ELEV.	6.6 Ft., NAVD88
DATE	

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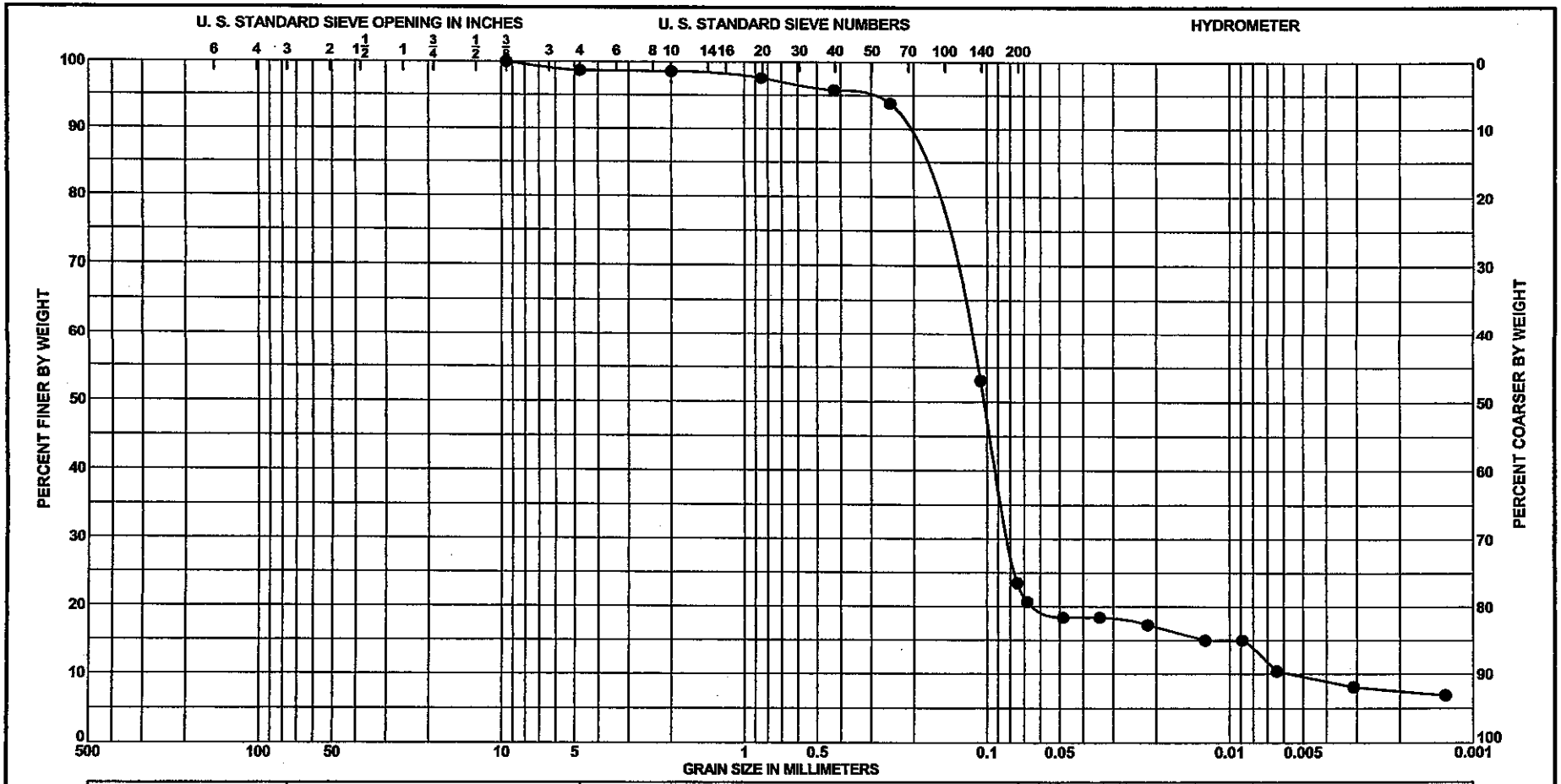

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 42	148.5 to 150.0 Ft.	SAND, silty, mostly subrounded		2.72		15.0			
		fine-grained quartz, little silt,							
		weak reaction w/HCL, weak							
		cementation, wet, few limestone							
		seams, gray-green (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-002
BORING ELEV.	6.6 Ft., NAVD88
DATE	

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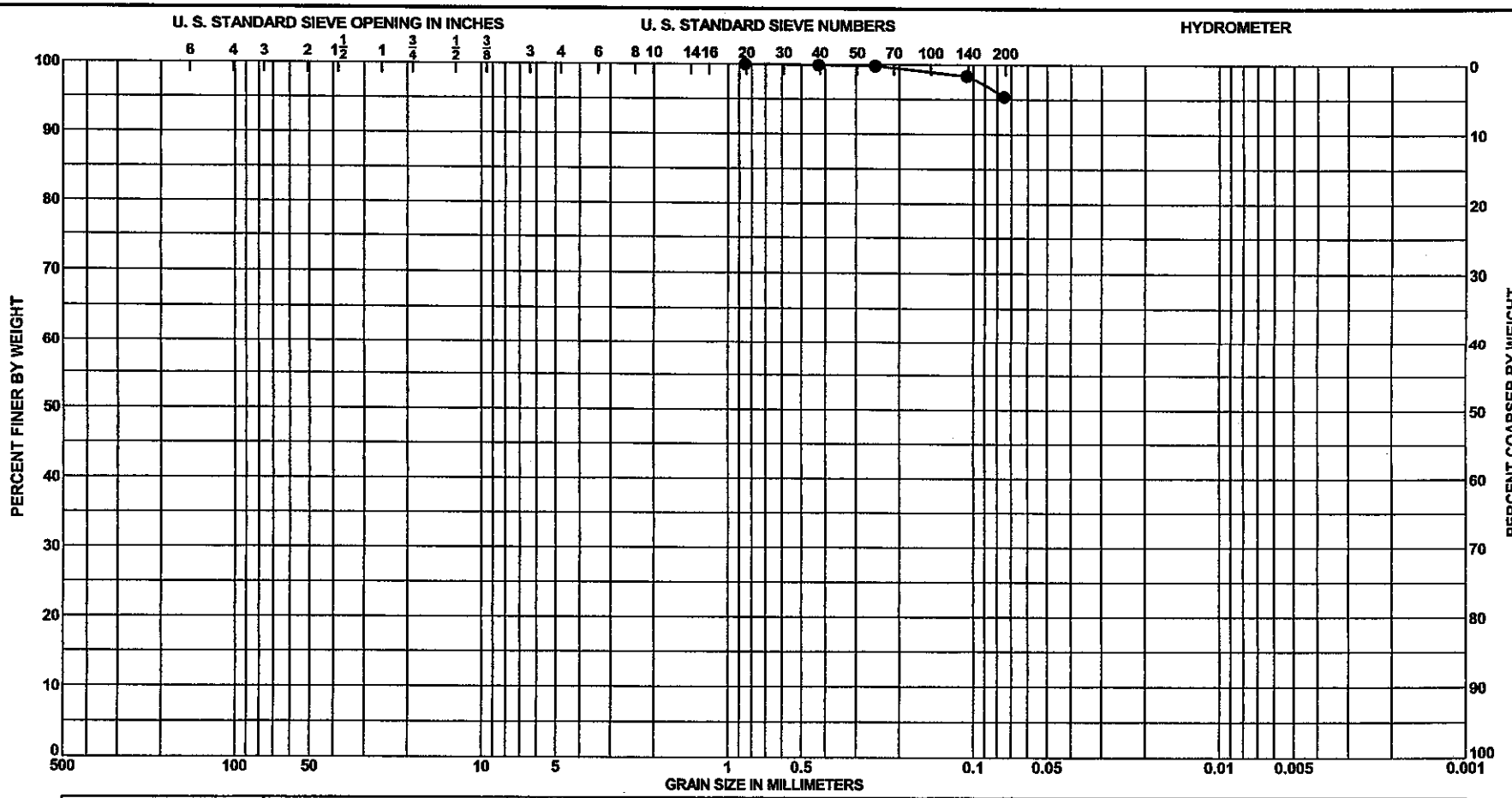

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 57	198.5 to 200.0 Ft.	CLAY, fat, high plasticity, firm,				40.0	131	46	85
		mostly fine-grained quartz, no							
		reaction w/HCL, moist dark							
		green (CH)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-002
BORING ELEV.	6.6 Ft., NAVD88
DATE	

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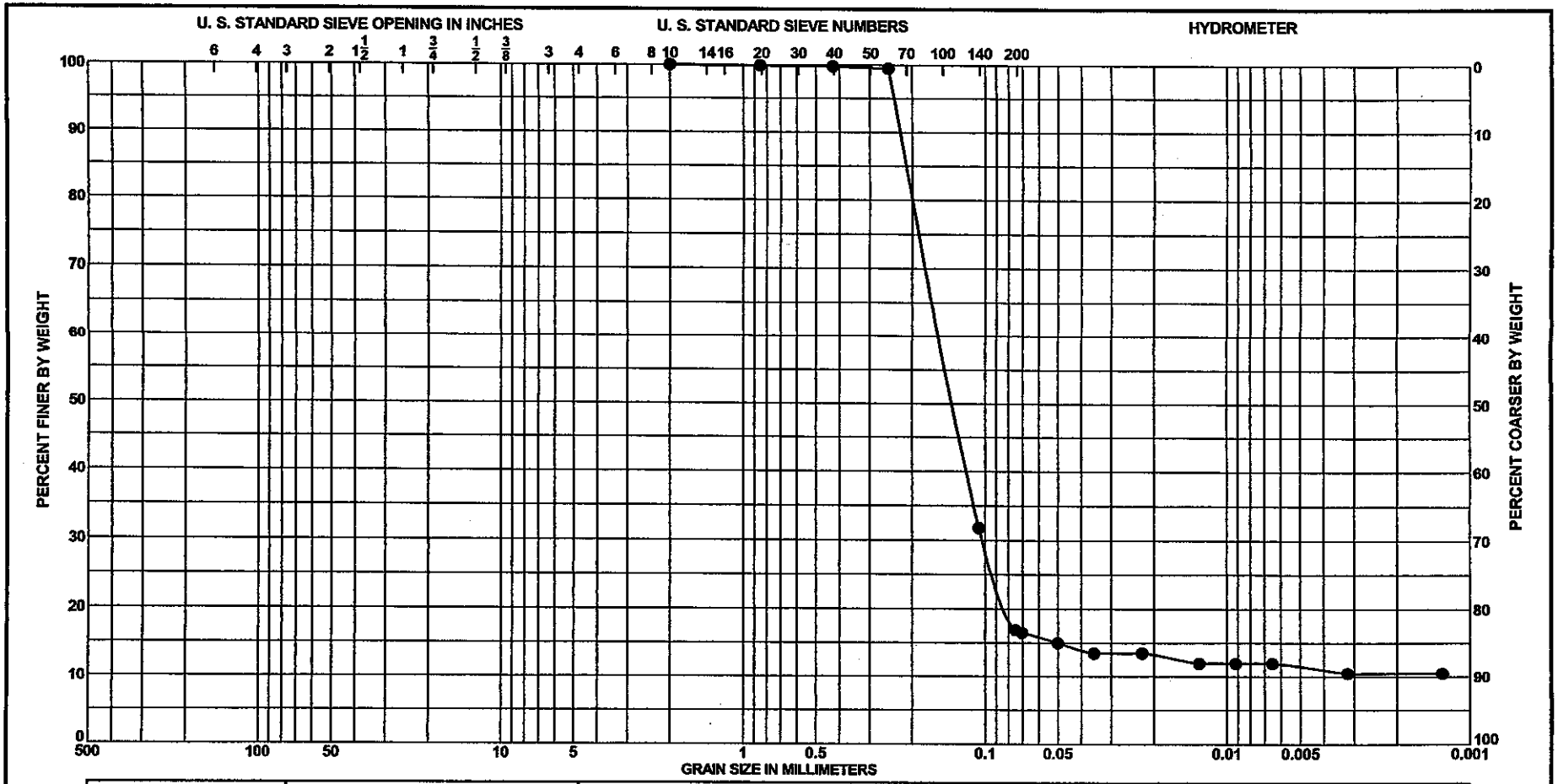

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 62	223.5 to 224.9 Ft.	SAND, clayey, mostly		2.66		21.0	33	30	3
		subrounded fine-grained quartz,							
		some clay, trace shell,							
		gray-green (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-002
BORING ELEV.	6.6 Ft., NAVD88
DATE	

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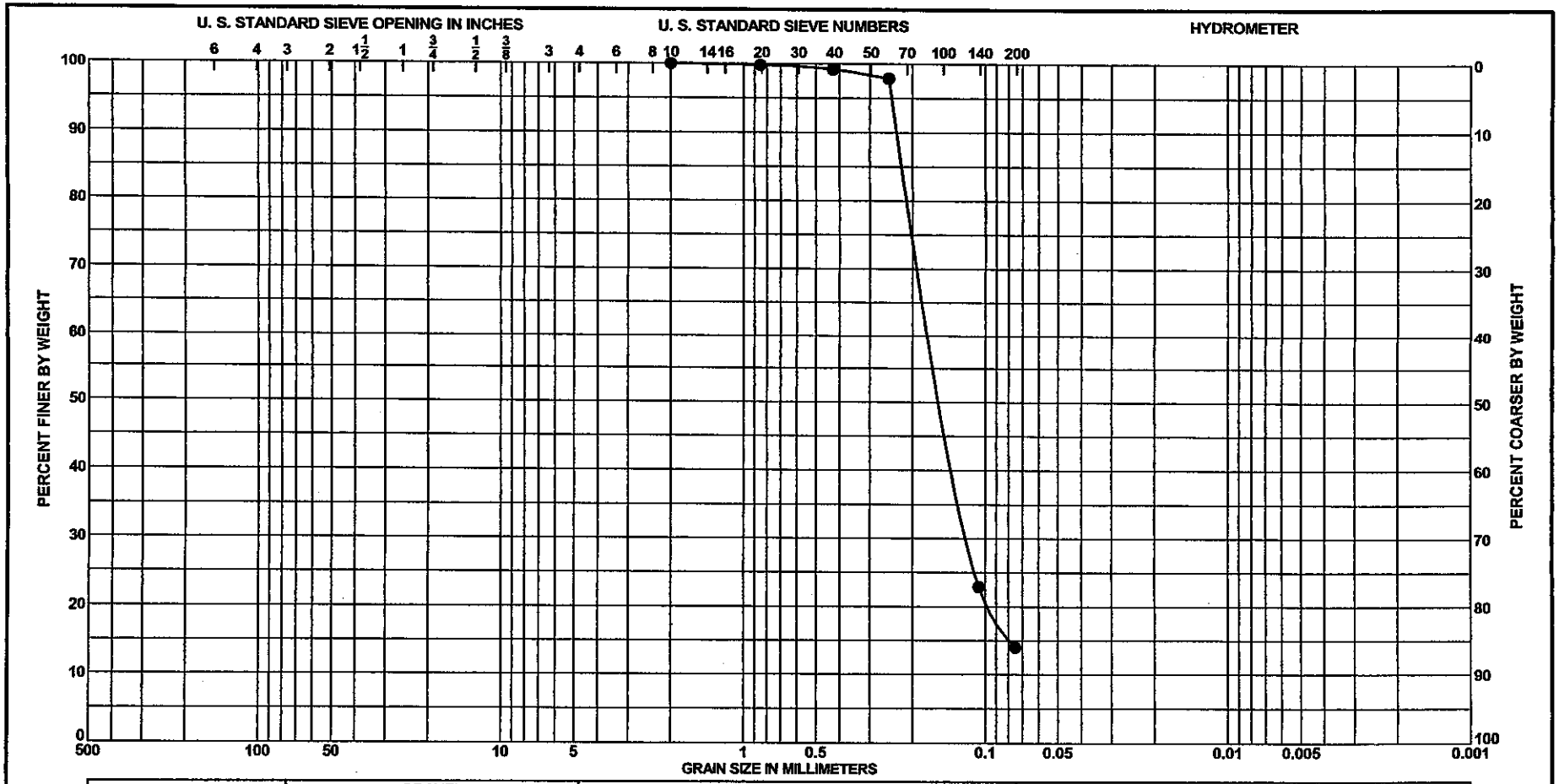

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 10	89.0 to 90.5 Ft.	SAND, silty, mostly subrounded				17.0			
		fine-grained quartz, little silt,							
		trace fine-grained shell, weak							
		reaction w/HCL, wet, occasional							
		thin limestone seams,							

green-GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-004
BORING ELEV.	7.9 Ft., NAVD88
DATE	

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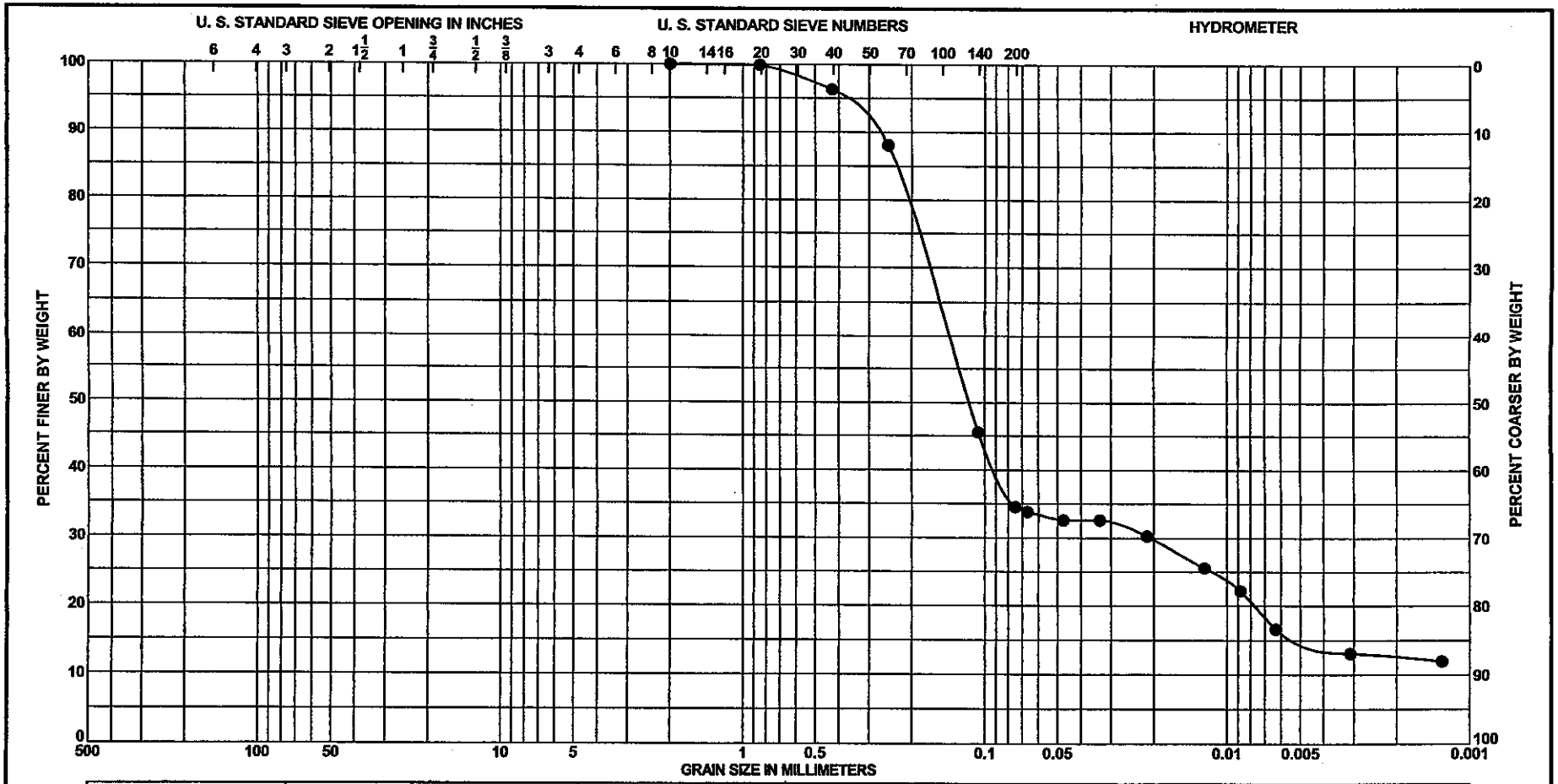

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_2 %	G_s	Org %	w_n	LL	PL	PI
● 29	119.5 to 121.0 Ft.	SAND, clayey mostly		2.70		21.0			
		subrounded fine-grained quartz,							
		little clay, few silt, trace shell,							
		weak reaction w/HCL, wet,							
		weak cementation, gray-green							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-004
BORING ELEV.	7.9 Ft., NAVD88
DATE	

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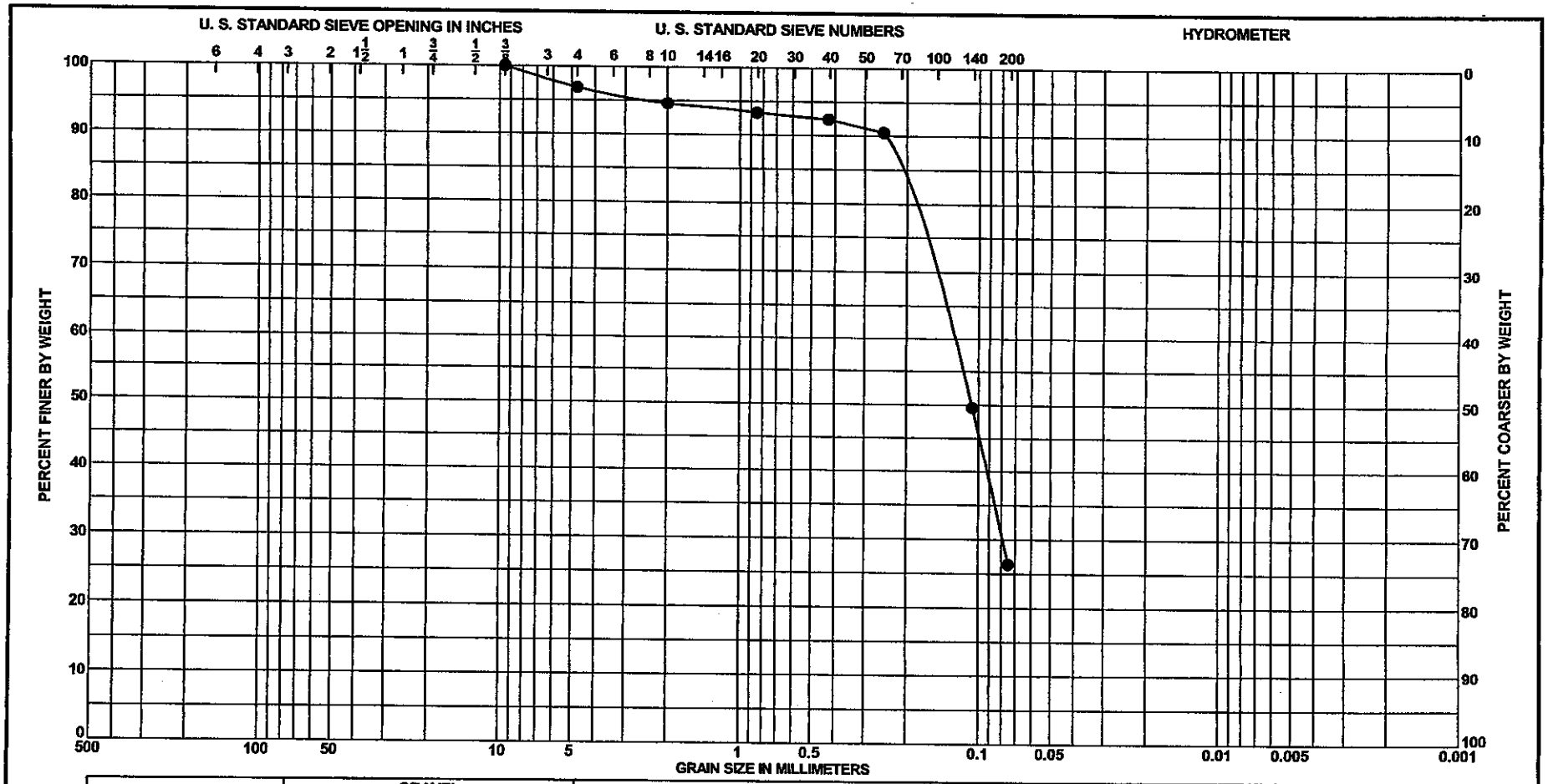

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 38	168.5 to 170.0 Ft.	SAND, silty, mostly subrounded fine-grained quartz, some silt, weak reaction w/HCL, moist gray (SM)				13.0			

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-004
BORING ELEV.	7.9 Ft., NAVD88
DATE	

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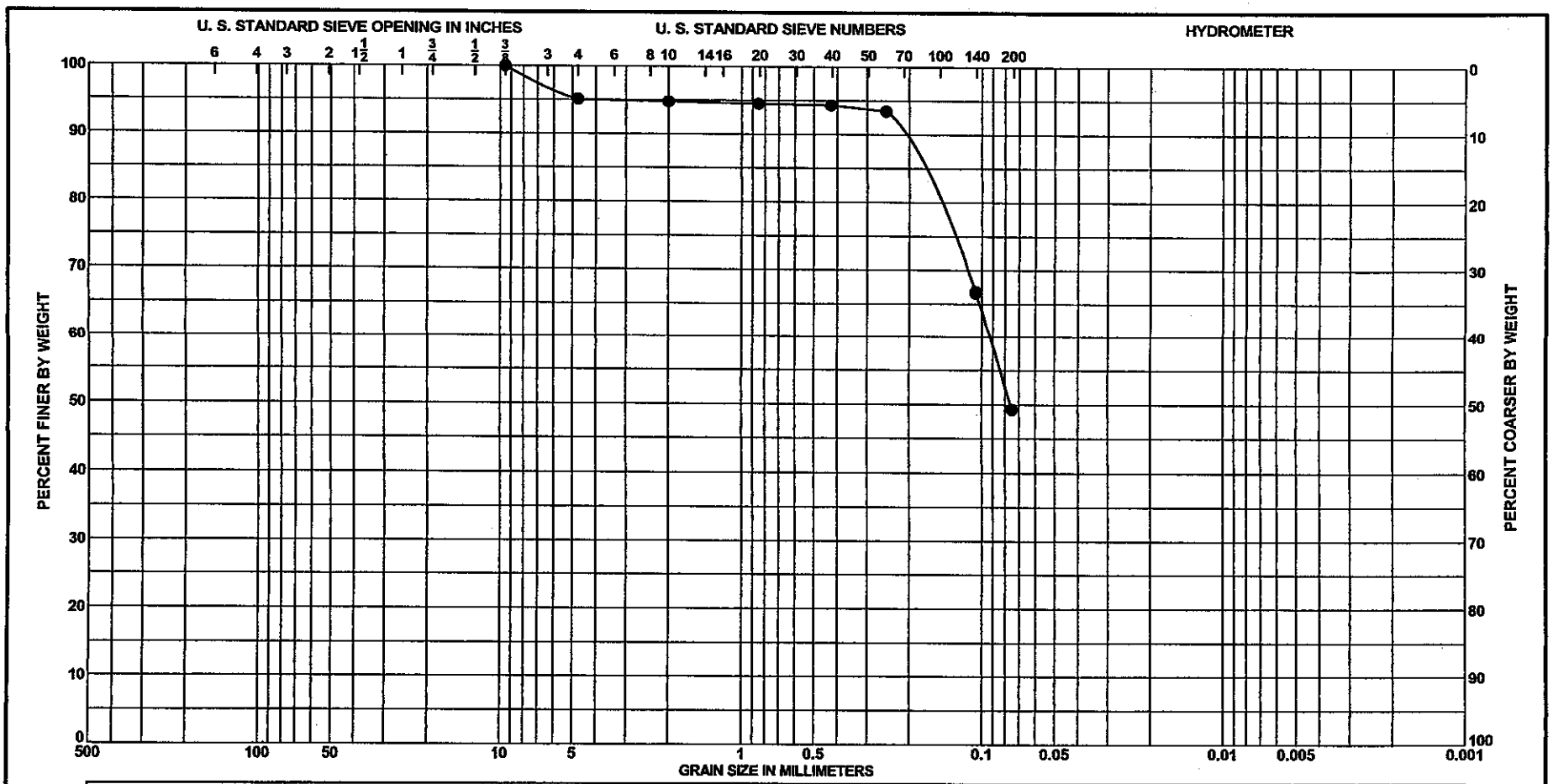


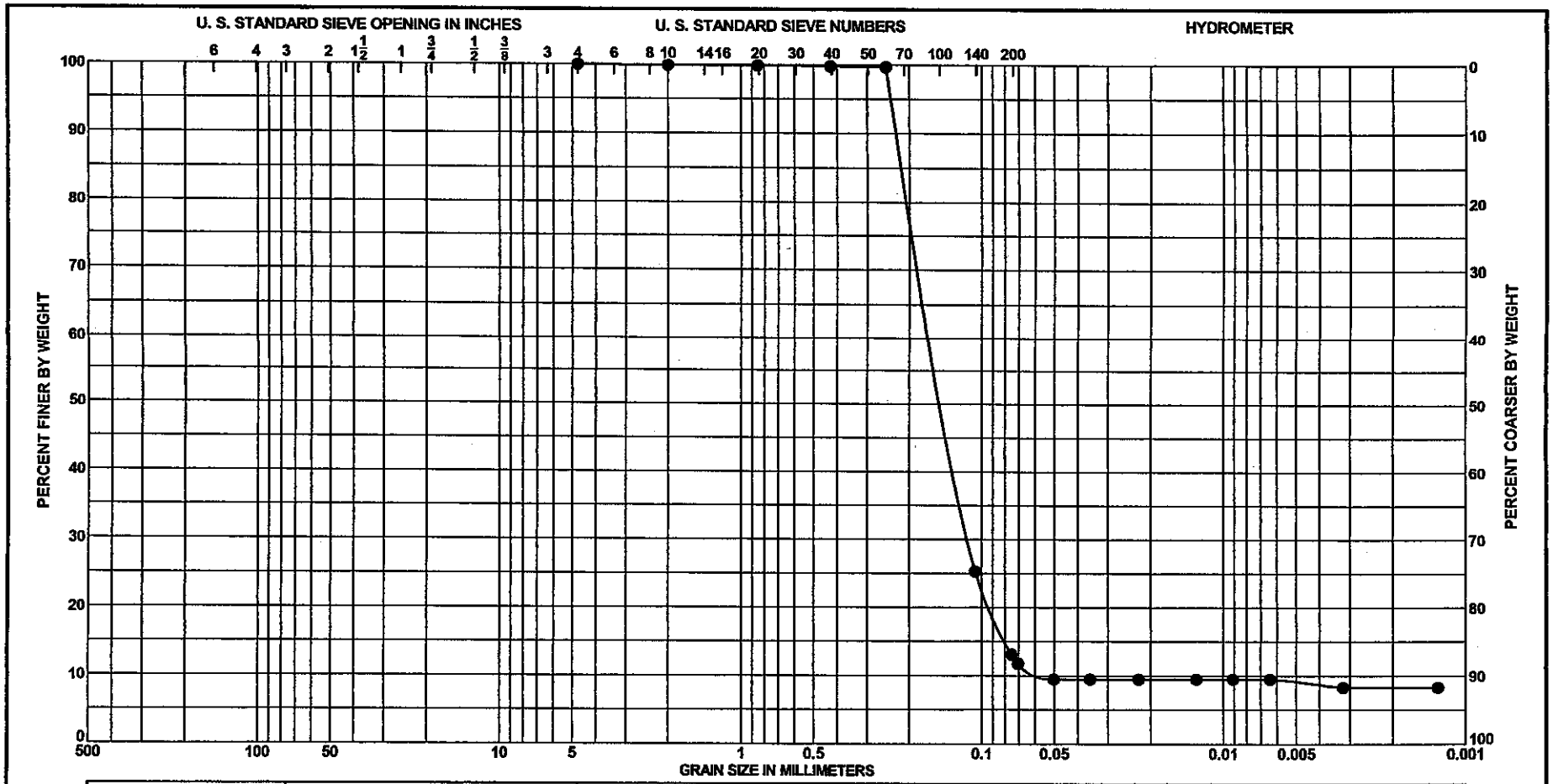
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 42	188.5 to 190.0 Ft.	SAND, silty, mostly subrounded				20.0	44	25	19
		fine-grained quartz, some silt,							
		weak reaction w/HCL, moist							
		dark gray (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-004
BORING ELEV.	7.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 49	223.5 to 225.0 Ft.	SAND, poorly graded with clay,		2.70		22.0			
		mostly subrounded fine-grained							
		quartz, little clay, weak reaction							
		w/HCL, wet, moderate							
		cementation, gray-green (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-004
BORING ELEV.	7.9 Ft., NAVD88
DATE	

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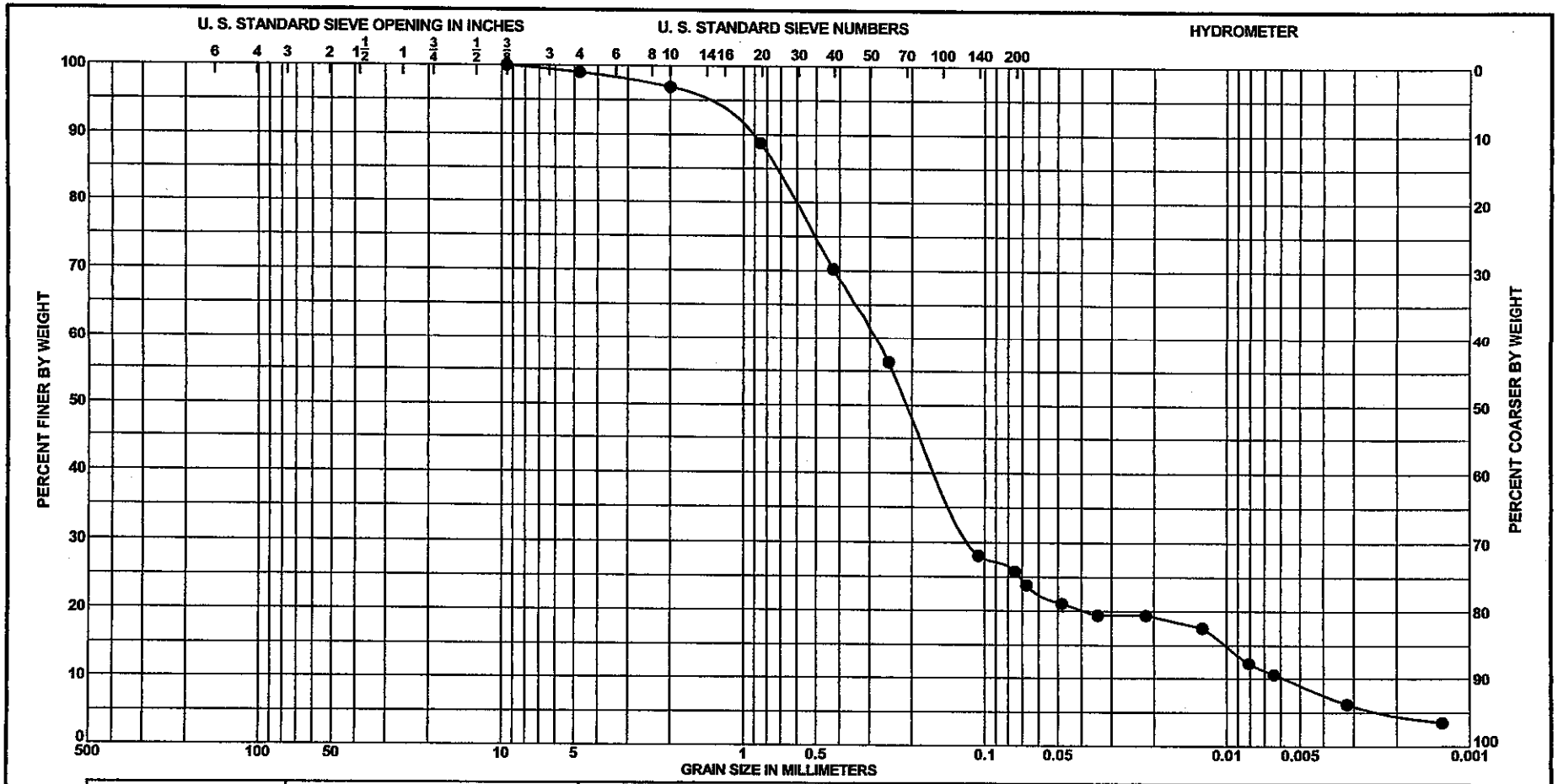
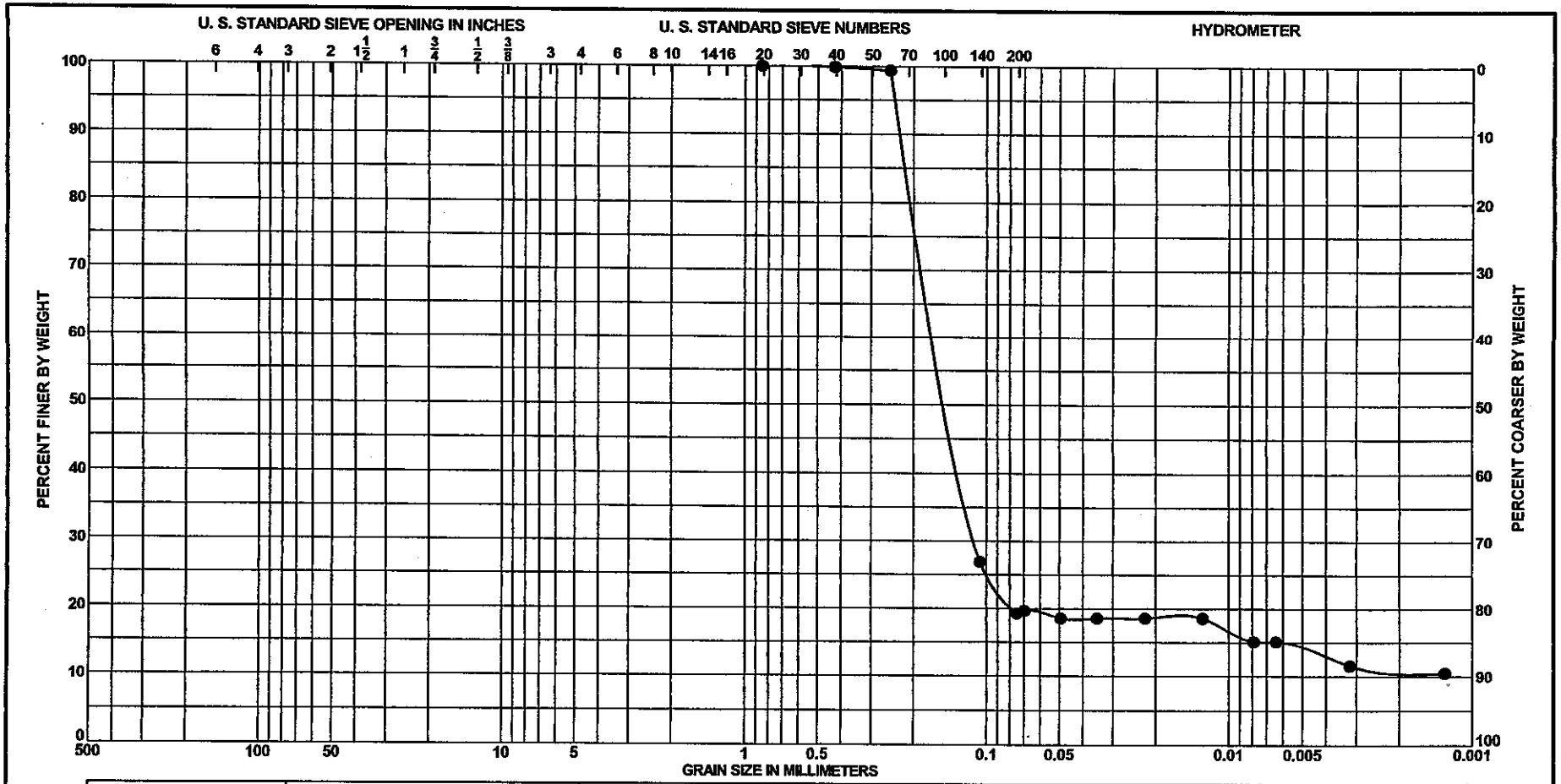


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● UD1	112.5 to 114.5 Ft.	SAND, silty, mostly subrounded		2.66		14.0			
		fine-grained quartz, little silt,							
		trace shell, weak reaction							
		w/HCL, moist, gray-green (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-005
BORING ELEV.	9.4 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

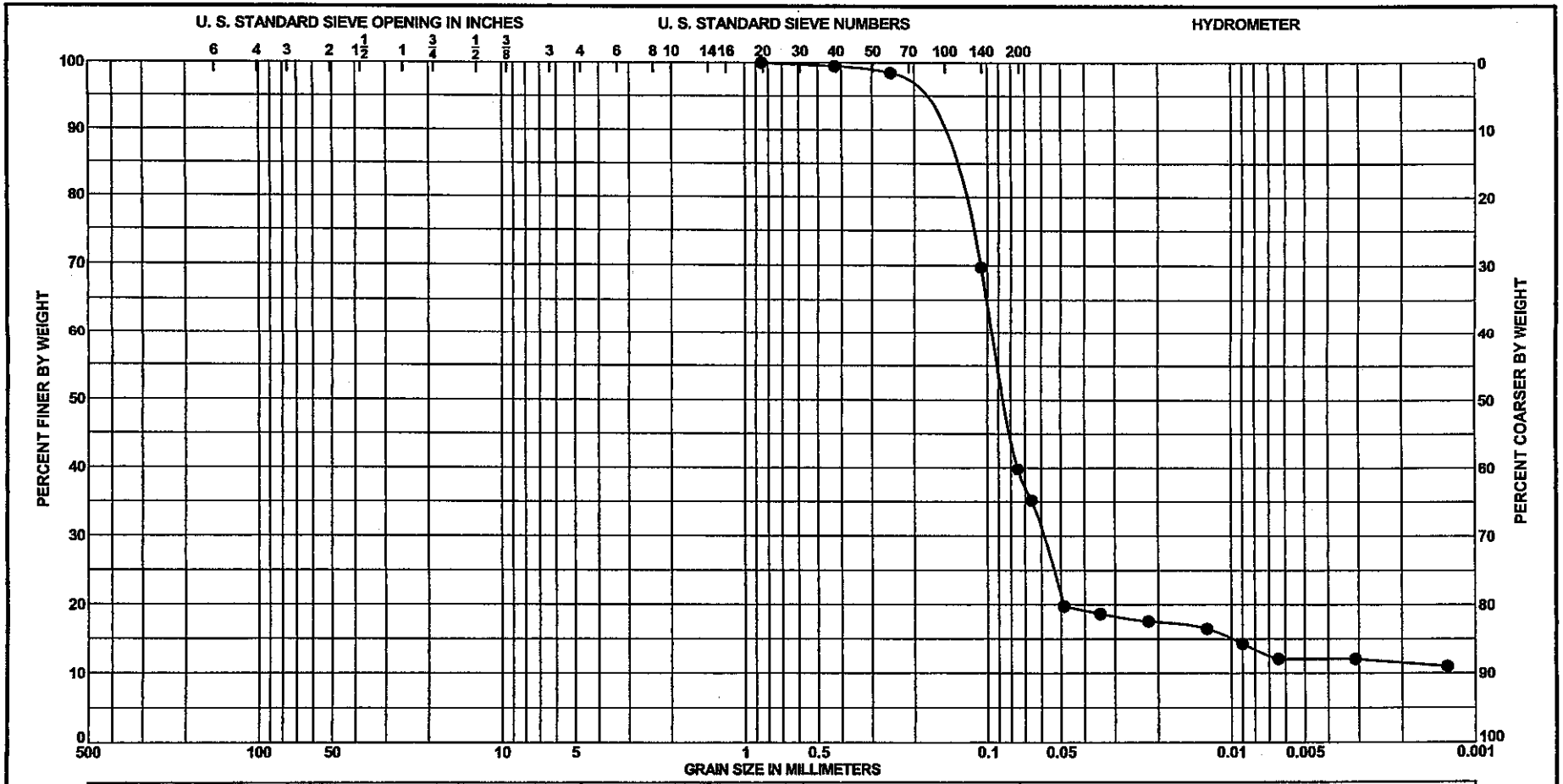


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 13	126.0 to 127.5 Ft.	SAND, clayey, mostly		2.65		19.0	55	27	28
		subrounded fine-grained quartz,							
		little clay, trace shell, no							
		reaction w/HCL, moist, dark							
		green (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-005
BORING ELEV.	9.4 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

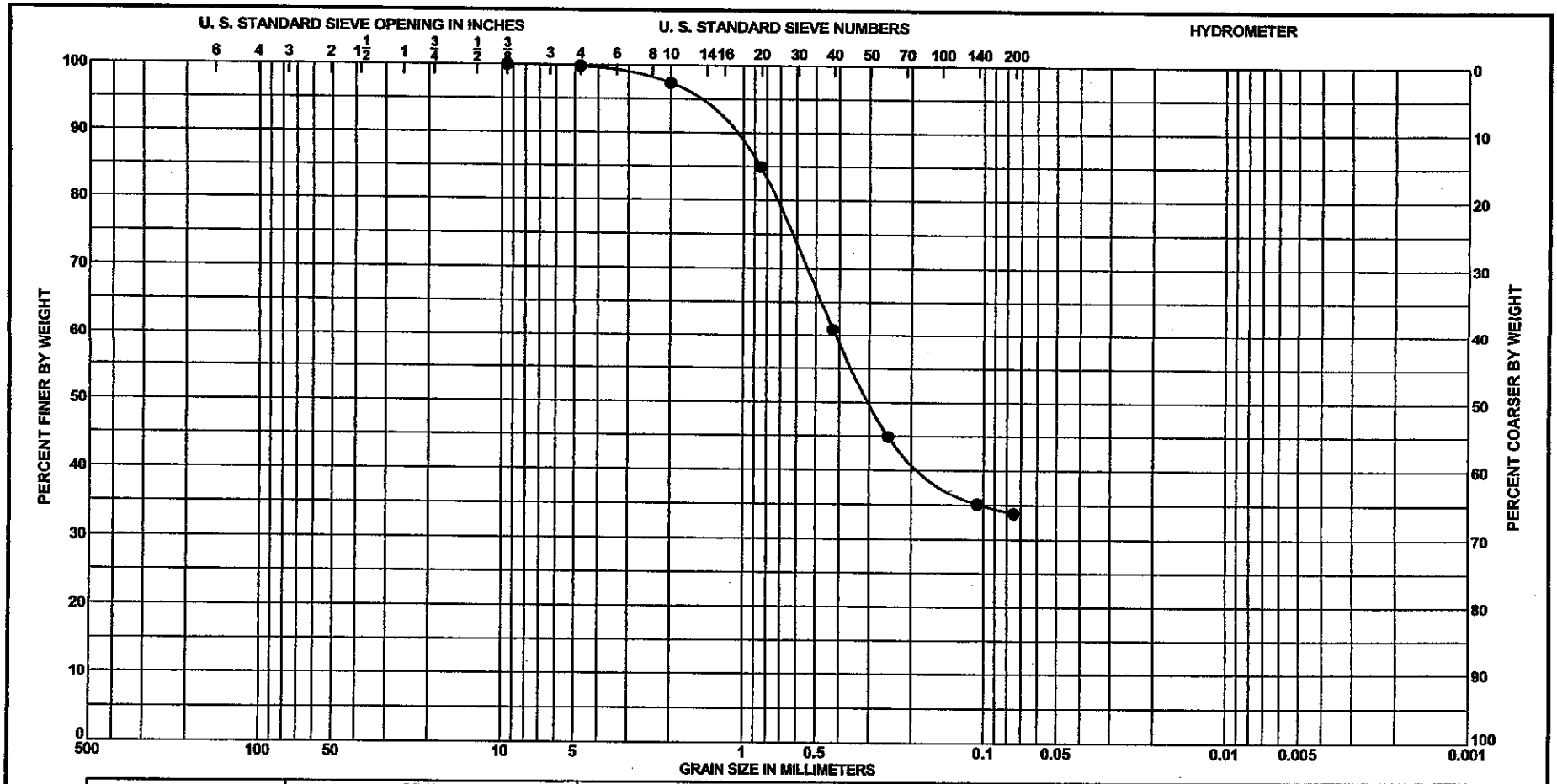


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 44	198.0 to 199.5 Ft.	SAND, clayey, mostly		2.71		16.0	45	27	18
		subrounded fine-grained quartz,							
		little clay, few silt, no reaction							
		w/HCL, moist, gray-green (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-005
BORING ELEV.	9.4 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

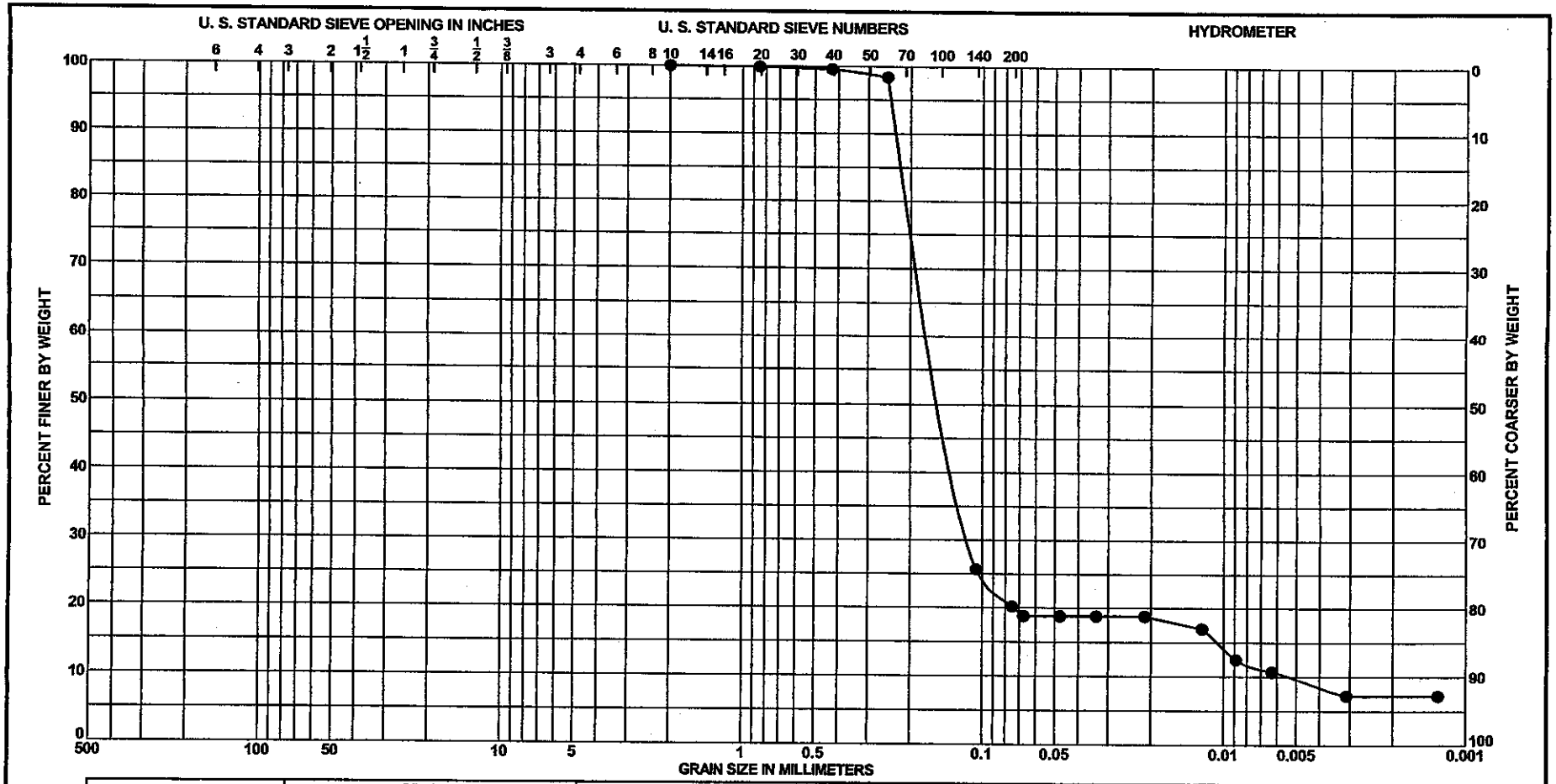


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 14	119.5 to 121.0 Ft.	SAND, silty, mostly subrounded				19.0			
		fine-grained quartz, little silt,							
		trace shell, weak reaction							
		w/HCL, moist, with few							
		limestone seams, gray-green							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-006
BORING ELEV.	4.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

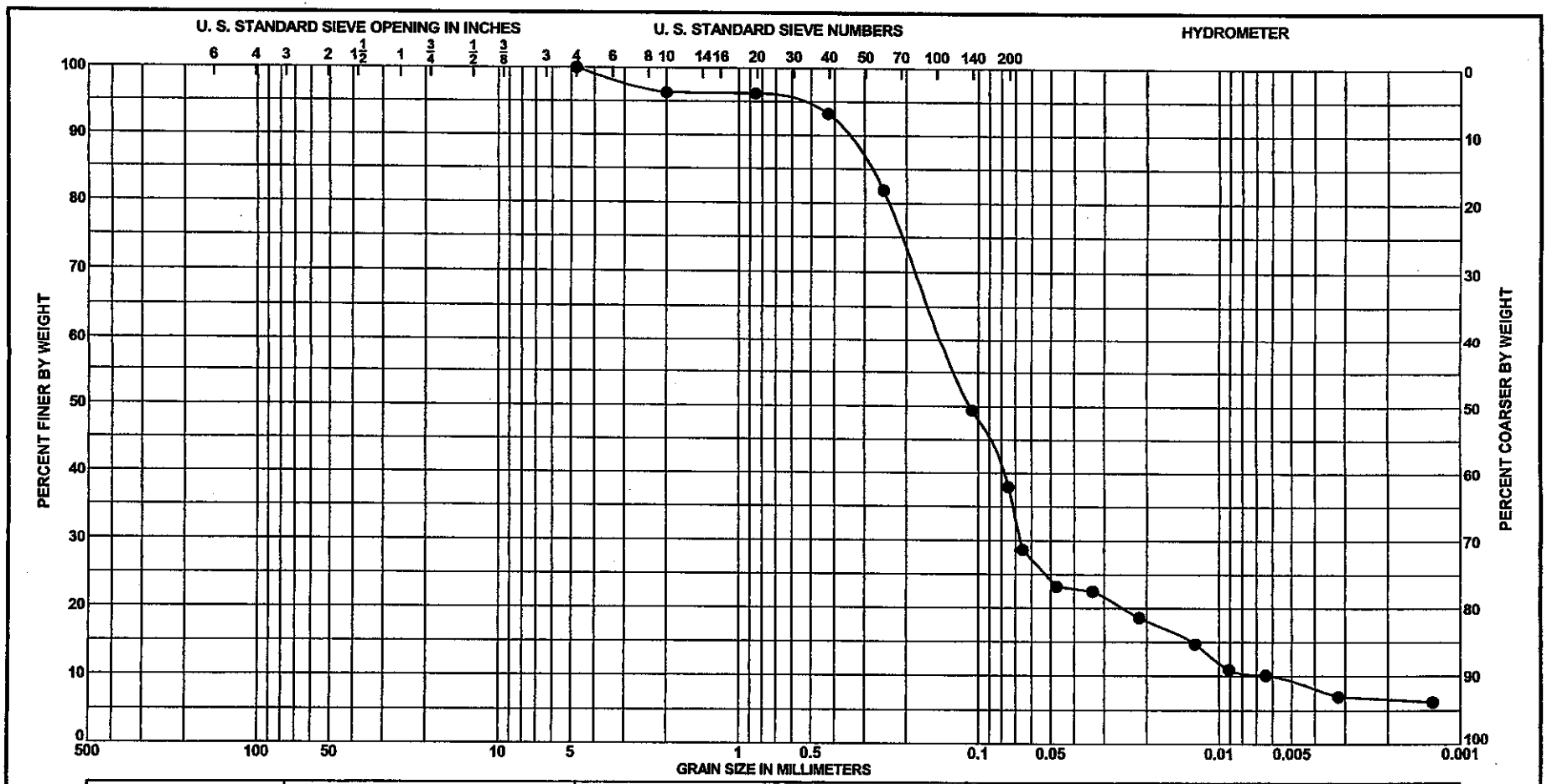


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● UD3	141.5 to 143.5 Ft.	SAND, silty, mostly subrounded		2.64		17.0			
		fine-grained quartz, little silt,							
		trace shell weak reaction							
		w/HCL, moist, with few							
		limestone seams, gray-green							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-006
BORING ELEV.	4.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

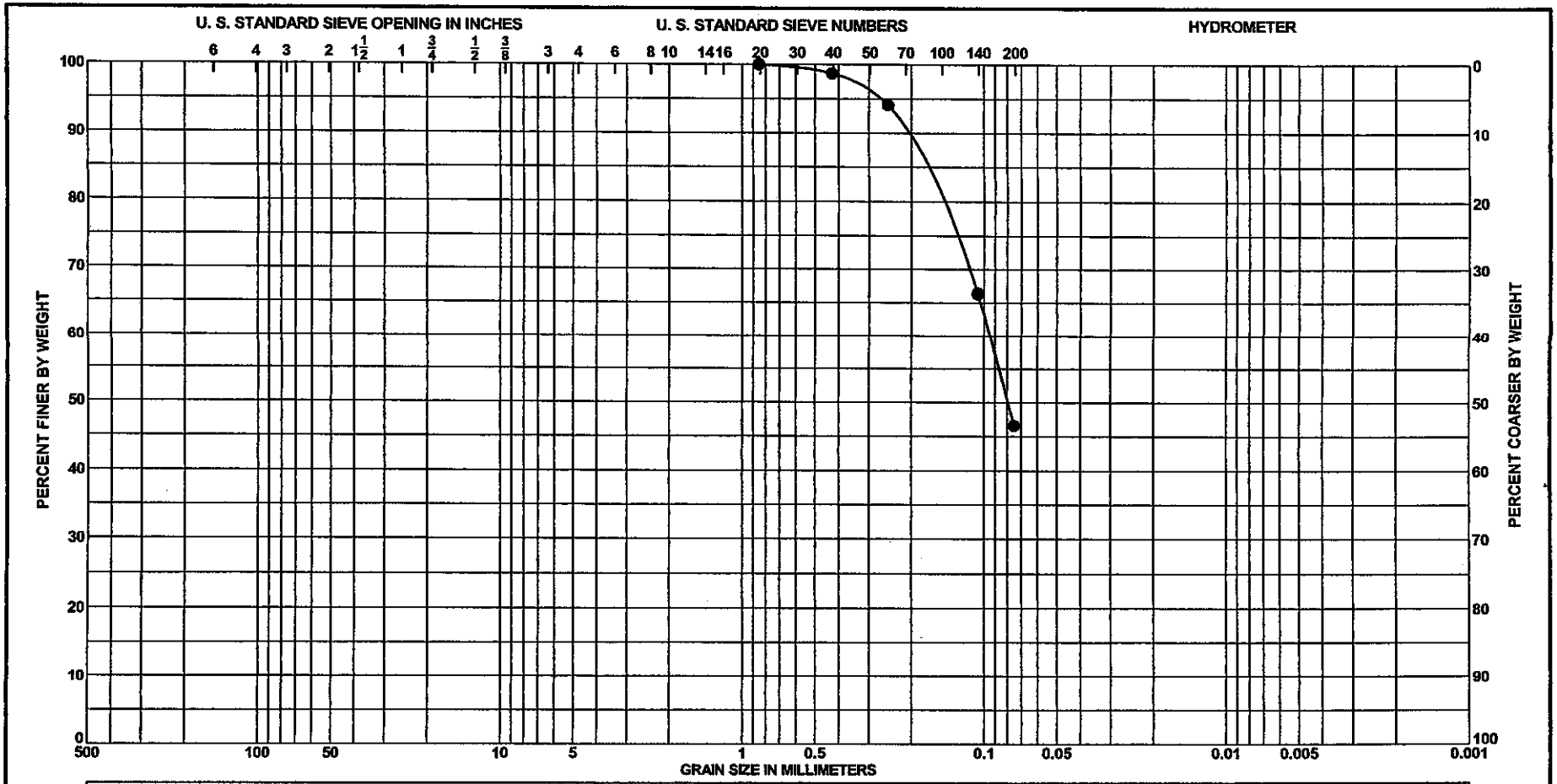


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 39	174.0 to 175.5 Ft.	SAND, silty, mostly subrounded		2.67		16.0			
		fine-grained quartz, some silt,							
		few clay, trace shell, weak							
		reaction w/HCL, wet, gray (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-006
BORING ELEV.	4.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02



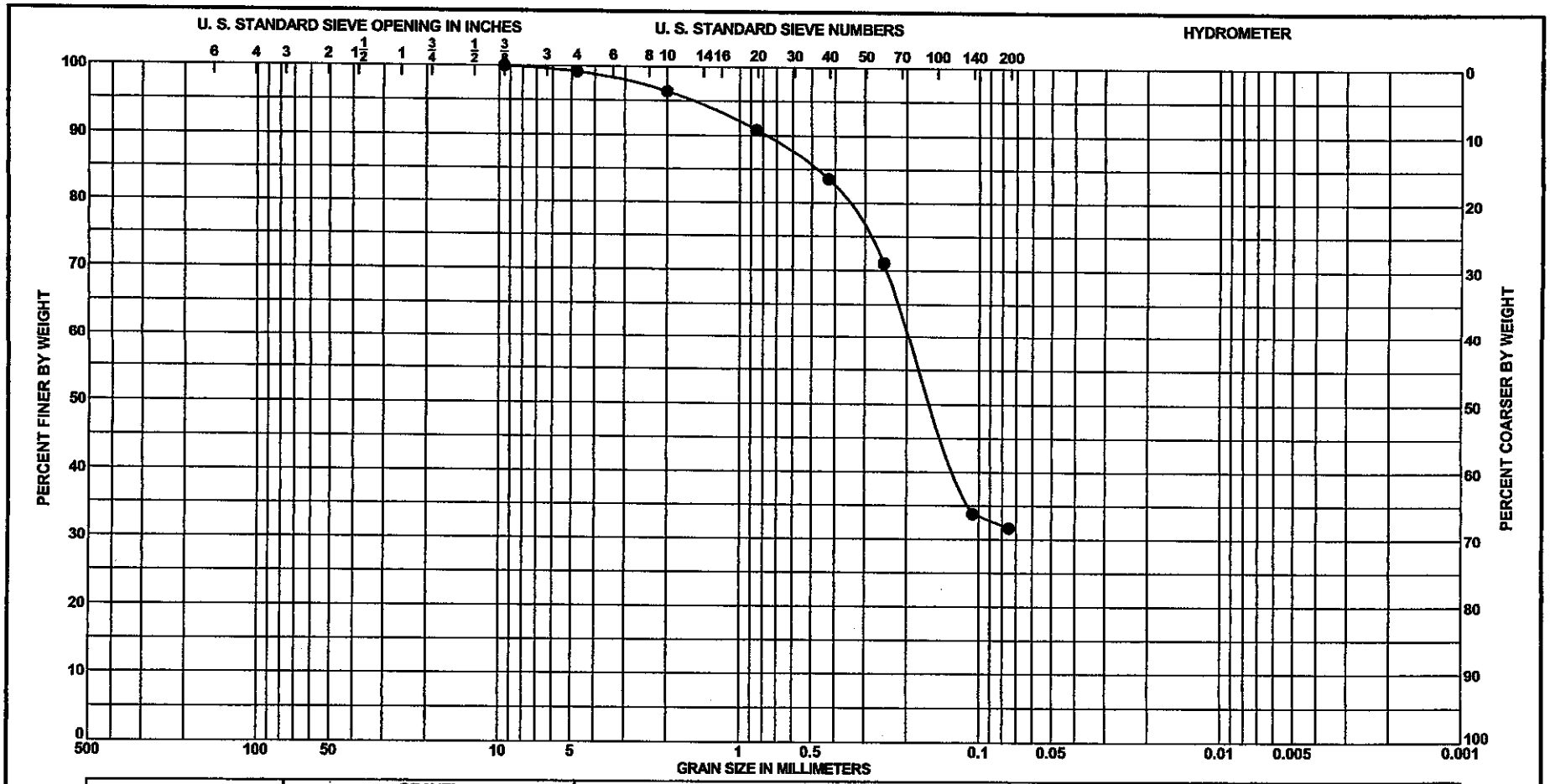
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 46	209.0 to 210.5 Ft.	SAND, clayey, mostly				19.0	33	23	10
		subrounded fine-grained quartz,							
		some clay, no reaction w/HCL,							
		moist, gray-green (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-006
BORING ELEV.	4.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

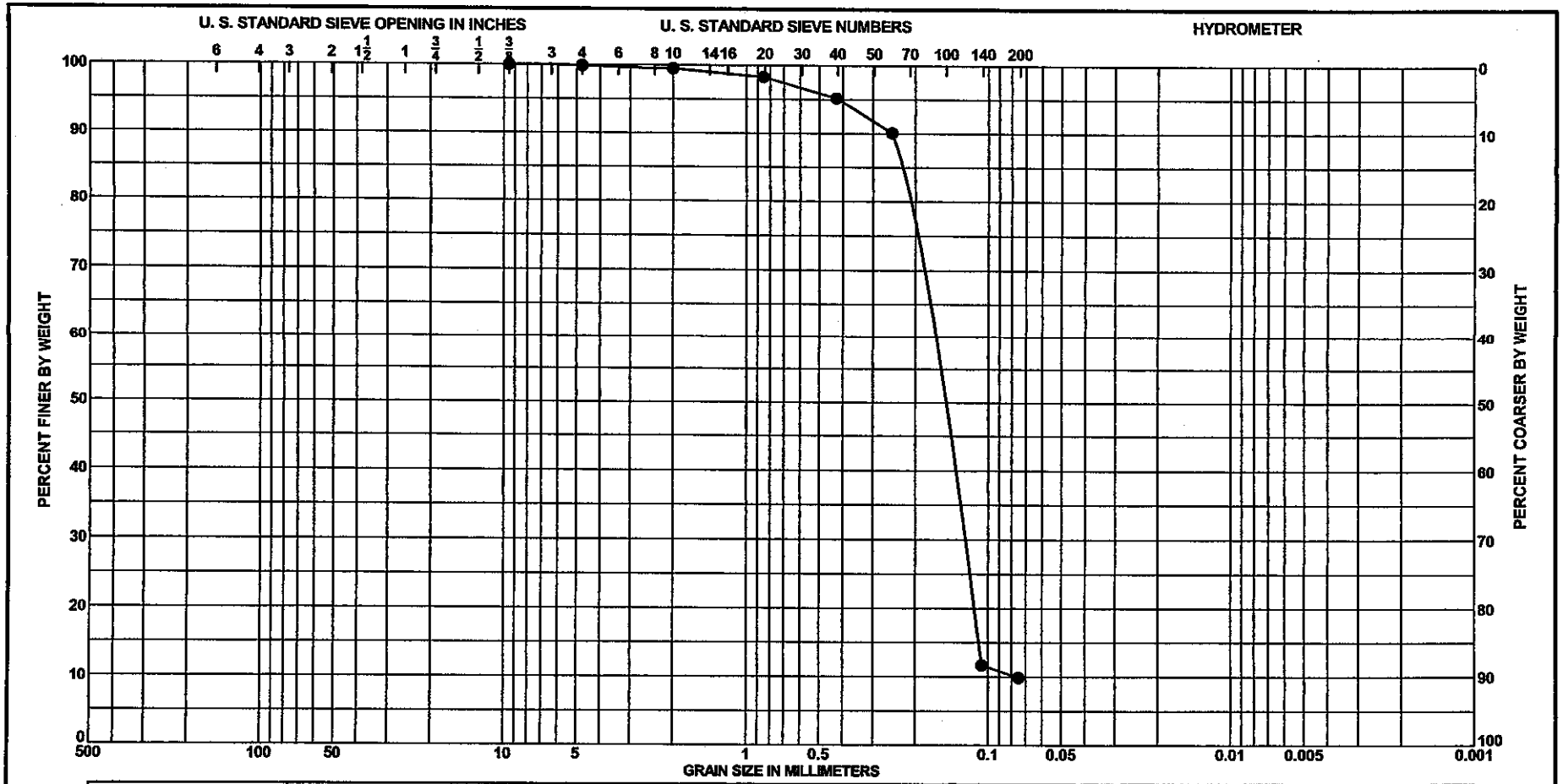


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 18	101.0 to 102.5 Ft.	SAND, silty, mostly subrounded fine-grained quartz, little silt, few clay, weak reaction w/HCL, moist, tan-gray (SM)				14.0	38	22	16

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-007
BORING ELEV.	10.5 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

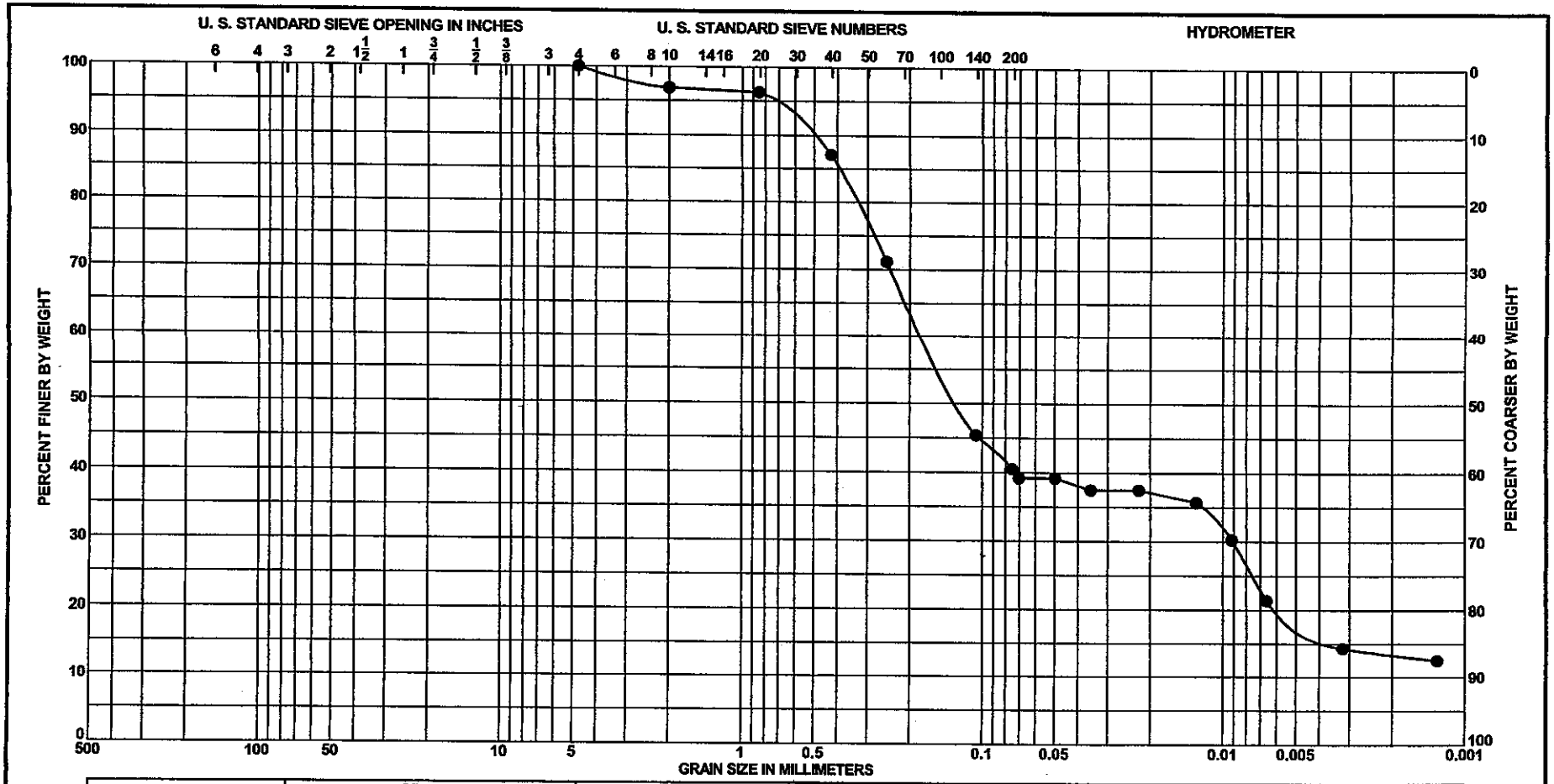


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 15	100.0 to 101.5 Ft.	SAND, poorly-graded with silt,				14.0			
		mostly subrounded fine-grained							
		quartz, few silt, few shell, weak							
		reaction w/HCL, wet, weak							
		cementation, gray to light gray							

(SGRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

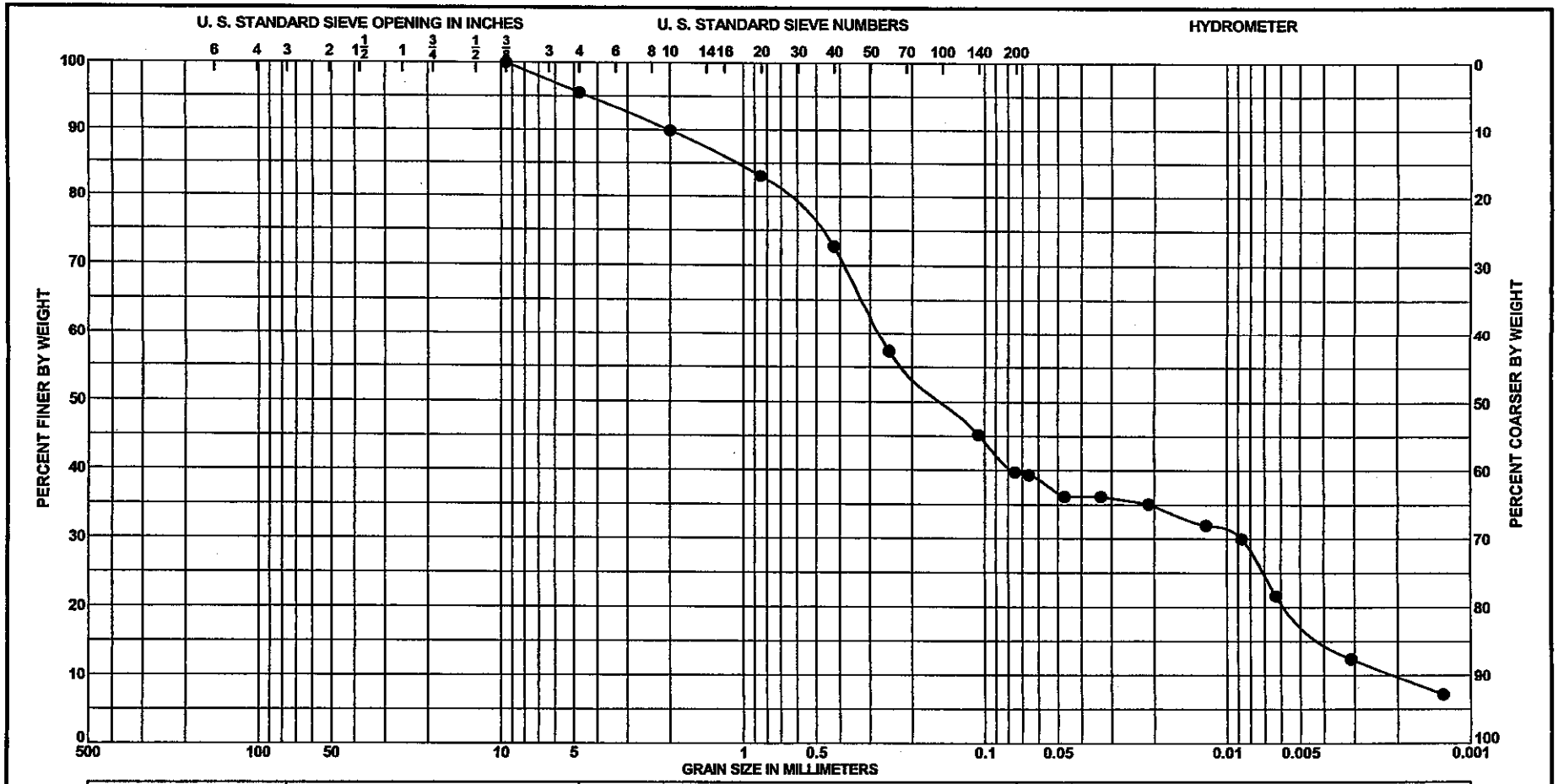


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 35	130.0 to 131.5 Ft.	CLAY, lean, low plasticity, firm,				18.0	38	18	20
		some subrounded fine-grained							
		quartz, little fine-grained shell,							
		no reaction w/HCL, moist,							
		greenish-gray (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

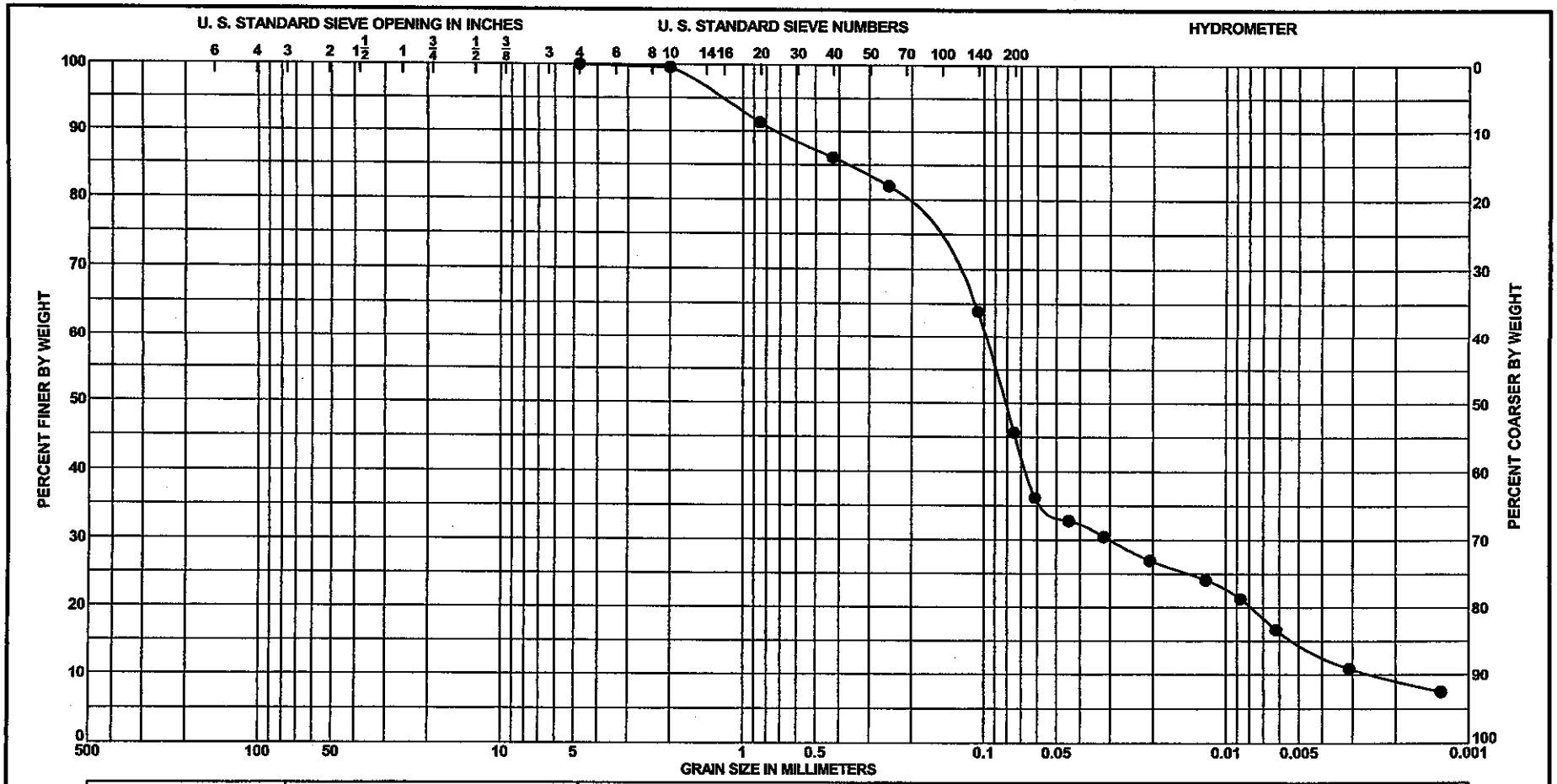


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 36	131.5 to 133.0 Ft.	CLAY, lean, low plasticity, soft,		2.71		5.0	26	17	9
		some subrounded fine-grained							
		quartz, little fine-grained shell,							
		no reaction w/HCL, moist,							
		greenish-gray (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

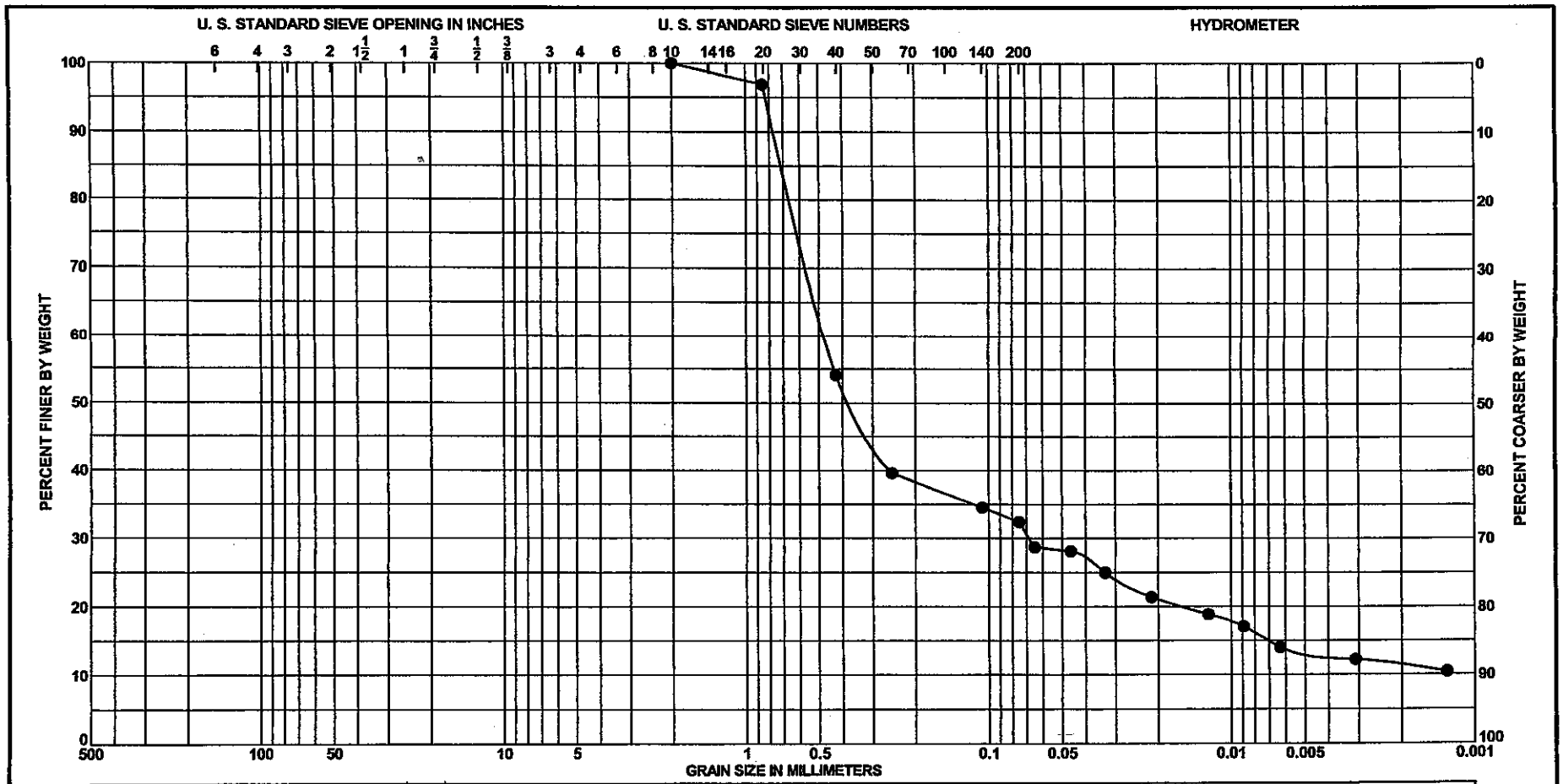


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 57	173.5 to 175.0 Ft.	SAND, clayey, mostly		2.74		11.0	21	20	1
		subrounded fine-grained quartz,							
		some clay, little shell, trace silt,							
		weak reaction w/HCL, weak							
		cementation, moist, light gray							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

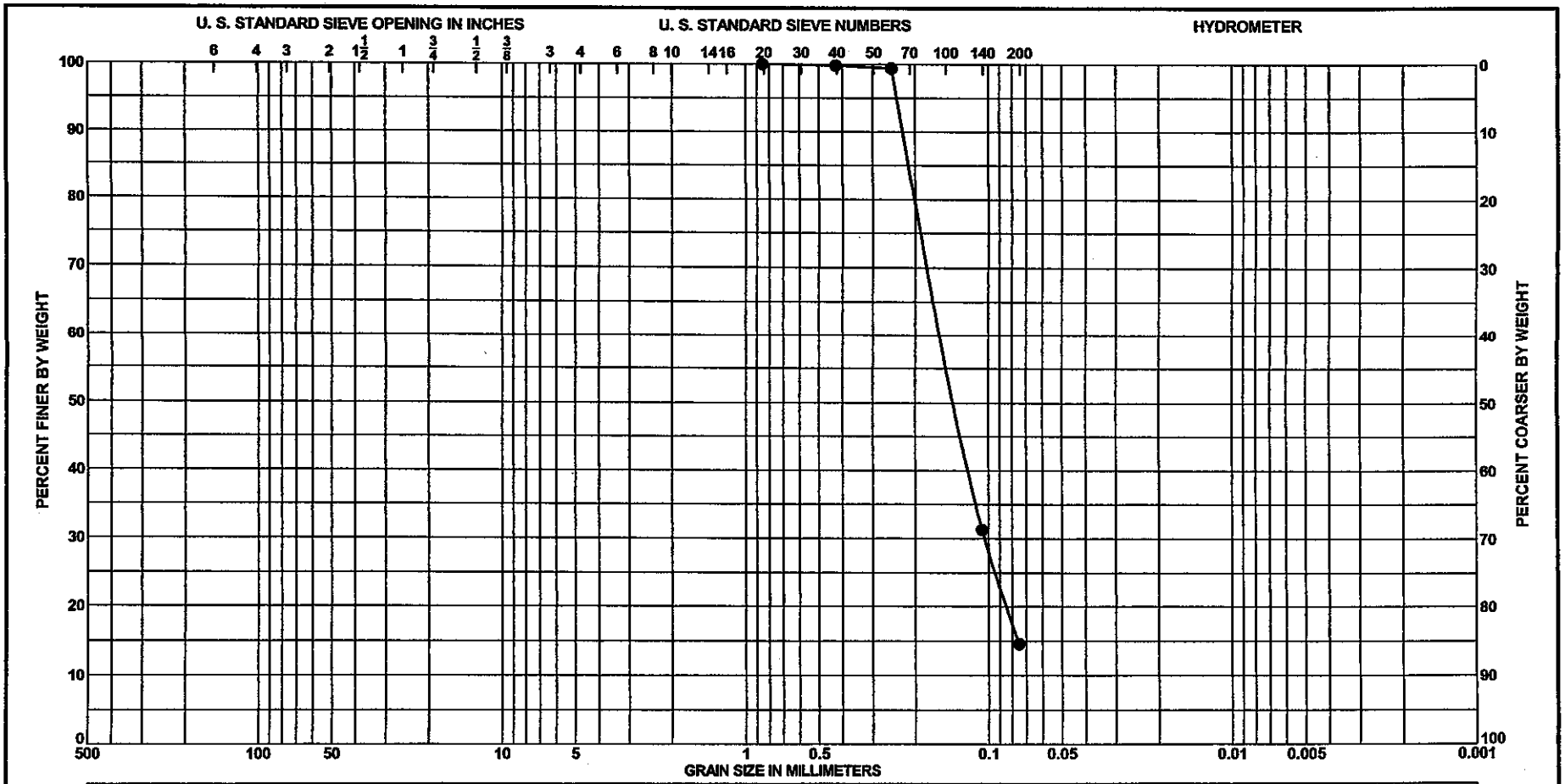


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 64	208.5 to 210.0 Ft.	SAND, clayey, mostly		2.66		16.0	73	21	52
		subrounded fine-grained quartz,							
		some clay, trace silt, no							
		reaction w/HCL, moist,							
		greenish-gray (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

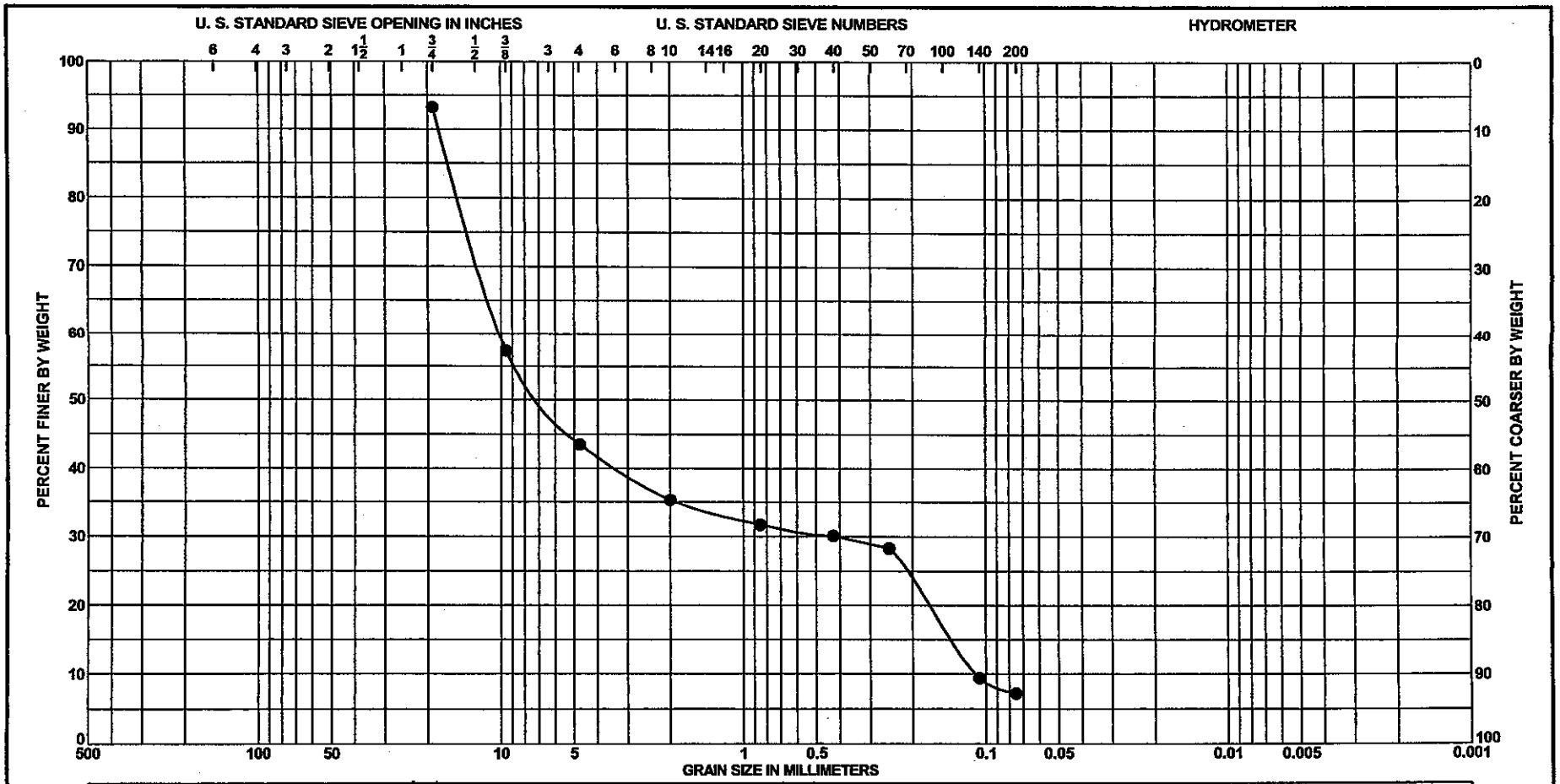


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 68	228.5 to 230.0 Ft.	SAND, poorly-graded, mostly				21.0			
		subrounded fine-grained quartz,							
		few silt, trace clay, trace shell,							
		weak reaction w/HCL, moist,							
		gray (SC)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-008
BORING ELEV.	8.3 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

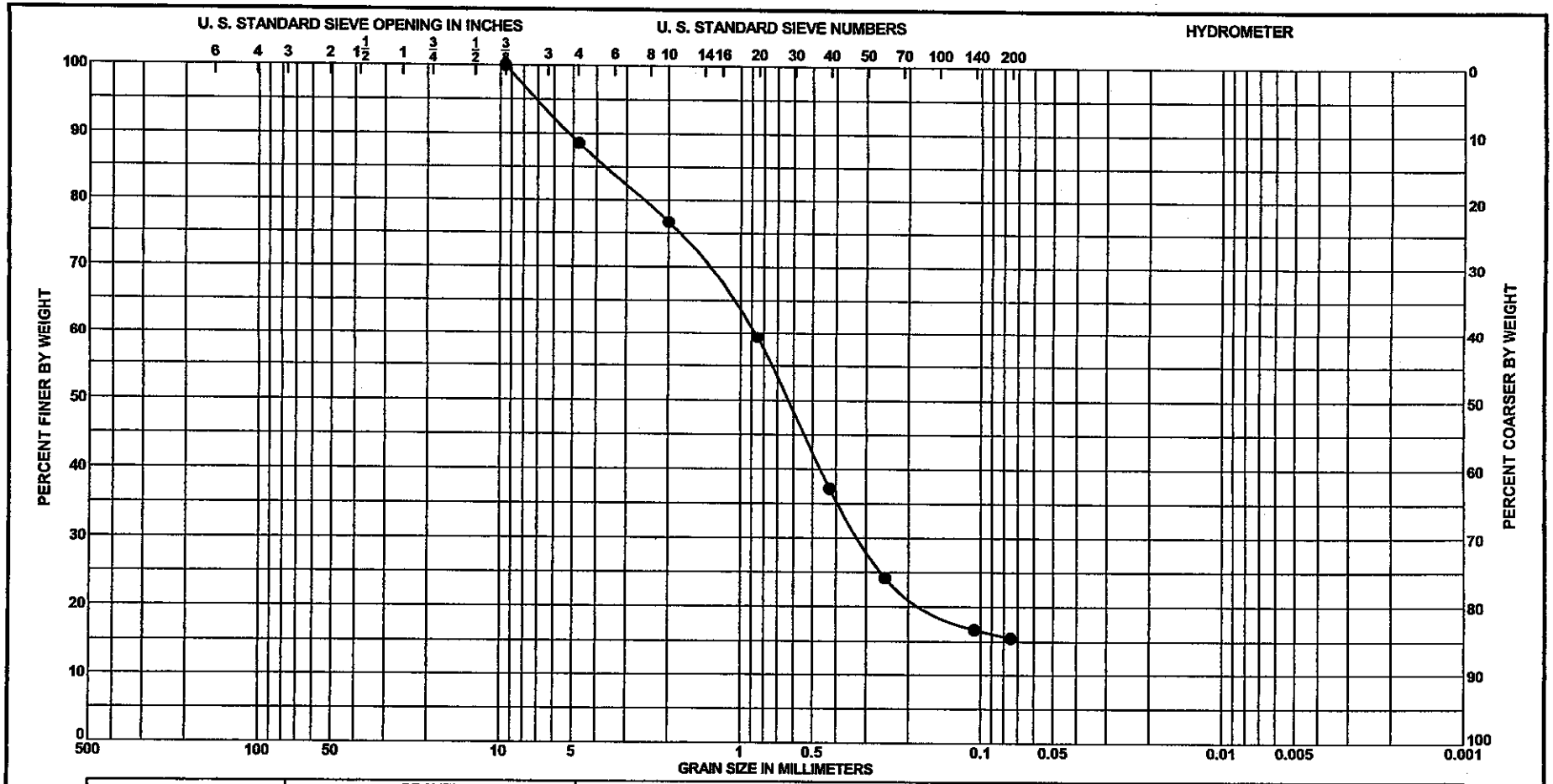


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 12	69.0 to 70.5 Ft.	LIMESTONE, moderately hard,				12.0			
		decomposed, trace clay, tan							
		(LS)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-009
BORING ELEV.	7.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

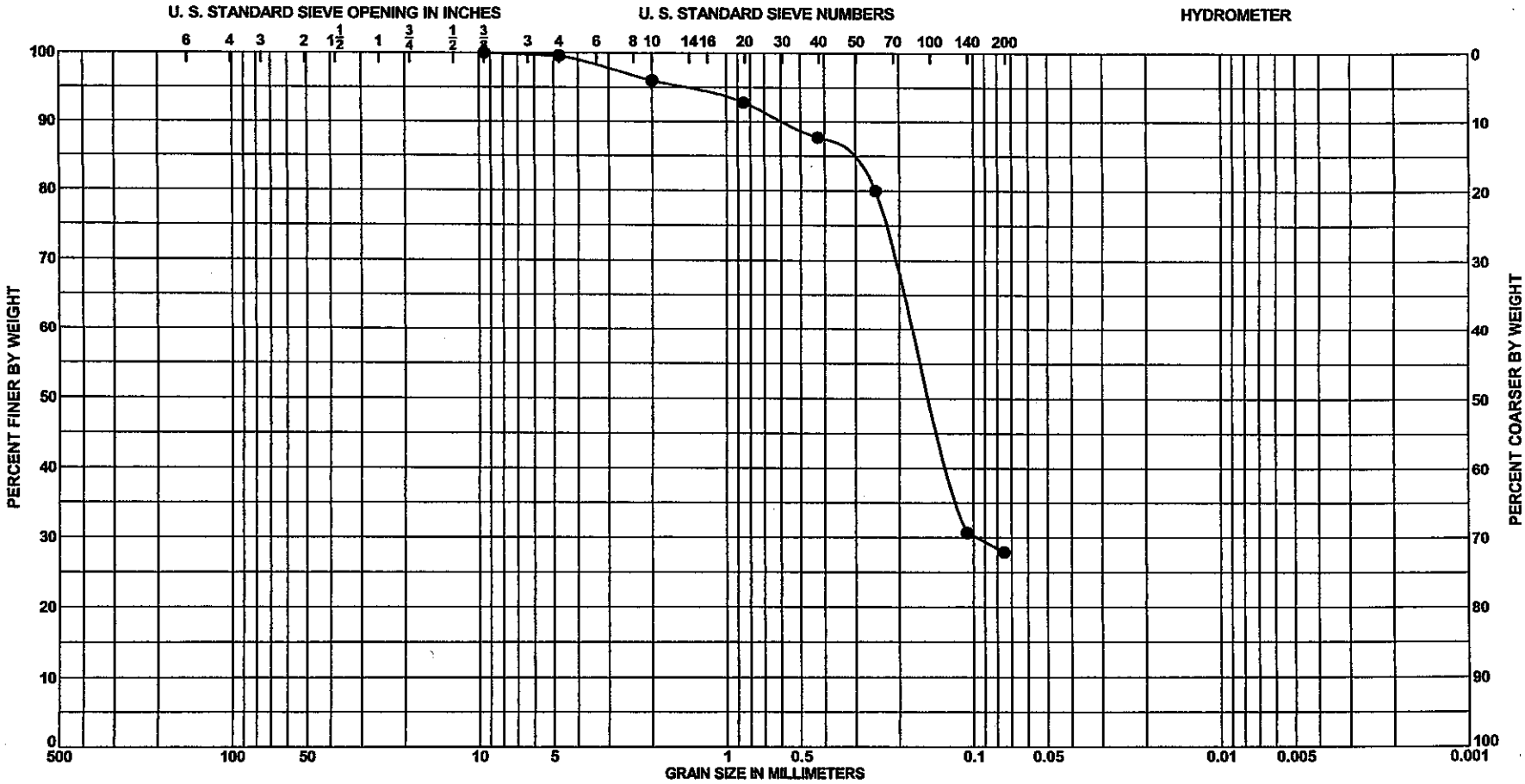


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 22	109.5 to 111.0 Ft.	SAND, silty, mostly subrounded		2.72		17.0			
		fine-grained quartz, little shell,							
		few clay, strong reaction w/							
		HCL, moderate cementation,							
		moist, occasional thin limestone							
		seam, gra							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-009
BORING ELEV.	7.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

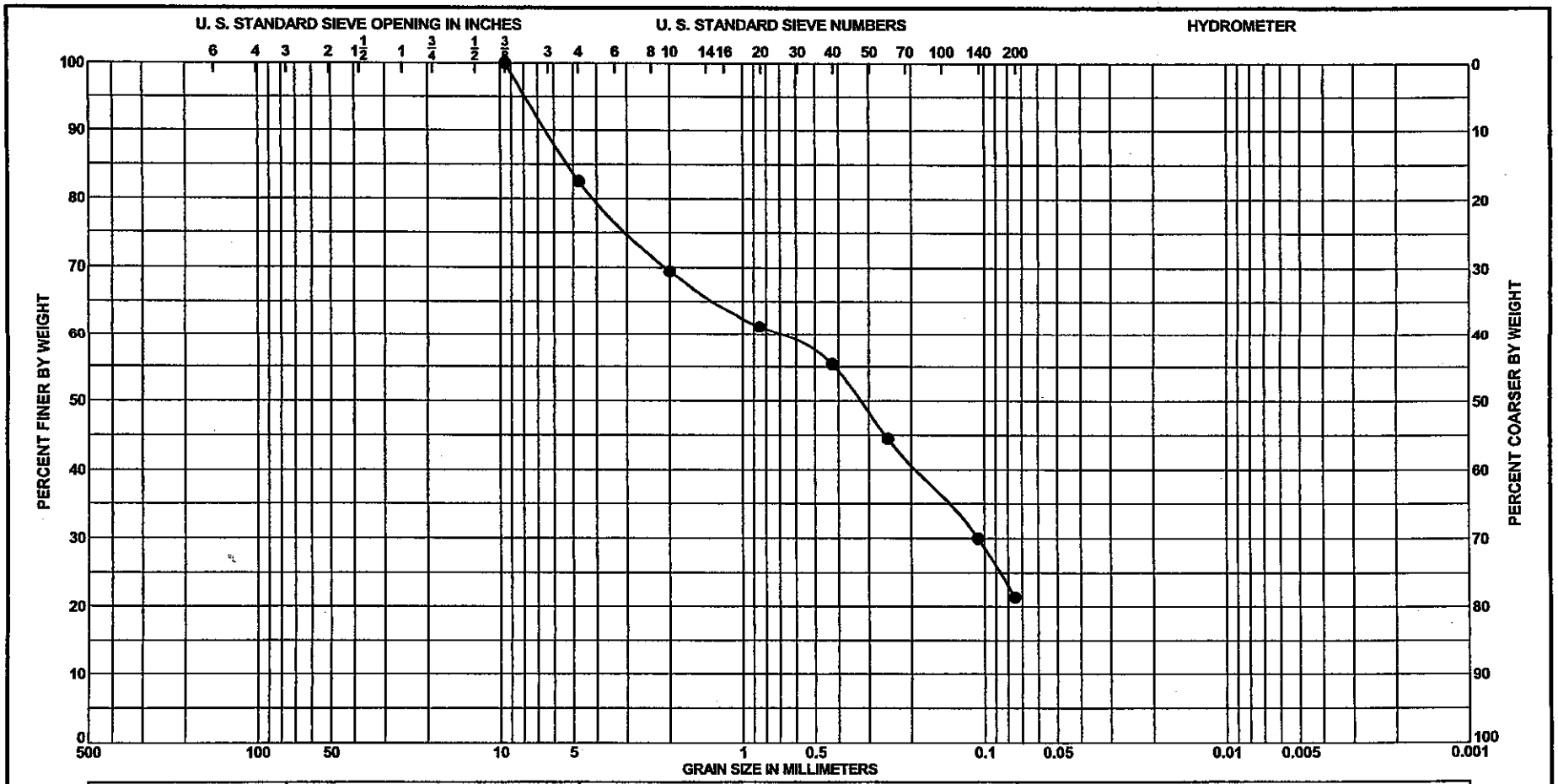


Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 34	127.5 to 129.0 Ft.	SAND, silty, mostly subrounded				17.0			
		fine-grained quartz, little silt,							
		trace clay, trace shell, weak							
		reaction w/HCL, moist, weak							
		cementation, gray (SM)							

GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-009
BORING ELEV.	7.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02



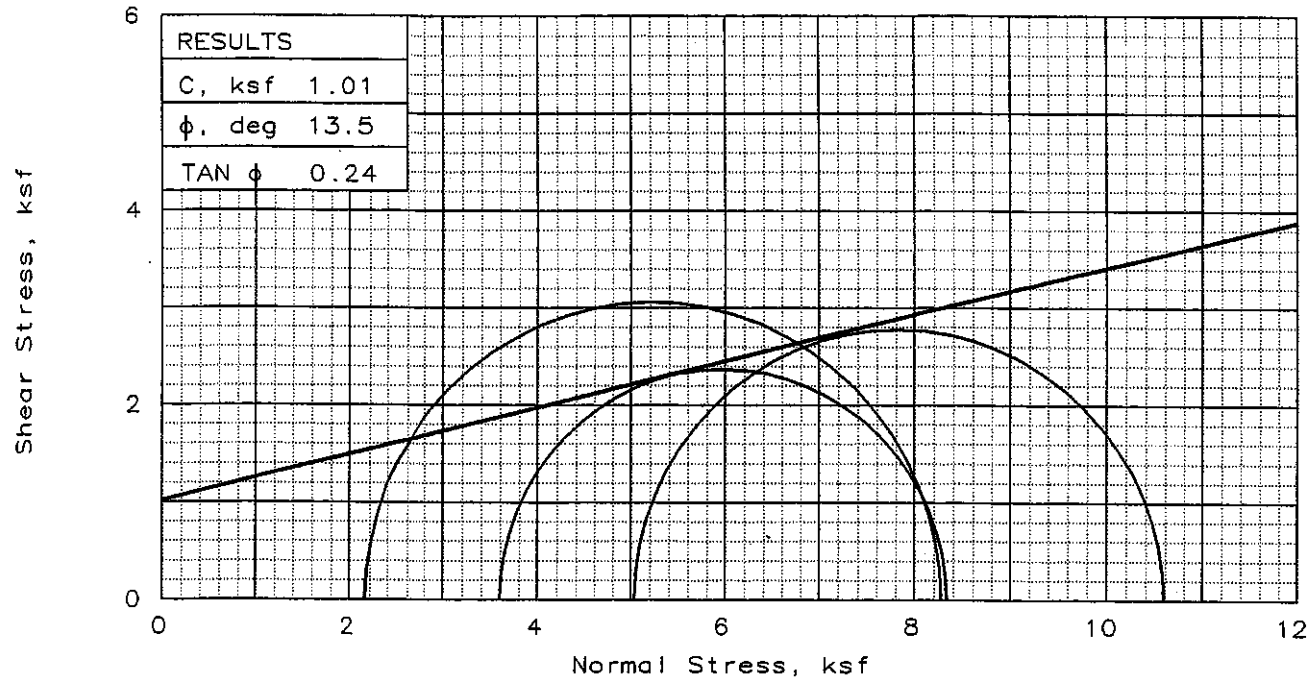
Sample No.	Depth	Classification	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 53	156.0 to 157.5 Ft.	SAND, silty, mostly subrounded				17.0			
		fine-grained quartz, little silt,							
		trace clay, little shell, weak							
		reaction w/HCL, moist,							
		moderate cementation,							
		gray-g							

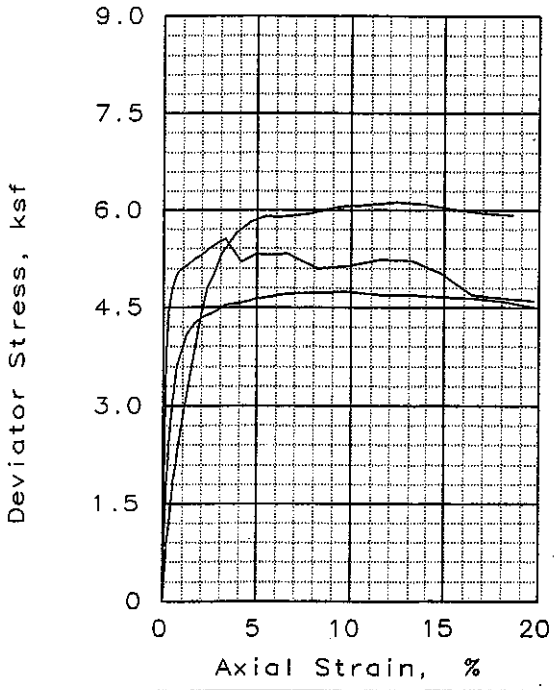
GRADATION CURVES

PROJECT	Lake Belt In-Ground Reservoir Technology Pilot Project
	Phase 1 - Regional
BORING NO.	CP02-LKBPP-CB-009
BORING ELEV.	7.9 Ft., NAVD88
DATE	

SAJ FORM 2087
JUN 02

APPENDIX C





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	18.8	18.8	18.8
	DRY DENSITY, pcf	106.1	102.7	102.2
	SATURATION, %	88.7	81.4	80.3
	VOID RATIO	0.563	0.614	0.622
	DIAMETER, in	2.85	2.86	2.83
	HEIGHT, in	6.45	6.06	6.07
AT TEST	WATER CONTENT, %	21.0	22.8	23.0
	DRY DENSITY, pcf	106.4	103.3	103.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.558	0.604	0.610
	DIAMETER, in	2.85	2.86	2.83
	HEIGHT, in	6.46	6.07	6.08
Strain rate, %/min		0.05	0.05	0.05
BACK PRESSURE, ksf		0.0	0.0	0.0
CELL PRESSURE, ksf		2.2	3.6	5.0
FAILURE STRESS, ksf		6.1	4.7	5.6
ULTIMATE STRESS, ksf		6.1	4.7	5.6
σ_1 FAILURE, ksf		8.3	8.3	10.6
σ_3 FAILURE, ksf		2.2	3.6	5.0

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION:

SPECIFIC GRAVITY= 2.656
REMARKS:

CLIENT: USACE, Jacksonville District

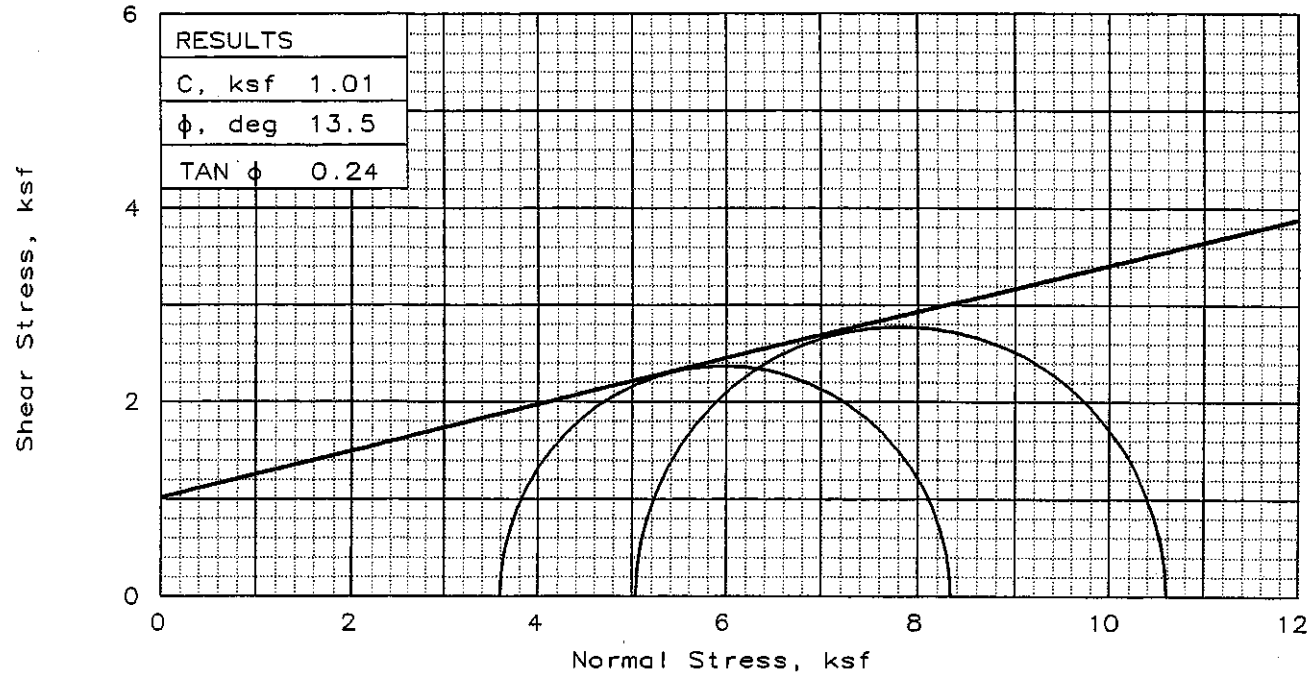
PROJECT: Lake Belt

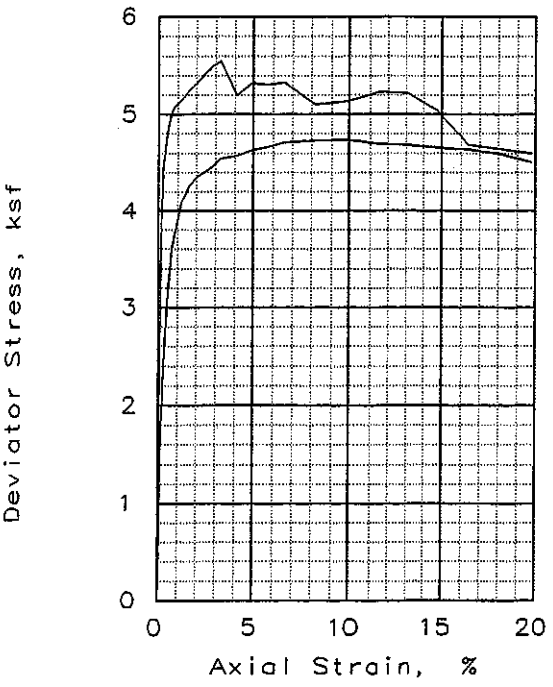
SAMPLE LOCATION: Boring 5, 112.5'-114.5'

PROJ. NO.: 21-1-848216 DATE: 10/19/02

TRIAXIAL SHEAR TEST REPORT

LAW ENGINEERING INC.





SAMPLE NO.:		1	2
INITIAL	WATER CONTENT, %	18.8	18.8
	DRY DENSITY, pcf	102.7	102.2
	SATURATION, %	81.4	80.3
	VOID RATIO	0.614	0.622
	DIAMETER, in	2.86	2.83
	HEIGHT, in	6.06	6.07
AT TEST	WATER CONTENT, %	22.8	23.0
	DRY DENSITY, pcf	103.3	103.0
	SATURATION, %	100.0	100.0
	VOID RATIO	0.604	0.610
	DIAMETER, in	2.86	2.83
	HEIGHT, in	6.07	6.08
Strain rate, %/min		0.05	0.05
BACK PRESSURE, ksf		0.0	0.0
CELL PRESSURE, ksf		3.6	5.0
FAILURE STRESS, ksf		4.7	5.6
ULTIMATE STRESS, ksf		4.7	5.6
σ_1 FAILURE, ksf		8.3	10.6
σ_3 FAILURE, ksf		3.6	5.0

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION:

SPECIFIC GRAVITY= 2.656
REMARKS:

CLIENT: USACE, Jacksonville District

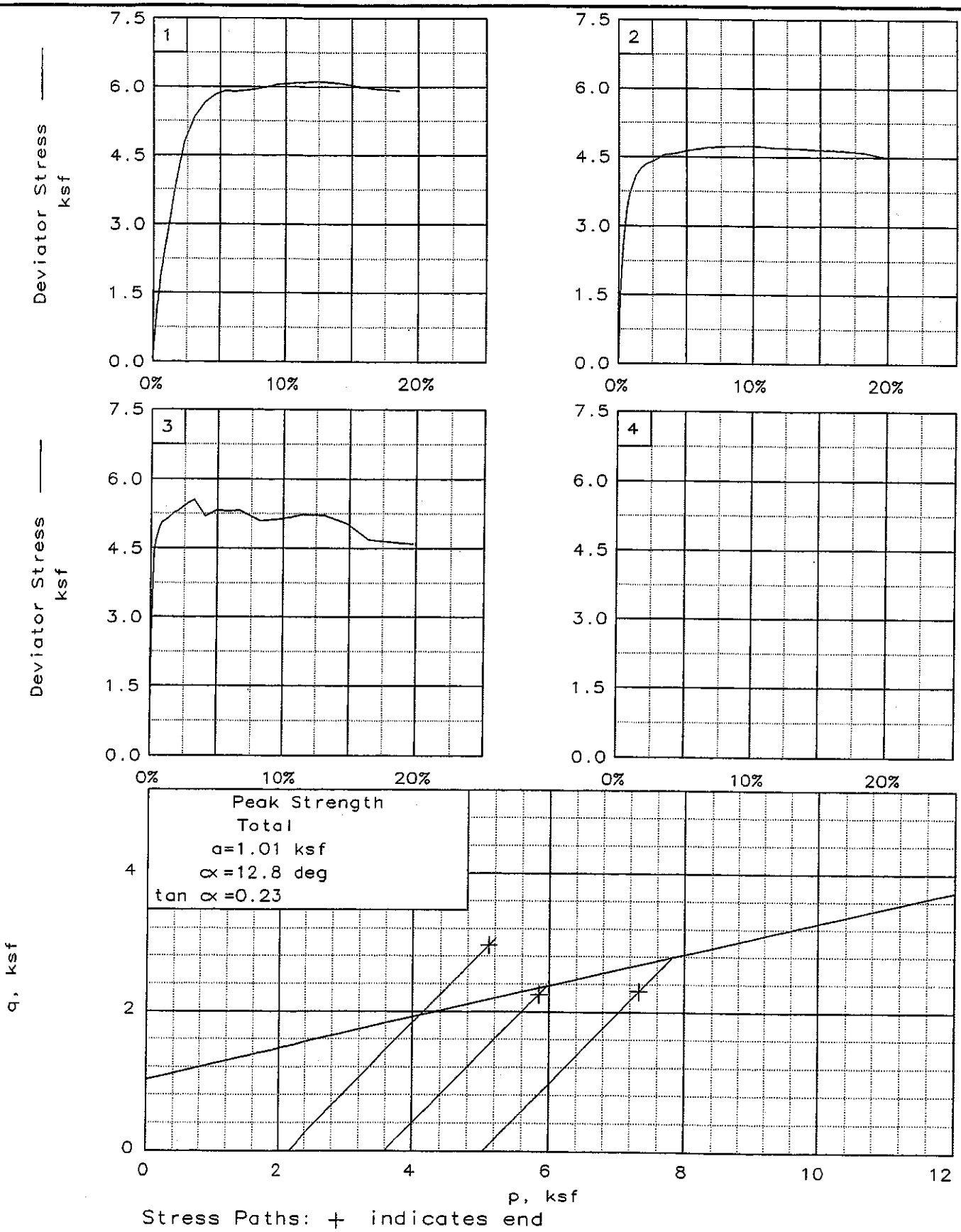
PROJECT: Lake Belt

SAMPLE LOCATION: Boring 5, 112.5'-114.5'

PROJ. NO.: 21-1-848216 DATE: 10/19/02

TRIAXIAL SHEAR TEST REPORT

LAW ENGINEERING INC.



Stress Paths: + indicates end

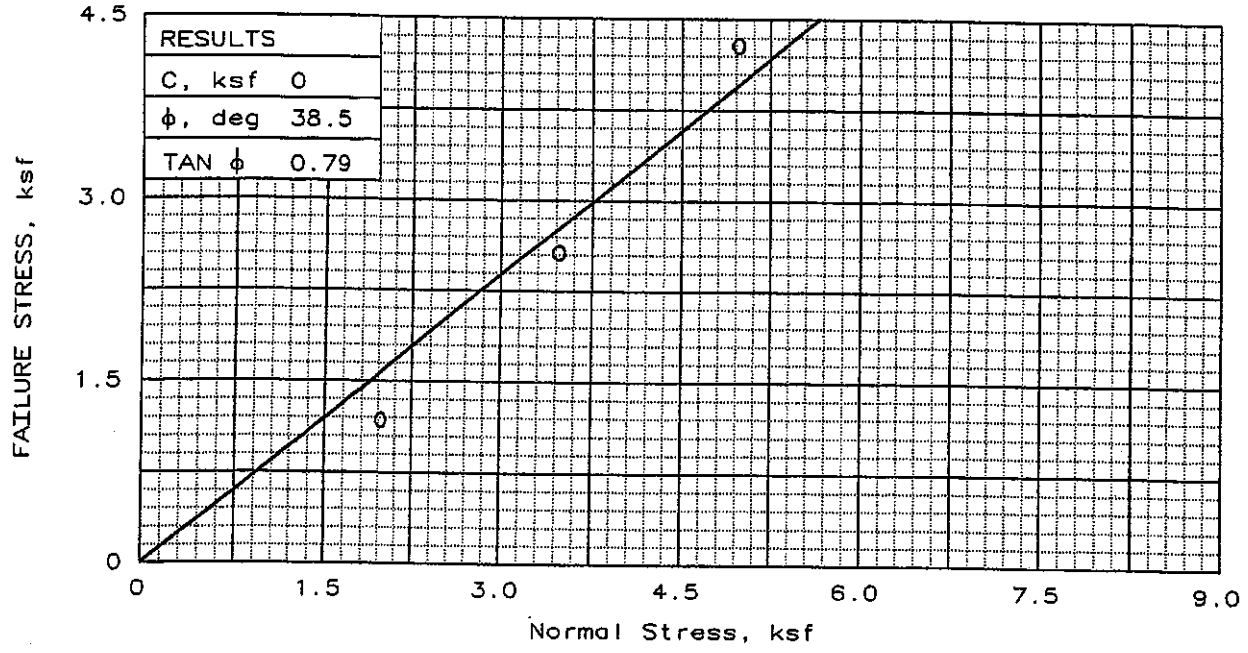
Client: USACE, Jacksonville District

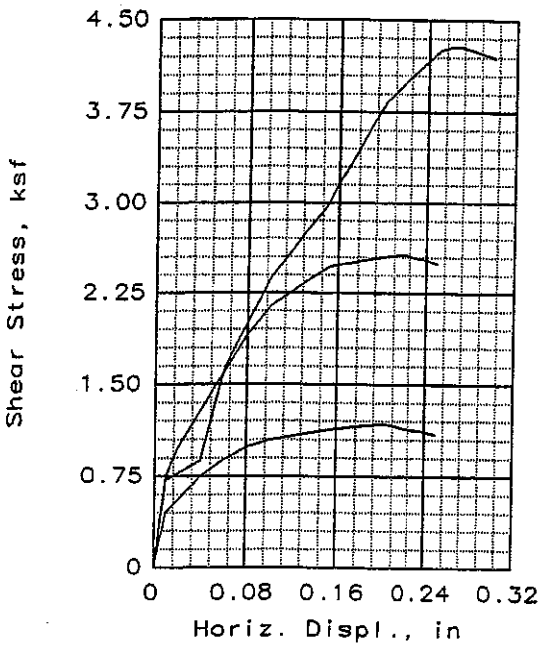
Project: Lake Belt

Location: Boring 5, 112.5'-114.5'

File: LKBLT-5 Project No.: 21-1-848216

APPENDIX D





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	26.0	26.0	26.0
	DRY DENSITY, pcf	95.0	95.0	95.0
	SATURATION, %	90.7	90.7	90.7
	VOID RATIO	0.774	0.774	0.774
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	26.0	26.0	26.0
	DRY DENSITY, pcf	97.4	97.4	98.8
	SATURATION, %	96.2	96.2	99.3
	VOID RATIO	0.730	0.730	0.707
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, ksf		2.00	3.50	5.00
FAILURE STRESS, ksf		1.18	2.57	4.28
DISPLACEMENT, in		0.20	0.22	0.26
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: SAND, silty, mostly sub-rounded fine grained quartz, little silt, weak reaction to HCL, moist, GRAY (SC)

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By:

Lab ID No.: 001333

CLIENT: USCOE

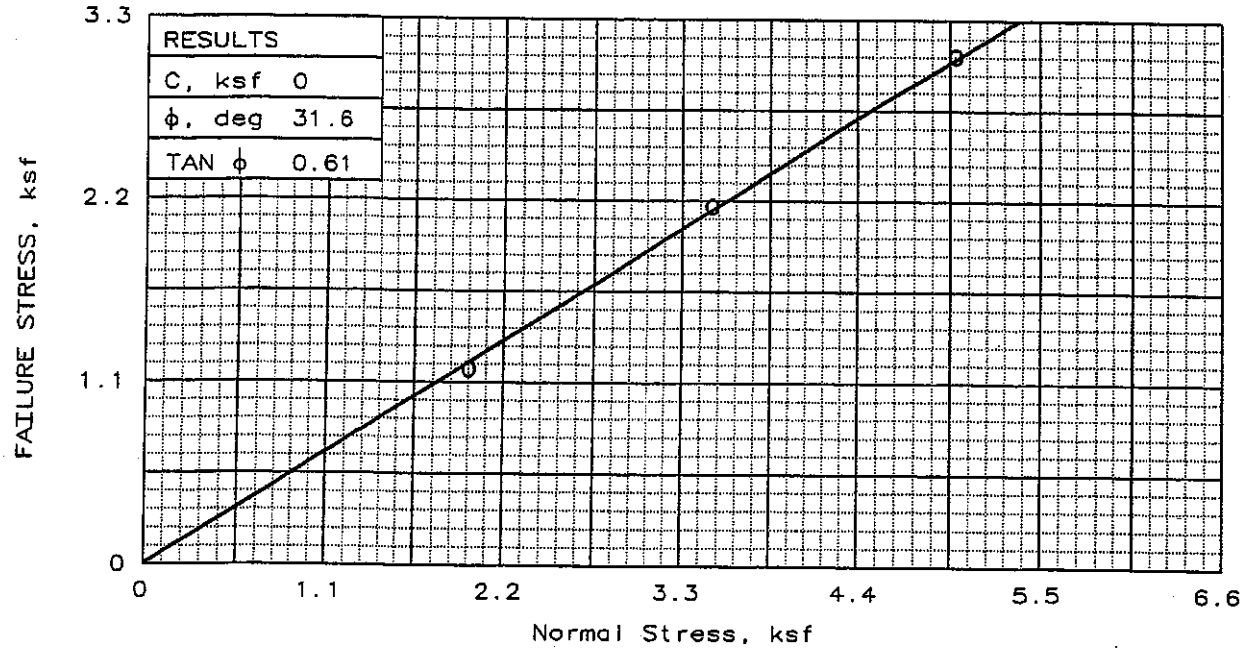
PROJECT: Lake Belt

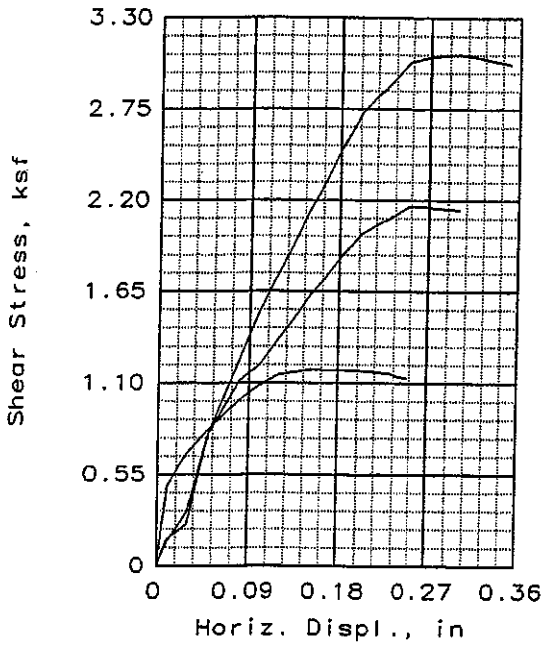
SAMPLE LOCATION: CB-04 S-10/Depth: 89.0' - 90.5'

PROJ. NO.: 40521-1-8482.15 DATE: 11/04/02

DIRECT SHEAR TEST REPORT

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	35.1	35.1	35.1
	DRY DENSITY, pcf	120.0	120.0	120.0
	SATURATION, %	234.2	234.2	234.2
	VOID RATIO	0.405	0.405	0.405
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.80	0.80	0.80
AT TEST	WATER CONTENT, %	35.1	35.1	35.1
	DRY DENSITY, pcf	125.7	123.7	123.6
	SATURATION, %	278.3	261.5	260.8
	VOID RATIO	0.341	0.363	0.363
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.76	0.78	0.78
NORMAL STRESS, ksf		2.00	3.50	5.00
FAILURE STRESS, ksf		1.18	2.16	3.08
DISPLACEMENT, in		0.15	0.25	0.29
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: SAND, with clay, mostly sub-rounded fine grained quartz sand, few to little clay, no reaction to HCL, moist, gray (SC)

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By:

Lab ID No.: 001334

CLIENT: USCOE

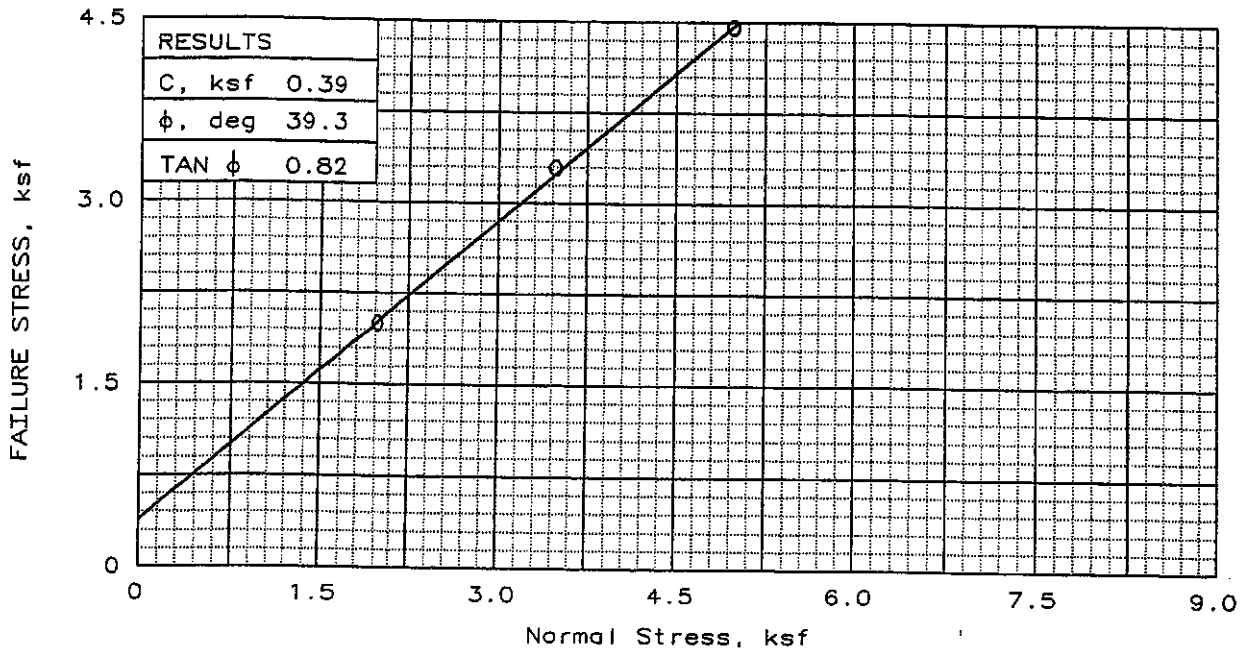
PROJECT: Lake Belt

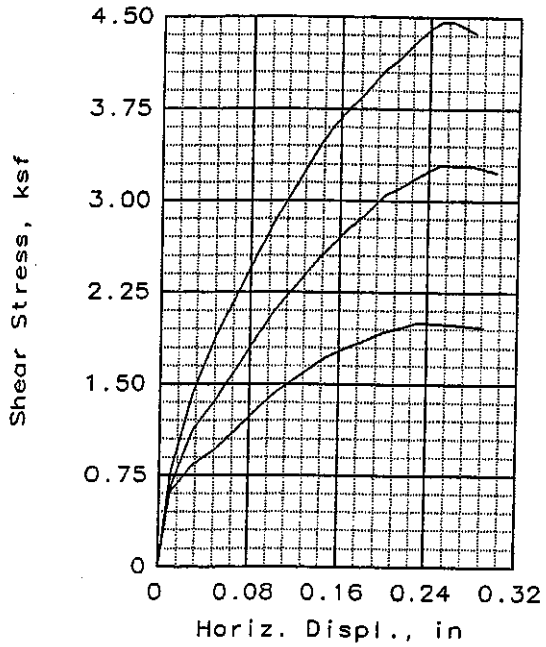
SAMPLE LOCATION: CB-04 S-49/Depth: 223.5' - 225.0'

PROJ. NO.: 40521-1-8482.15 DATE: 11/04/02

DIRECT SHEAR TEST REPORT

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	29.1	29.1	29.1
	DRY DENSITY, pcf	90.0	90.0	90.0
	SATURATION, %	90.0	90.0	90.0
	VOID RATIO	0.873	0.873	0.873
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	29.1	29.1	29.1
	DRY DENSITY, pcf	92.3	93.4	94.3
	SATURATION, %	95.1	97.6	99.9
	VOID RATIO	0.826	0.805	0.787
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.98	0.96	0.95
NORMAL STRESS, ksf		2.00	3.50	5.00
FAILURE STRESS, ksf		2.00	3.29	4.46
DISPLACEMENT, in		0.23	0.25	0.25
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: SAND, silty, mostly sub-rounded fine grained quartz, some silt, weak reaction to HCL, moist, gray-green (SM)

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By:

Lab ID No.: 001336

CLIENT: USCOE

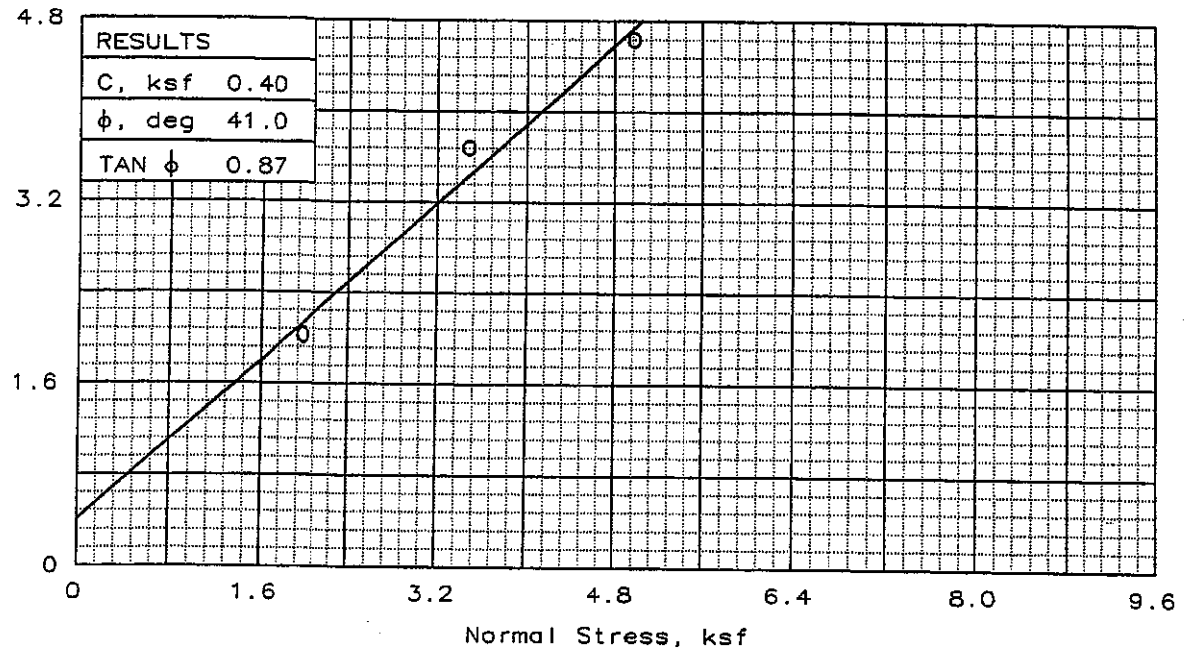
PROJECT: Lake Belt

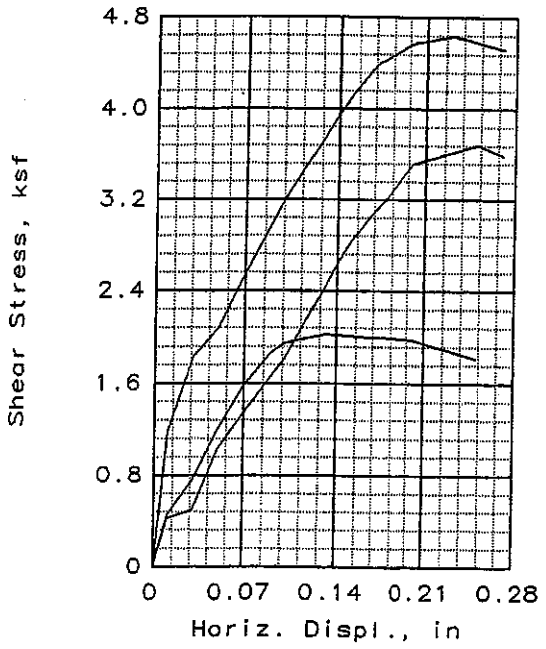
SAMPLE LOCATION: CB-6/Depth: 119.5' - 121.0'

PROJ. NO.: 40521-1-8482.15 DATE: 11/04/02

DIRECT SHEAR TEST REPORT

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	30.0	30.0	30.0
	DRY DENSITY, pcf	115.0	115.0	115.0
	SATURATION, %	174.0	174.0	174.0
	VOID RATIO	0.466	0.466	0.466
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	30.0	30.0	30.0
	DRY DENSITY, pcf	116.9	118.1	118.6
	SATURATION, %	183.2	189.5	192.1
	VOID RATIO	0.442	0.428	0.422
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.98	0.97	0.97
NORMAL STRESS, ksf		2.00	3.50	5.00
FAILURE STRESS, ksf		2.02	3.68	4.64
DISPLACEMENT, in		0.13	0.25	0.23
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: SAND, silty, mostly sub-rounded fine grained quartz, little silt, weak reaction to HCL, moist, gray-green (SM)

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By:

Lab ID No.: 001337

CLIENT: USCOE

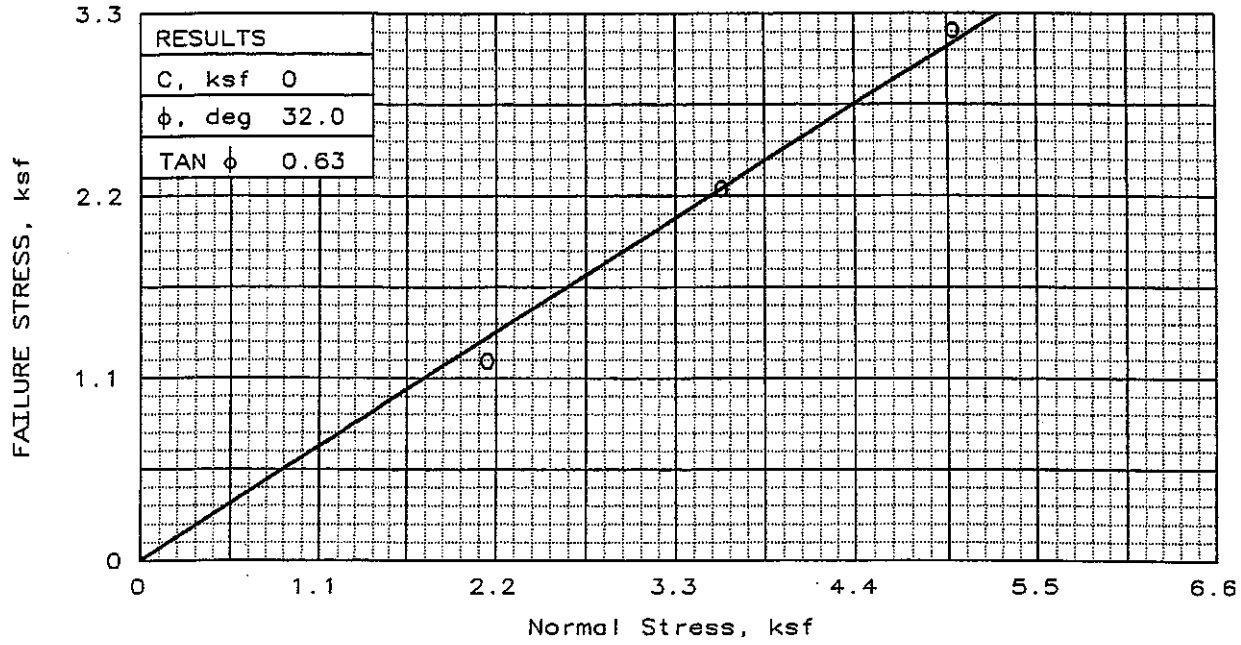
PROJECT: Lake Belt

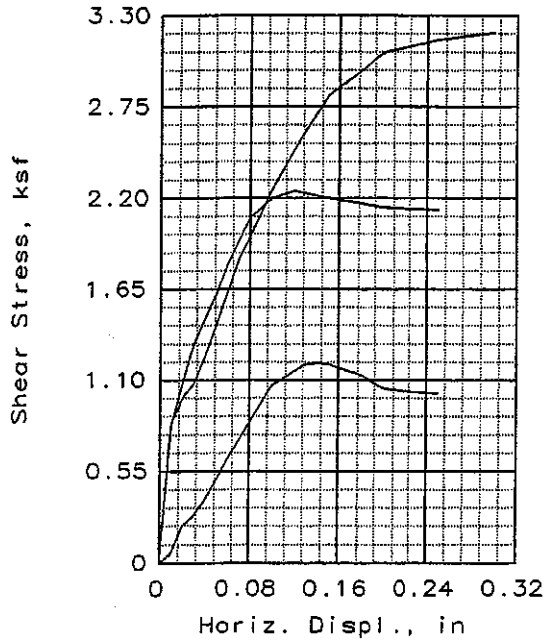
SAMPLE LOCATION: CB-09 S-53/156.0' - 157.5'

PROJ. NO.: 40521-1-8482.15 DATE: 11/04/02

DIRECT SHEAR TEST REPORT

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	32.7	32.7	32.7
	DRY DENSITY, pcf	115.0	115.0	115.0
	SATURATION, %	189.7	189.6	189.6
	VOID RATIO	0.465	0.466	0.466
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.80	0.80	0.80
AT TEST	WATER CONTENT, %	32.7	32.7	32.7
	DRY DENSITY, pcf	117.6	117.8	117.8
	SATURATION, %	203.8	204.9	204.9
	VOID RATIO	0.433	0.431	0.431
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.78	0.78	0.78
NORMAL STRESS, ksf		2.16	3.60	5.00
FAILURE STRESS, ksf		1.20	2.24	3.20
DISPLACEMENT, in		0.14	0.12	0.30
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: SAND, poorly graded with silt, mostly subrounded fine-grained quartz, few silt, few shell, weak cementation, weak reaction to HCL, wet, gray (SP-SM)

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By:

Lab ID No.: 001449

CLIENT: USCOE

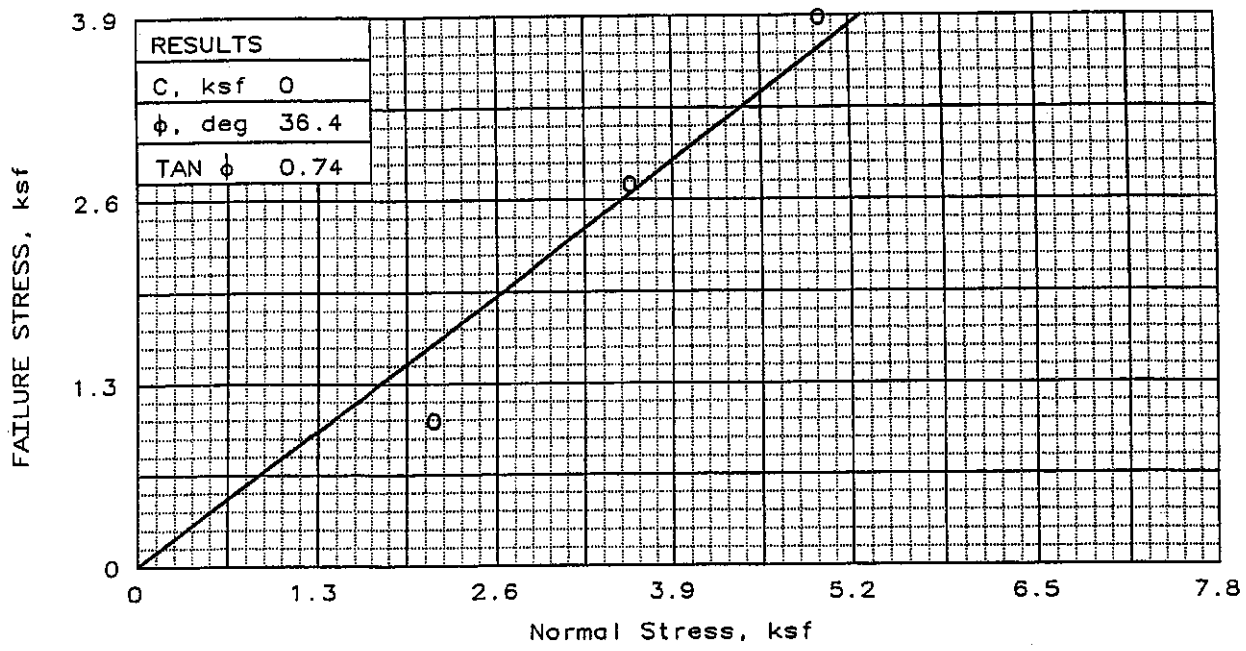
PROJECT: Lake Belt

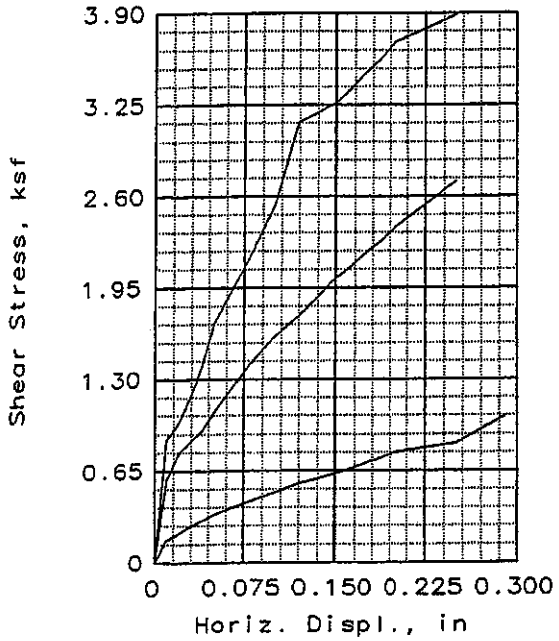
SAMPLE LOCATION: CB-8 S-16/Depth: 100.0' - 101.5'

PROJ. NO.: 40521-1-8482.15 DATE: 11/22/02

DIRECT SHEAR TEST REPORT

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	46.7	46.7	46.7
	DRY DENSITY, pcf	114.7	114.7	114.7
	SATURATION, %	268.4	268.4	268.4
	VOID RATIO	0.469	0.469	0.469
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.80	0.80	0.80
AT TEST	WATER CONTENT, %	46.7	46.7	46.7
	DRY DENSITY, pcf	115.8	120.1	125.0
	SATURATION, %	276.6	312.5	361.0
	VOID RATIO	0.455	0.403	0.349
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.79	0.76	0.73
NORMAL STRESS, ksf		2.16	3.60	5.00
FAILURE STRESS, ksf		1.03	2.71	3.89
DISPLACEMENT, in		0.29	0.25	0.25
ULTIMATE STRESS, ksf				
DISPLACEMENT, in				
Strain rate, %/min		0.17	0.17	0.17

SAMPLE TYPE: Remolded

DESCRIPTION: **SAND, silty, mostly sub-rounded fine-grained quartz, little silt, little shell, trace clay, weak reaction to HCL, moderate cementation, moist, gray (SM)**

SPECIFIC GRAVITY= 2.7

REMARKS: Tested By: GLW

Reviewed By

Lab ID No.: 001450

CLIENT: USCOE

PROJECT: Lake Belt

SAMPLE LOCATION: CB-9 S-53/Depth: 156.0' - 157.5'

PROJ. NO.: 40521-1-8482.15 DATE: 11/22/02

DIRECT SHEAR TEST REPORT
LAW ENGINEERING
AND ENVIRONMENTAL SERVICES, INC.

APPENDIX E

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name CB-2 A
Driller Matt Osterberg
Helper Haven McNiel
Date Installed 09/27/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 87.5 ft.

F. Fine Sand Top N/A ft.

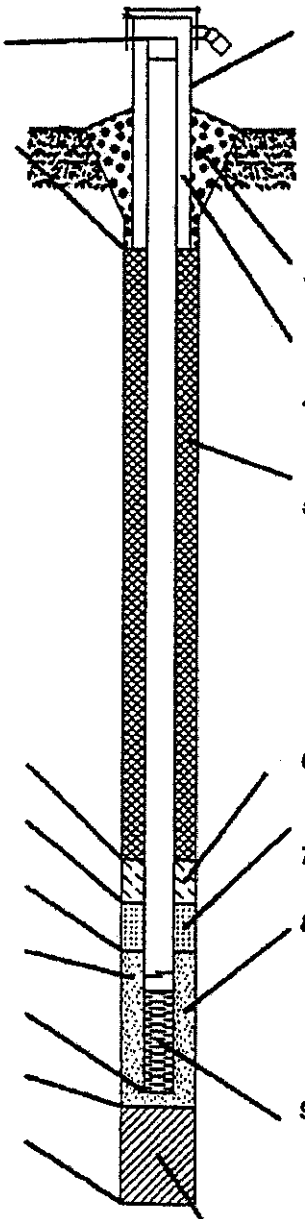
G. Filter Pack Top 91.0 ft.

H. Screen Joint Top 94.0 ft.

I. Well Bottom 114.0 ft.

J. Filter Pack Bottom 114.0 ft.

K. Borehole Bottom 114.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. No in.; b. Length ___ ft.; c. Material: ___ Steel, ___ Other ___; d. Bumper Post ___ qty ___ 3" ___ 4"

3. Surface Seal: ___ Bentonite, X Concrete, ___ Other ___

4. Material between Casing and Protop: ___ Bentonite, ___ Other ___

5. Annular Space Seal: ___ Granular Bentonite, ___ Bentonite Slurry, X Cement-Bentonite Grout, ___ Other ___

How Installed: ___ Gravity, X Tremie Pumped

6. Bentonite Seal: ___ Granules, X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
Type: X Factory Cut, ___ Continuous Slot
Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack) X None, ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name CB-2 B
Driller Matt Osterberg
Helper Haven McNiel
Date Installed 09/26/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 119.0 ft.

F. Fine Sand Top N/A ft.

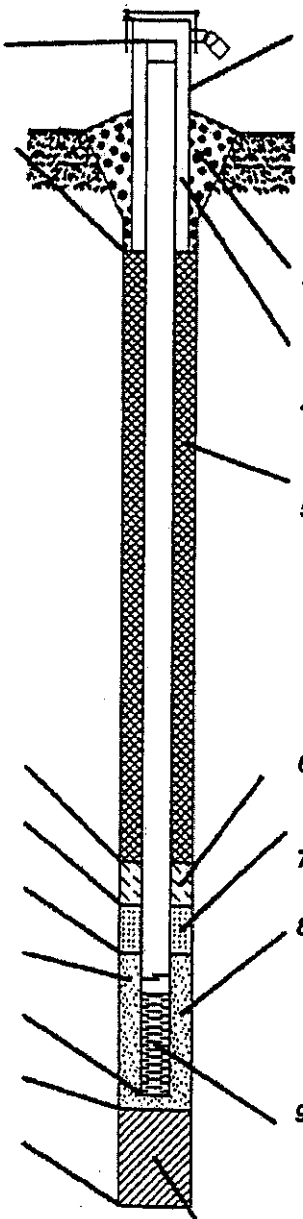
G. Filter Pack Top 123.5 ft.

H. Screen Joint Top 126.0 ft.

I. Well Bottom 146.0 ft.

J. Filter Pack Bottom 146.0 ft.

K. Borehole Bottom 146.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. No in.
- b. Length ___ ft.
- c. Material
  - ___ Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- ___ Other ___

5. Annular Space Seal:
- ___ Granular Bentonite
- ___ Bentonite Slurry
- X Cement-Bentonite Grout
- ___ Other ___

How Installed:
- ___ Gravity
- X Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Beach, FL

Well Name CB-2 C
Driller Matt Osterberg
Helper Haven McNiel
Date Installed 09/25/02

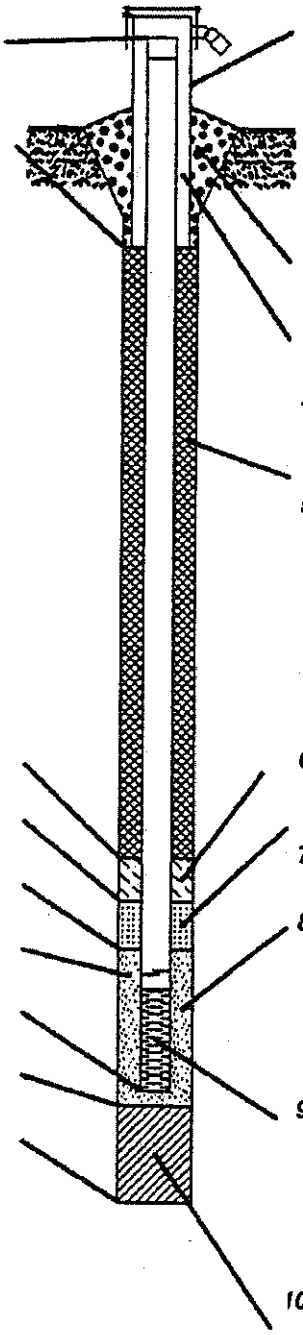
Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___



E. Bentonite Seal Top 163.0 ft.

F. Fine Sand Top N/A ft.

G. Filter Pack Top 167.0 ft.

H. Screen Joint Top 170.0 ft.

I. Well Bottom 190.0 ft.

J. Filter Pack Bottom 190.0 ft.

K. Borehole Bottom 190.0 ft.

1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. No in.
- b. Length ___ ft.
- c. Material
  - ___ Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- ___ Other ___

5. Annular Space Seal:
- ___ Granular Bentonite
- ___ Bentonite Slurry
- X Cement-Bentonite Grout
- ___ Other ___

How Installed:
- ___ Gravity
- X Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name Well 4A
Driller Mike Czech
Helper Jason Gerwing
Date Installed 10/25/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground
2.0 ft.

B. Diameter of Well Casing
4.0 in.

C. Surface Seal Bottom
1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 85.0 ft.

F. Fine Sand Top N/A ft.

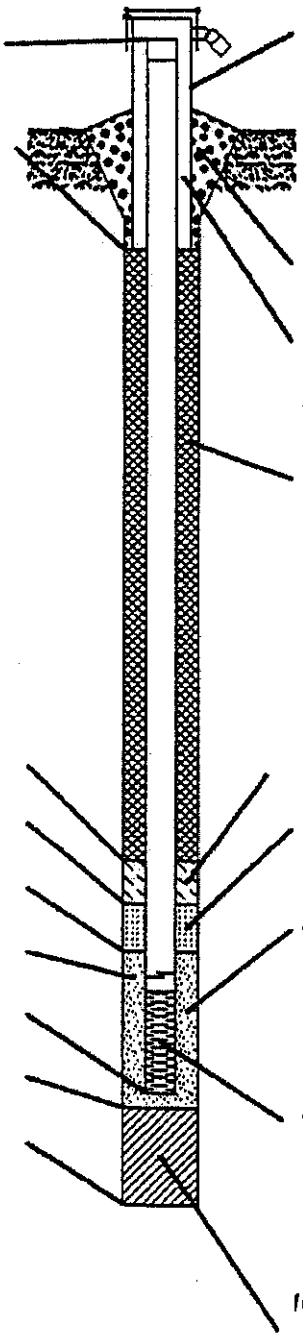
G. Filter Pack Top 95.0 ft.

H. Screen Joint Top 100.0 ft.

I. Well Bottom 120.0 ft.

J. Filter Pack Bottom 120.0 ft.

K. Borehole Bottom 120.0 ft.



1. Locking Cap? ___ Yes X No

2. Protective Cover: a. Inside diam. No in.
b. Length ___ ft.
c. Material
___ Steel
___ Other ___
d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
___ Bentonite
X Concrete
___ Other ___

4. Material between Casing and Protop:
___ Bentonite
___ Other ___

5. Annular Space Seal:
___ Granular Bentonite
___ Bentonite Slurry
X Cement-Bentonite Grout
___ Other ___

How Installed:
___ Gravity
X Tremie Pumped

6. Bentonite Seal:
___ Granules
X Pellets

7. Type of Fine Sand:
N/A

8. Type of Filter Pack:
20-30 Sand

9. Screen Material:
Type: X Factory Cut
___ Continuous Slot
Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
X None
___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name	Law Engineering	**Well Name**	CB-4B
Job Number	3411-2556	**Driller**	Matt Osterberg
Location	Miami Lakes, FL	**Helper**	Haven McNiel
		Date Installed	09/29/02

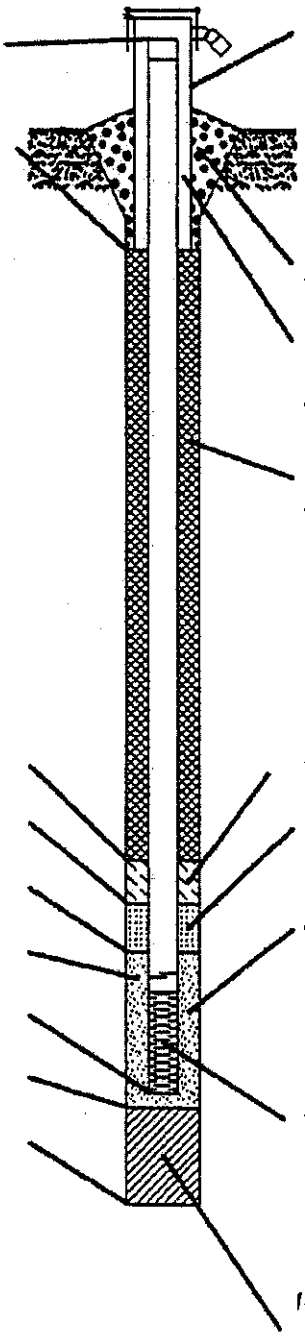
Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___



E. Bentonite Seal Top 118.0 ft.

F. Fine Sand Top N/A ft.

G. Filter Pack Top 122.5 ft.

H. Screen Joint Top 127.0 ft.

I. Well Bottom 157.0 ft.

J. Filter Pack Bottom 157.0 ft.

K. Borehole Bottom 157.0 ft.

1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. No in.; b. Length ___ ft.; c. Material: ___ Steel, ___ Other ___; d. Bumper Post ___ qty ___ 3" ___ 4"

3. Surface Seal: ___ Bentonite, X Concrete, ___ Other ___

4. Material between Casing and Protop: ___ Bentonite, ___ Other ___

5. Annular Space Seal: ___ Granular Bentonite, ___ Bentonite Slurry, X Cement-Bentonite Grout, ___ Other ___

How Installed: ___ Gravity, X Tremie Pumped

6. Bentonite Seal: ___ Granules, X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
Type: X Factory Cut, ___ Continuous Slot
Slot Size: 0.010 in.
Length: 30.0 ft.

10. Backfill Material: (Below filter pack) X None, ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name Well 4C
Driller Mike Czech
Helper Jason Gerwing
Date Installed 10/24/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground
2.0 ft.

B. Diameter of Well Casing
4.0 in.

C. Surface Seal Bottom
1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 145.0 ft.

F. Fine Sand Top N/A ft.

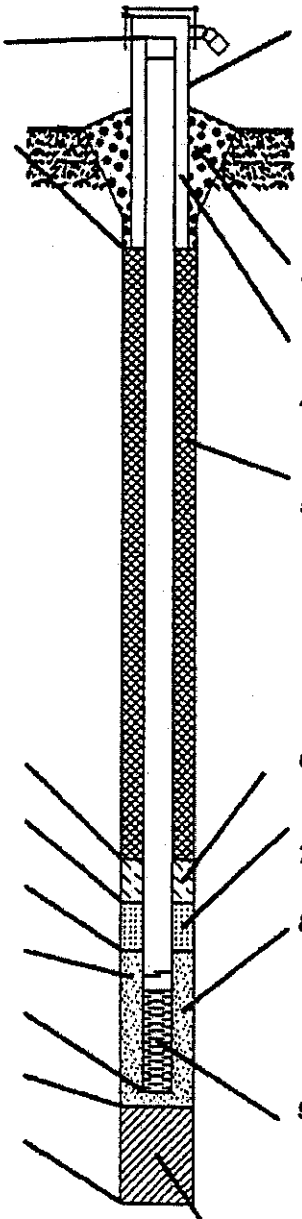
G. Filter Pack Top 155.0 ft.

H. Screen Joint Top 160.0 ft.

I. Well Bottom 220.0 ft.

J. Filter Pack Bottom 220.0 ft.

K. Borehole Bottom 220.0 ft.



1. Locking Cap? ___ Yes X No

2. Protective Cover:
a. Inside diam. No in.
b. Length ___ ft.
c. Material
- ___ Steel
- ___ Other ___

d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- ___ Other ___

5. Annular Space Seal:
- ___ Granular Bentonite
- ___ Bentonite Slurry
- X Cement-Bentonite Grout
- ___ Other ___

How Installed:
- ___ Gravity
- X Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- X Pellets

7. Type of Fine Sand:
N/A

8. Type of Filter Pack:
20-30 Sand

9. Screen Material:
Type: X Factory Cut
___ Continuous Slot
Slot Size: 0.010 in.
Length: 60.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name	Law Engineering	**Well Name**	Well 9A
Job Number	3411-2556	**Driller**	Mike Czech
Location	Miami Lakes, FL	**Helper**	Jason Gerwing
		Date Installed	10/23/02

Type of Well:

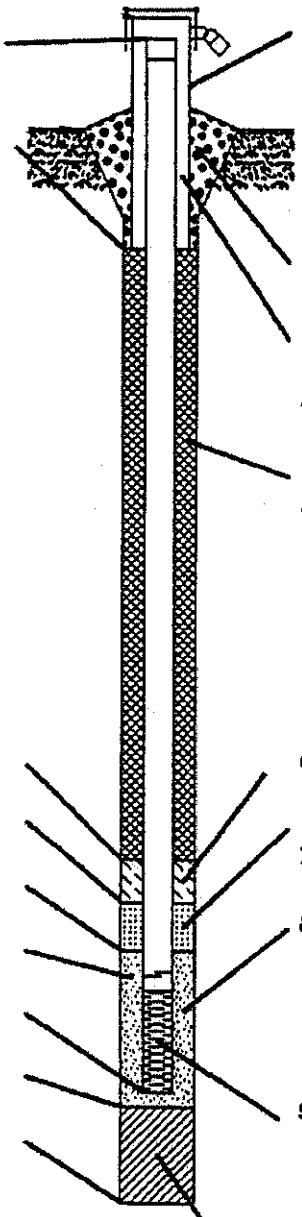
X Water Table Observation
___ Piezometer
___ Other _____

A. Height of Well Casing above ground
2.0 ft.

B. Diameter of Well Casing
4.0 in.

C. Surface Seal Bottom
1.0 ft.

D. Well Casing: Flush Threaded PVC
X Schedule 40
___ Schedule 80
___ Other _____



E. Bentonite Seal Top 90.0 ft.

F. Fine Sand Top N/A ft.

G. Filter Pack Top 100.0 ft.

H. Screen Joint Top 105.0 ft.

I. Well Bottom 120.0 ft.

J. Filter Pack Bottom 120.0 ft.

K. Borehole Bottom 120.0 ft.

1. Locking Cap? ___ Yes X No

2. Protective Cover:
a. Inside diam. No in.
b. Length ___ ft.
c. Material
___ Steel
___ Other _____
d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
___ Bentonite
X Concrete
___ Other _____

4. Material between Casing and Protop:
___ Bentonite
___ Other _____

5. Annular Space Seal:
___ Granular Bentonite
___ Bentonite Slurry
X Cement-Bentonite Grout
___ Other _____

How Installed:
___ Gravity
X Tremie Pumped

6. Bentonite Seal:
___ Granules
X Pellets

7. Type of Fine Sand:
N/A

8. Type of Filter Pack:
20-30 Sand

9. Screen Material:
Type: X Factory Cut
___ Continuous Slot
Slot Size: 0.010 in.
Length: 15.0 ft.

10. Backfill Material: (Below filter pack)
X None
___ Other _____

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name Well 9B
Driller Mike Czech
Helper Jason Gerwing
Date Installed 10/22/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 105.0 ft.

F. Fine Sand Top N/A ft.

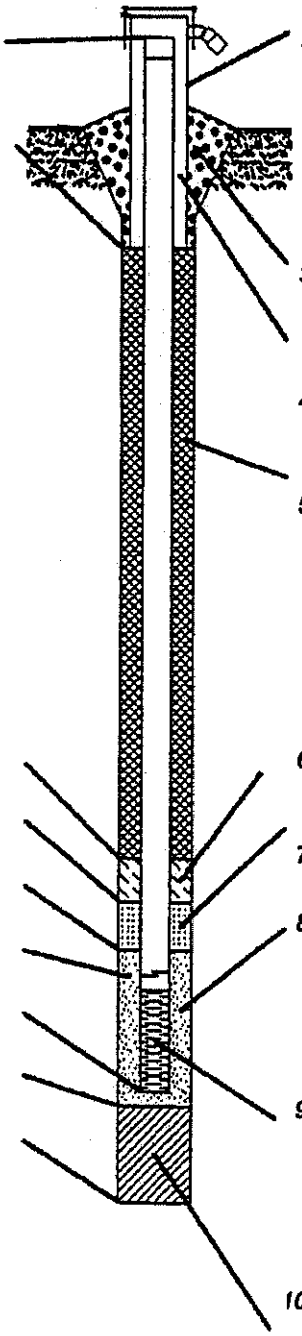
G. Filter Pack Top 115.0 ft.

H. Screen Joint Top 120.0 ft.

I. Well Bottom 145.0 ft.

J. Filter Pack Bottom 145.0 ft.

K. Borehole Bottom 145.0 ft.



1. Locking Cap? ___ Yes X No

2. Protective Cover:
- a. Inside diam. No in.
- b. Length ___ ft.
- c. Material
  - ___ Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- ___ Other ___

5. Annular Space Seal:
- ___ Granular Bentonite
- ___ Bentonite Slurry
- X Cement-Bentonite Grout
- ___ Other ___

How Installed:
- ___ Gravity
- X Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 25.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

BOART LONGYEAR
Well Construction Report

Job Name Law Engineering
Job Number 3411-2556
Location Miami Lakes, FL

Well Name Well 9C
Driller Mike Czech
Helper Jason Gerwing
Date Installed 10/21/02

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 4.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 135.0 ft.

F. Fine Sand Top N/A ft.

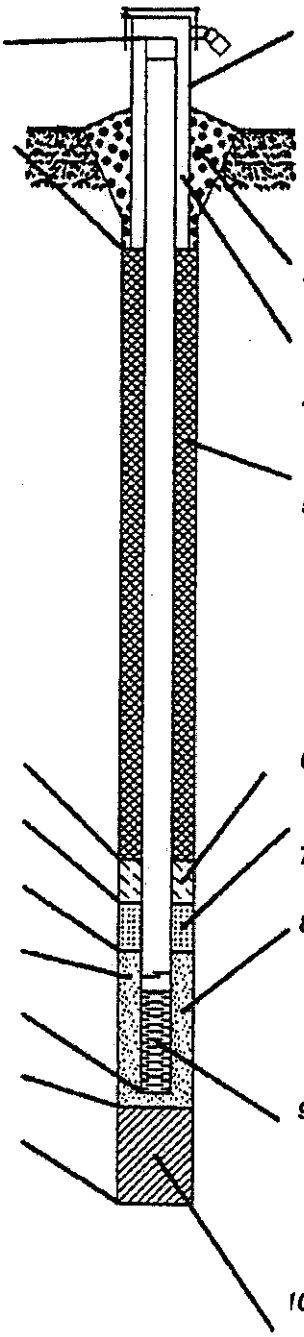
G. Filter Pack Top 145.0 ft.

H. Screen Joint Top 150.0 ft.

I. Well Bottom 190.0 ft.

J. Filter Pack Bottom 190.0 ft.

K. Borehole Bottom 190.0 ft.



1. Locking Cap? ___ Yes X No

2. Protective Cover:
- a. Inside diam. No in.
- b. Length ___ ft.
- c. Material
  - ___ Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- ___ Other ___

5. Annular Space Seal:
- ___ Granular Bentonite
- ___ Bentonite Slurry
- X Cement-Bentonite Grout
- ___ Other ___

How Installed:
- ___ Gravity
- X Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- X Pellets

7. Type of Fine Sand: N/A

8. Type of Filter Pack: 20-30 Sand

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 40.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

Boart Longyear
14950 Iris Road, PO Box 355
Little Falls, MN 56345
Phone (320) 632-6552
Fax (320) 632-2915

Lake Belt In-Ground Reservoir Technology Pilot Project
Well Development Log

Well No.	Purge Volume	Turbidity (NTU)	pH	Temperature (°C)	Conductivity (µS)
CB-2A (94' - 114')	1	147.8	7.88	24.3	396.8
	2	165.1	7.74	24.2	398.1
	3	130.7	7.74	24.2	396.3
CB-2B (126' - 146')	1	68.6	7.96	24.7	488
	2	18.6	7.91	24.8	446.3
	3	12.0	7.91	24.6	436.3
	4	15.4	7.86	24.6	420.2
	5	11.1	7.82	24.8	420.4
CB-2C (170' - 190')	1	86.6	7.36	24.5	515
	2	36.6	7.77	24.5	498
	3	58.1	7.93	24.6	490
	4	40.2	7.95	24.7	494
	5	33.1	7.90	24.7	528
CB-4A (100' - 120')	1	223.4	7.55	28.1	484.0
	2	167.0	7.54	27.2	383.4
	3	120.3	7.58	26.2	353.3
	4	5.6	7.63	26.9	367.5
CB-4B (127' - 157')	1	43.0	7.69	25.1	363.2
	2	9.8	7.75	25.3	361.5
	3	6.0	7.75	25.2	360.4
	4	5.0	7.63	25.2	334.9
	5	4.8	7.63	25.2	333.0
CB-4C (160' - 220')	1	209.0	7.54	25.5	444.0
	2	167.8	7.44	24.7	431.8
	3	166.2	7.66	24.8	427.2
	4	165.8	7.75	24.6	433.3
	5	164.8	7.63	24.7	436.3
CB-9A (105' - 120')	1	38.0	7.60	24.4	318.0
	2	14.1	7.94	24.0	300.0
	3	7.0	7.73	24.1	287.2
	4	5.4	7.57	24.1	283.2
	5	3.8	7.70	24.1	285.4
CB-9B (120' - 145')	1	37.3	7.73	24.8	346.3
	2	20.3	7.72	24.6	338.2
	3	70.6	7.77	24.9	327.6
	4	28.2	7.70	25.2	330.9
	5	14.5	7.69	24.9	323.1
CB-9C (150' - 190')	1	4.7	7.86	25.0	366.6
	2	3.2	7.83	24.9	351.3
	3	3.5	7.77	25.2	340.0
	4	3.3	7.89	25.1	334.0
	5	4.3	7.77	25.3	330.2

APPENDIX F

Lake Belt In-Ground Reservoir Pilot Project
Short Duration Pump Test Log

Pump Test No.	Duration (minutes)	Temperature (°C)	Conductivity (µS)	pH	Turbidity (NTU)
CB-2A (94' - 114')	0	25.0	450.8	7.58	6.2
	15	24.7	430.9	7.63	6.3
	30	24.5	425.1	7.77	24.4
	45	24.6	409.0	7.87	163.7
	60	24.6	396.0	7.71	118.9
	75	24.8	391.0	7.72	73.4
	90	25.5	412.0	7.71	61.6
	105	25.5	397.0	7.71	47.2
	120	25.6	396.0	7.77	58.8
CB-4B (127' - 157')	5.48	25.1	540.0	7.47	77.7
	11.15	24.7	418.1	7.55	26.0
	16.9	25.4	381.8	7.54	11.7
	22.65	24.4	368.2	7.55	6.8
	28.40	24.5	367.0	7.54	5.6
	34.15	24.4	359.0	7.51	4.6
	39.90	24.4	356.4	7.51	4.2
	45.65	24.3	352.8	7.51	3.5
	51.40	24.4	351.3	7.52	3.4
	57.15	24.3	349.2	7.52	3.1
	62.90	24.5	349.0	7.58	3.1
CB-9C (150' - 190')	6.58	24.6	379.1	7.60	13.4
	13.167	24.3	347.9	7.63	7.6
	19.75	24.3	337.2	7.63	6.1
	26.42	24.4	330.3	7.63	4.9
	33.08	24.3	315.7	7.63	4.5
	39.75	24.3	316.2	7.63.	4.9
	46.42	24.3	309.9	7.63	4.2
	53.09	24.3	306.8	7.63	4.3
	59.75	24.3	308.0	7.63	3.3
	66.42	24.2	303.5	7.62	3.2
	73.09	24.4	301.5	7.60	2.8
	79.75	24.2	300.0	7.60	2.4
	86.42	24.4	299.8	7.60	2.7
	93.09	24.4	298.2	7.60	2.5
	99.75	24.5	298.2	7.60	1.8
	106.42	24.5	296.3	7.60	1.9
	113.09	24.7	295.7	7.60	1.7
	119.75	24.5	294.4	7.60	2.1

Lake Belt In-Ground Reservoir Technology Pilot Project
Pump Test Water Quality Test Report

Well No.: CB2 (94' - 114')

		Units
Chloride	36	mg/L
Color	10	CU
Sulfate	17	mg/L
Total Dispersed Solids	410	mg/L
Total Suspended Solids	80	mg/L

Well No.: CB4 (127' - 157')

		Units
Chloride	72	mg/L
Color	10	CU
Sulfate	12	mg/L
Total Dispersed Solids	370	mg/L
Total Suspended Solids	4.0	mg/L

Well No.: CB9 (150' - 190')

		Units
Chloride	22	mg/L
Color	10	CU
Sulfate	10	mg/L
Total Dispersed Solids	320	mg/L
Total Suspended Solids	2.0	mg/L

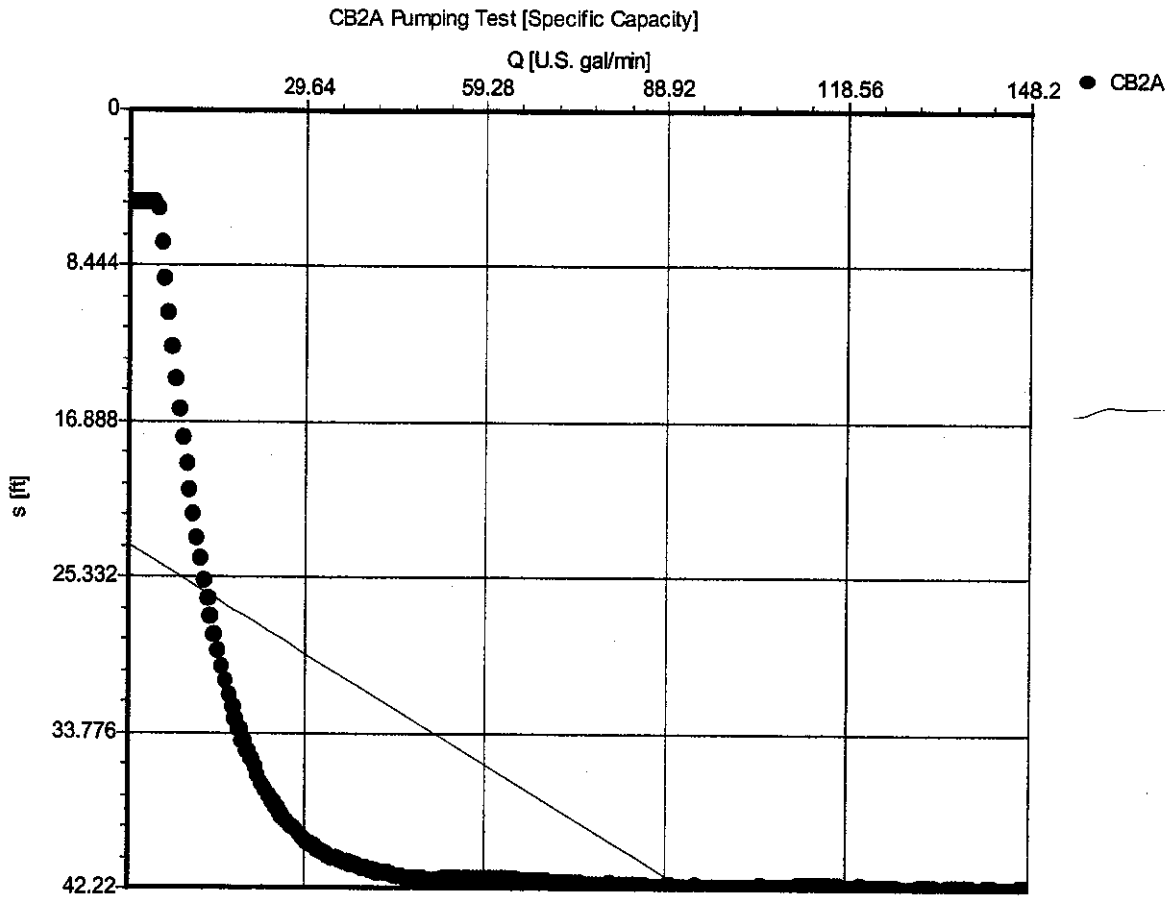
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: LakeBelt Well CB2A

Number: 40521-2-8482.15

Client: ACOE



Pumping Test: **CB2A**

Analysis Method: **Specific Capacity**

Analysis Results: Spec. Capacity: 6.65E-1 [ft²/min]

Test parameters:

Pumping Well:	CB2A	Aquifer Thickness:	109.4 [ft]
Casing radius:	0.167 [ft]		
Screen length:	20 [ft]		
Boring radius:	0.67 [ft]		
Discharge Rate:	1.2 [U.S. gal/min]		

Comments:

Evaluated by: LAW

Evaluation Date: 1/10/2003

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460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Data Report

Project: LakeBelt Well CB2A

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
1	0	5.00	0.00
2	0.5	4.99	-0.01
3	1	4.99	-0.01
4	1.5	5.00	0.00
5	2	5.38	0.38
6	2.5	7.16	2.16
7	3	9.15	4.15
8	3.5	11.07	6.07
9	4	12.88	7.88
10	4.5	14.60	9.60
11	5	16.23	11.23
12	5.5	17.78	12.78
13	6	19.24	14.24
14	6.5	20.64	15.64
15	7	21.96	16.96
16	7.5	23.21	18.21
17	8	24.38	19.38
18	8.5	25.49	20.49
19	9	26.55	21.55
20	9.5	27.54	22.54
21	10	28.47	23.47
22	10.5	29.36	24.36
23	11	30.19	25.19
24	11.5	30.98	25.98
25	12	31.71	26.71
26	12.5	32.40	27.40
27	13	33.05	28.05
28	13.5	33.65	28.65
29	14	34.22	29.22
30	14.5	34.76	29.76
31	15	35.26	30.26

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460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Data Report

Project: LakeBelt Well CB2A

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
32	15.5	35.72	30.72
33	16	36.14	31.14
34	16.5	36.54	31.54
35	17	36.90	31.90
36	17.5	37.24	32.24
37	18	37.55	32.55
38	18.5	37.85	32.85
39	19	38.13	33.13
40	19.5	38.38	33.38
41	20	38.62	33.62
42	20.5	38.80	33.80
43	21	38.98	33.98
44	21.5	39.15	34.15
45	22	39.33	34.33
46	22.5	39.50	34.50
47	23	39.68	34.68
48	23.5	39.83	34.83
49	24	39.97	34.97
50	24.5	40.11	35.11
51	25	40.23	35.23
52	25.5	40.34	35.34
53	26	40.44	35.44
54	26.5	40.54	35.54
55	27	40.63	35.63
56	27.5	40.70	35.70
57	28	40.77	35.77
58	28.5	40.82	35.82
59	29	40.87	35.87
60	29.5	40.92	35.92
61	30	41.01	36.01
62	30.5	41.09	36.09

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Pumping Test Data Report

Project: LakeBelt Well CB2A

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
63	31	41.16	36.16
64	31.5	41.22	36.22
65	32	41.26	36.26
66	32.5	41.30	36.30
67	33	41.33	36.33
68	33.5	41.35	36.35
69	34	41.35	36.35
70	34.5	41.45	36.45
71	35	41.52	36.52
72	35.5	41.56	36.56
73	36	41.61	36.61
74	36.5	41.64	36.64
75	37	41.65	36.65
76	37.5	41.66	36.66
77	38	41.66	36.66
78	38.5	41.68	36.68
79	39	41.71	36.71
80	39.5	41.74	36.74
81	40	41.75	36.75
82	40.5	41.77	36.77
83	41	41.74	36.74
84	41.5	41.72	36.72
85	42	41.70	36.70
86	42.5	41.68	36.68
87	43	41.71	36.71
88	43.5	41.71	36.71
89	44	41.72	36.72
90	44.5	41.72	36.72
91	45	41.71	36.71
92	45.5	41.69	36.69
93	46	41.68	36.68

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460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Data Report
Project: LakeBelt Well CB2A
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
94	46.5	41.67	36.67
95	47	41.65	36.65
96	47.5	41.70	36.70
97	48	41.72	36.72
98	48.5	41.71	36.71
99	49	41.71	36.71
100	49.5	41.71	36.71
101	50	41.71	36.71
102	50.5	41.70	36.70
103	51	41.69	36.69
104	51.5	41.69	36.69
105	52	41.73	36.73
106	52.5	41.73	36.73
107	53	41.74	36.74
108	53.5	41.76	36.76
109	54	41.76	36.76
110	54.5	41.77	36.77
111	55	41.79	36.79
112	55.5	41.79	36.79
113	56	41.81	36.81
114	56.5	41.85	36.85
115	57	41.89	36.89
116	57.5	41.90	36.90
117	58	41.92	36.92
118	58.5	41.93	36.93
119	59	41.92	36.92
120	59.5	41.91	36.91
121	60	41.93	36.93
122	60.5	41.94	36.94
123	61	41.97	36.97
124	61.5	41.99	36.99

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460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Data Report
Project: LakeBelt Well CB2A
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
125	62	41.99	36.99
126	62.5	41.99	36.99
127	63	41.97	36.97
128	63.5	41.96	36.96
129	64	41.97	36.97
130	64.5	41.94	36.94
131	65	41.97	36.97
132	65.5	41.99	36.99
133	66	42.00	37.00
134	66.5	42.01	37.01
135	67	42.01	37.01
136	67.5	42.01	37.01
137	68	41.99	36.99
138	68.5	42.00	37.00
139	69	42.03	37.03
140	69.5	42.05	37.05
141	70	42.07	37.07
142	70.5	42.09	37.09
143	71	42.08	37.08
144	71.5	42.08	37.08
145	72	42.06	37.06
146	72.5	42.03	37.03
147	73	42.05	37.05
148	73.5	42.06	37.06
149	74	42.08	37.08
150	74.5	42.09	37.09
151	75	42.09	37.09
152	75.5	42.09	37.09
153	76	42.08	37.08
154	76.5	42.05	37.05
155	77	42.07	37.07

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Waterloo, Ontario, Canada
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Pumping Test Data Report
Project: LakeBelt Well CB2A
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
156	77.5	42.07	37.07
157	78	42.07	37.07
158	78.5	42.08	37.08
159	79	42.09	37.09
160	79.5	42.09	37.09
161	80	42.08	37.08
162	80.5	42.07	37.07
163	81	42.06	37.06
164	81.5	42.06	37.06
165	82	42.09	37.09
166	82.5	42.14	37.14
167	83	42.12	37.12
168	83.5	42.11	37.11
169	84	42.11	37.11
170	84.5	42.10	37.10
171	85	42.08	37.08
172	85.5	42.05	37.05
173	86	42.09	37.09
174	86.5	42.11	37.11
175	87	42.13	37.13
176	87.5	42.13	37.13
177	88	42.14	37.14
178	88.5	42.13	37.13
179	89	42.12	37.12
180	89.5	42.08	37.08
181	90	42.06	37.06
182	90.5	42.05	37.05
183	91	42.05	37.05
184	91.5	42.02	37.02
185	92	42.02	37.02
186	92.5	42.00	37.00

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Pumping Test Data Report

Project: LakeBelt Well CB2A

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
187	93	41.99	36.99
188	93.5	41.99	36.99
189	94	41.99	36.99
190	94.5	41.97	36.97
191	95	41.99	36.99
192	95.5	42.03	37.03
193	96	42.05	37.05
194	96.5	42.07	37.07
195	97	42.08	37.08
196	97.5	42.08	37.08
197	98	42.08	37.08
198	98.5	42.07	37.07
199	99	42.05	37.05
200	99.5	42.07	37.07
201	100	42.09	37.09
202	100.5	42.12	37.12
203	101	42.13	37.13
204	101.5	42.14	37.14
205	102	42.14	37.14
206	102.5	42.13	37.13
207	103	42.11	37.11
208	103.5	42.11	37.11
209	104	42.15	37.15
210	104.5	42.17	37.17
211	105	42.18	37.18
212	105.5	42.18	37.18
213	106	42.18	37.18
214	106.5	42.18	37.18
215	107	42.15	37.15
216	107.5	42.10	37.10
217	108	42.08	37.08

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Pumping Test Data Report
Project: LakeBelt Well CB2A
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB2A**	**Pumping Test:**	**CB2A**
Distance from PW:	0 [ft]	Pumping Well:	CB2A
Depth to Static WL:	5 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	20 [ft]
Date:	10/25/2002	Aquifer Thickness:	109.4 [ft]

	Time [min]	Depth to WL [ft]	Drawdown [ft]
218	108.5	42.12	37.12
219	109	42.15	37.15
220	109.5	42.17	37.17
221	110	42.18	37.18
222	110.5	42.17	37.17
223	111	42.15	37.15
224	111.5	42.13	37.13
225	112	42.10	37.10
226	112.5	42.09	37.09
227	113	42.12	37.12
228	113.5	42.14	37.14
229	114	42.16	37.16
230	114.5	42.17	37.17
231	115	42.18	37.18
232	115.5	42.17	37.17
233	116	42.16	37.16
234	116.5	42.13	37.13
235	117	42.16	37.16
236	117.5	42.18	37.18
237	118	42.20	37.20
238	118.5	42.22	37.22
239	119	42.21	37.21
240	119.5	42.21	37.21
241	120	42.20	37.20
242	120.5	42.16	37.16
243	121	42.13	37.13
244	121.5	42.09	37.09
245	122	42.13	37.13
246	122.5	42.15	37.15
247	123	42.17	37.17
248	123.5	42.15	37.15

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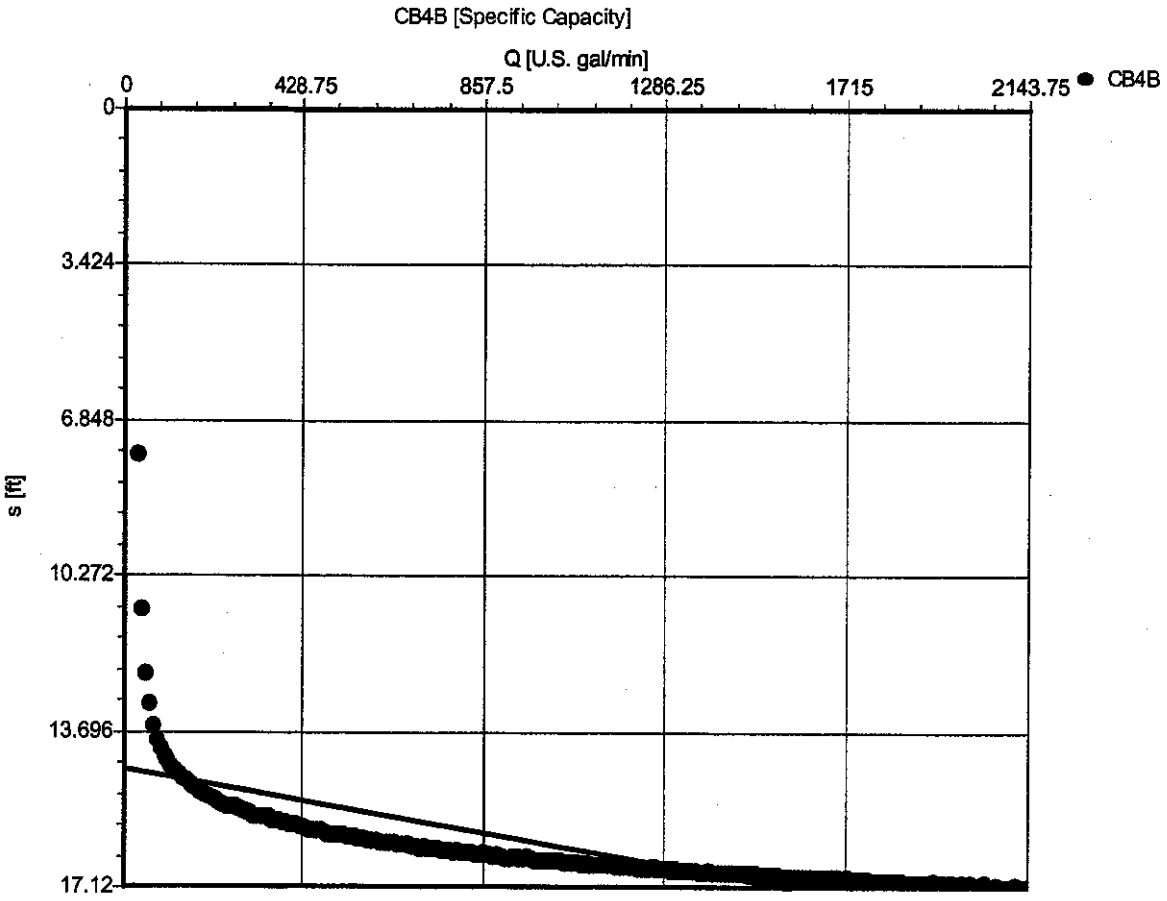
Pumping Test Analysis Report

Project: LakeBelt Well CB4B

Number: 40521-2-8482.15

Client: ACOE



Pumping Test: **CB4B**

Analysis Method: **Specific Capacity**

Analysis Results: Spec. Capacity: 8.15E+1 [ft²/min]

Test parameters:

Pumping Well:	CB4B	Aquifer Thickness:	152.69 [ft]
Casing radius:	0.167 [ft]		
Screen length:	30 [ft]		
Boring radius:	0.67 [ft]		
Discharge Rate:	17.5 [U.S. gal/min]		

Comments:

Evaluated by: LAW

Evaluation Date: 1/10/2003

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Pumping Test Data Report

Project: LakeBelt Well CB4B

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
1	0	4.91	0.00
2	8.75	4.90	-0.01
3	17.5	4.90	-0.01
4	26.25	4.89	-0.02
5	35	12.54	7.63
6	43.75	15.92	11.01
7	52.5	17.33	12.42
8	61.25	17.99	13.08
9	70	18.48	13.57
10	78.75	18.78	13.87
11	87.5	18.96	14.05
12	96.25	19.14	14.23
13	105	19.26	14.35
14	113.75	19.37	14.46
15	122.5	19.47	14.56
16	131.25	19.55	14.64
17	140	19.64	14.73
18	148.75	19.69	14.78
19	157.5	19.77	14.86
20	166.25	19.82	14.91
21	175	19.88	14.97
22	183.75	19.95	15.04
23	192.5	20.00	15.09
24	201.25	20.03	15.12
25	210	20.07	15.16
26	218.75	20.14	15.23
27	227.5	20.15	15.24
28	236.25	20.21	15.30
29	245	20.24	15.33
30	253.75	20.26	15.35
31	262.5	20.27	15.36

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Pumping Test Data Report
Project: LakeBelt Well CB4B
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
32	271.25	20.32	15.41
33	280	20.36	15.45
34	288.75	20.41	15.50
35	297.5	20.41	15.50
36	306.25	20.46	15.55
37	315	20.46	15.55
38	323.75	20.47	15.56
39	332.5	20.48	15.57
40	341.25	20.49	15.58
41	350	20.55	15.64
42	358.75	20.58	15.67
43	367.5	20.56	15.65
44	376.25	20.62	15.71
45	385	20.61	15.70
46	393.75	20.65	15.74
47	402.5	20.68	15.77
48	411.25	20.68	15.77
49	420	20.72	15.81
50	428.75	20.72	15.81
51	437.5	20.75	15.84
52	446.25	20.78	15.87
53	455	20.78	15.87
54	463.75	20.77	15.86
55	472.5	20.81	15.90
56	481.25	20.83	15.92
57	490	20.86	15.95
58	498.75	20.86	15.95
59	507.5	20.89	15.98
60	516.25	20.88	15.97
61	525	20.89	15.98
62	533.75	20.91	16.00

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Pumping Test Data Report
Project: LakeBelt Well CB4B
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
63	542.5	20.94	16.03
64	551.25	20.94	16.03
65	560	20.98	16.07
66	568.75	20.97	16.06
67	577.5	20.99	16.08
68	586.25	21.01	16.10
69	595	21.01	16.10
70	603.75	21.03	16.12
71	612.5	21.04	16.13
72	621.25	21.07	16.16
73	630	21.05	16.14
74	638.75	21.07	16.16
75	647.5	21.07	16.16
76	656.25	21.08	16.17
77	665	21.10	16.19
78	673.75	21.11	16.20
79	682.5	21.11	16.20
80	691.25	21.15	16.24
81	700	21.13	16.22
82	708.75	21.17	16.26
83	717.5	21.16	16.25
84	726.25	21.19	16.28
85	735	21.20	16.29
86	743.75	21.21	16.30
87	752.5	21.19	16.28
88	761.25	21.23	16.32
89	770	21.23	16.32
90	778.75	21.25	16.34
91	787.5	21.26	16.35
92	796.25	21.25	16.34
93	805	21.28	16.37

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Pumping Test Data Report

Project: LakeBelt Well CB4B

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
94	813.75	21.27	16.36
95	822.5	21.26	16.35
96	831.25	21.30	16.39
97	840	21.33	16.42
98	848.75	21.33	16.42
99	857.5	21.29	16.38
100	866.25	21.32	16.41
101	875	21.31	16.40
102	883.75	21.36	16.45
103	892.5	21.34	16.43
104	901.25	21.37	16.46
105	910	21.39	16.48
106	918.75	21.40	16.49
107	927.5	21.37	16.46
108	936.25	21.38	16.47
109	945	21.39	16.48
110	953.75	21.42	16.51
111	962.5	21.38	16.47
112	971.25	21.42	16.51
113	980	21.44	16.53
114	988.75	21.45	16.54
115	997.5	21.46	16.55
116	1006.25	21.47	16.56
117	1015	21.46	16.55
118	1023.75	21.46	16.55
119	1032.5	21.47	16.56
120	1041.25	21.47	16.56
121	1050	21.49	16.58
122	1058.75	21.49	16.58
123	1067.5	21.48	16.57
124	1076.25	21.49	16.58

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Pumping Test Data Report
Project: LakeBelt Well CB4B
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
125	1085	21.52	16.61
126	1093.75	21.54	16.63
127	1102.5	21.50	16.59
128	1111.25	21.53	16.62
129	1120	21.55	16.64
130	1128.75	21.55	16.64
131	1137.5	21.53	16.62
132	1146.25	21.56	16.65
133	1155	21.54	16.63
134	1163.75	21.56	16.65
135	1172.5	21.58	16.67
136	1181.25	21.57	16.66
137	1190	21.60	16.69
138	1198.75	21.59	16.68
139	1207.5	21.59	16.68
140	1216.25	21.60	16.69
141	1225	21.61	16.70
142	1233.75	21.62	16.71
143	1242.5	21.63	16.72
144	1251.25	21.62	16.71
145	1260	21.60	16.69
146	1268.75	21.63	16.72
147	1277.5	21.63	16.72
148	1286.25	21.63	16.72
149	1295	21.64	16.73
150	1303.75	21.66	16.75
151	1312.5	21.65	16.74
152	1321.25	21.68	16.77
153	1330	21.66	16.75
154	1338.75	21.66	16.75
155	1347.5	21.67	16.76

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Pumping Test Data Report

Project: LakeBelt Well CB4B

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
156	1356.25	21.68	16.77
157	1365	21.68	16.77
158	1373.75	21.71	16.80
159	1382.5	21.72	16.81
160	1391.25	21.69	16.78
161	1400	21.67	16.76
162	1408.75	21.70	16.79
163	1417.5	21.70	16.79
164	1426.25	21.71	16.80
165	1435	21.72	16.81
166	1443.75	21.73	16.82
167	1452.5	21.73	16.82
168	1461.25	21.73	16.82
169	1470	21.74	16.83
170	1478.75	21.74	16.83
171	1487.5	21.76	16.85
172	1496.25	21.74	16.83
173	1505	21.73	16.82
174	1513.75	21.76	16.85
175	1522.5	21.76	16.85
176	1531.25	21.79	16.88
177	1540	21.77	16.86
178	1548.75	21.76	16.85
179	1557.5	21.78	16.87
180	1566.25	21.79	16.88
181	1575	21.79	16.88
182	1583.75	21.80	16.89
183	1592.5	21.82	16.91
184	1601.25	21.82	16.91
185	1610	21.82	16.91
186	1618.75	21.81	16.90

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Pumping Test Data Report
Project: LakeBelt Well CB4B
Number: 40521-2-8482.15
Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0 [ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
187	1627.5	21.81	16.90
188	1636.25	21.81	16.90
189	1645	21.84	16.93
190	1653.75	21.82	16.91
191	1662.5	21.84	16.93
192	1671.25	21.82	16.91
193	1680	21.84	16.93
194	1688.75	21.83	16.92
195	1697.5	21.83	16.92
196	1706.25	21.84	16.93
197	1715	21.85	16.94
198	1723.75	21.83	16.92
199	1732.5	21.85	16.94
200	1741.25	21.86	16.95
201	1750	21.85	16.94
202	1758.75	21.86	16.95
203	1767.5	21.86	16.95
204	1776.25	21.89	16.98
205	1785	21.89	16.98
206	1793.75	21.90	16.99
207	1802.5	21.91	17.00
208	1811.25	21.93	17.02
209	1820	21.89	16.98
210	1828.75	21.90	16.99
211	1837.5	21.89	16.98
212	1846.25	21.91	17.00
213	1855	21.92	17.01
214	1863.75	21.92	17.01
215	1872.5	21.92	17.01
216	1881.25	21.93	17.02
217	1890	21.94	17.03

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Pumping Test Data Report

Project: LakeBelt Well CB4B

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB4B**	**Pumping Test:**	**CB4B**
Distance from PW:	0.[ft]	Pumping Well:	CB4B
Depth to Static WL:	4.91 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	30 [ft]
Date:	1/10/2003	Aquifer Thickness:	152.69 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
218	1898.75	21.94	17.03
219	1907.5	21.94	17.03
220	1916.25	21.94	17.03
221	1925	21.91	17.00
222	1933.75	21.96	17.05
223	1942.5	21.94	17.03
224	1951.25	21.94	17.03
225	1960	21.96	17.05
226	1968.75	21.96	17.05
227	1977.5	21.98	17.07
228	1986.25	21.97	17.06
229	1995	21.96	17.05
230	2003.75	21.98	17.07
231	2012.5	21.95	17.04
232	2021.25	21.99	17.08
233	2030	21.99	17.08
234	2038.75	21.99	17.08
235	2047.5	21.96	17.05
236	2056.25	22.01	17.10
237	2065	22.01	17.10
238	2073.75	21.99	17.08
239	2082.5	22.01	17.10
240	2091.25	22.01	17.10
241	2100	22.03	17.12
242	2108.75	22.01	17.10
243	2117.5	22.00	17.09
244	2126.25	22.02	17.11
245	2135	22.02	17.11
246	2143.75	22.03	17.12

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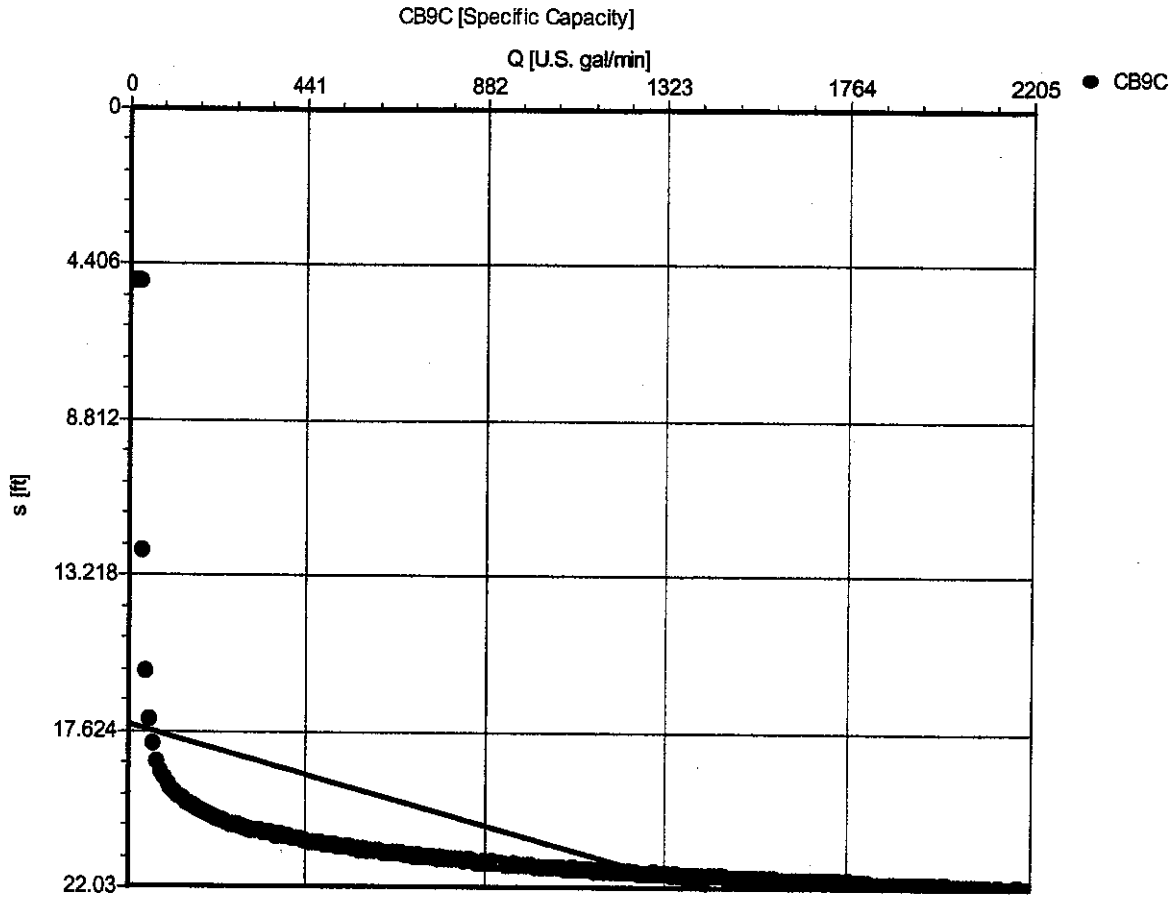
Pumping Test Analysis Report

Project: LakeBelt Well CB9C

Number: 40521-2-8482.15

Client: ACOE



Pumping Test: **CB9C**

Analysis Method: **Specific Capacity**

Analysis Results: Spec. Capacity: 4.15E+1 [ft²/min]

Test parameters:

Pumping Well:	CB9C	Aquifer Thickness:	186.57 [ft]
Casing radius:	0.167 [ft]		
Screen length:	40 [ft]		
Boring radius:	0.67 [ft]		
Discharge Rate:	18 [U.S. gal/min]		

Comments:

Evaluated by: LAW

Evaluation Date: 1/11/2003

Waterloo Hydrogeologic, Inc.
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Waterloo, Ontario, Canada
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Pumping Test Data Report

Project: LakeBelt Well CB9C

Number: 40521-2-8482.15

Client: ACOE

Data observed at:	**CB9C**	**Pumping Test:**	**CB9C**
Distance from PW:	0 [ft]	Pumping Well:	CB9C
Depth to Static WL:	0 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
1	0	4.91	4.91
2	9	4.90	4.90
3	18	4.90	4.90
4	27	4.89	4.89
5	36	12.54	12.54
6	45	15.92	15.92
7	54	17.33	17.33
8	63	17.99	17.99
9	72	18.48	18.48
10	81	18.78	18.78
11	90	18.96	18.96
12	99	19.14	19.14
13	108	19.26	19.26
14	117	19.37	19.37
15	126	19.47	19.47
16	135	19.55	19.55
17	144	19.64	19.64
18	153	19.69	19.69
19	162	19.77	19.77
20	171	19.82	19.82
21	180	19.88	19.88
22	189	19.95	19.95
23	198	20.00	20.00
24	207	20.03	20.03
25	216	20.07	20.07
26	225	20.14	20.14
27	234	20.15	20.15
28	243	20.21	20.21
29	252	20.24	20.24
30	261	20.26	20.26
31	270	20.27	20.27

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Client: ACOE

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Depth to Static WL:	0 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
32	279	20.32	20.32
33	288	20.36	20.36
34	297	20.41	20.41
35	306	20.41	20.41
36	315	20.46	20.46
37	324	20.46	20.46
38	333	20.47	20.47
39	342	20.48	20.48
40	351	20.49	20.49
41	360	20.55	20.55
42	369	20.58	20.58
43	378	20.56	20.56
44	387	20.62	20.62
45	396	20.61	20.61
46	405	20.65	20.65
47	414	20.68	20.68
48	423	20.68	20.68
49	432	20.72	20.72
50	441	20.72	20.72
51	450	20.75	20.75
52	459	20.78	20.78
53	468	20.78	20.78
54	477	20.77	20.77
55	486	20.81	20.81
56	495	20.83	20.83
57	504	20.86	20.86
58	513	20.86	20.86
59	522	20.89	20.89
60	531	20.88	20.88
61	540	20.89	20.89
62	549	20.91	20.91

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Depth to Static WL:	0 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
63	558	20.94	20.94
64	567	20.94	20.94
65	576	20.98	20.98
66	585	20.97	20.97
67	594	20.99	20.99
68	603	21.01	21.01
69	612	21.01	21.01
70	621	21.03	21.03
71	630	21.04	21.04
72	639	21.07	21.07
73	648	21.05	21.05
74	657	21.07	21.07
75	666	21.07	21.07
76	675	21.08	21.08
77	684	21.10	21.10
78	693	21.11	21.11
79	702	21.11	21.11
80	711	21.15	21.15
81	720	21.13	21.13
82	729	21.17	21.17
83	738	21.16	21.16
84	747	21.19	21.19
85	756	21.20	21.20
86	765	21.21	21.21
87	774	21.19	21.19
88	783	21.23	21.23
89	792	21.23	21.23
90	801	21.25	21.25
91	810	21.26	21.26
92	819	21.25	21.25
93	828	21.28	21.28

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Client: ACOE

Data observed at:	**CB9C**	**Pumping Test:**	**CB9C**
Distance from PW:	0 [ft]	Pumping Well:	CB9C
Depth to Static WL:	0 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
94	837	21.27	21.27
95	846	21.26	21.26
96	855	21.30	21.30
97	864	21.33	21.33
98	873	21.33	21.33
99	882	21.29	21.29
100	891	21.32	21.32
101	900	21.31	21.31
102	909	21.36	21.36
103	918	21.34	21.34
104	927	21.37	21.37
105	936	21.39	21.39
106	945	21.40	21.40
107	954	21.37	21.37
108	963	21.38	21.38
109	972	21.39	21.39
110	981	21.42	21.42
111	990	21.38	21.38
112	999	21.42	21.42
113	1008	21.44	21.44
114	1017	21.45	21.45
115	1026	21.46	21.46
116	1035	21.47	21.47
117	1044	21.46	21.46
118	1053	21.46	21.46
119	1062	21.47	21.47
120	1071	21.47	21.47
121	1080	21.49	21.49
122	1089	21.49	21.49
123	1098	21.48	21.48
124	1107	21.49	21.49

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Client: ACOE

Data observed at:	**CB9C**	**Pumping Test:**	**CB9C**
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Depth to Static WL:	0 [ft]	Casing radius:	0.167 [ft]
Location:	Miami, Dade County, Florida	Boring radius:	0.67 [ft]
Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
125	1116	21.52	21.52
126	1125	21.54	21.54
127	1134	21.50	21.50
128	1143	21.53	21.53
129	1152	21.55	21.55
130	1161	21.55	21.55
131	1170	21.53	21.53
132	1179	21.56	21.56
133	1188	21.54	21.54
134	1197	21.56	21.56
135	1206	21.58	21.58
136	1215	21.57	21.57
137	1224	21.60	21.60
138	1233	21.59	21.59
139	1242	21.59	21.59
140	1251	21.60	21.60
141	1260	21.61	21.61
142	1269	21.62	21.62
143	1278	21.63	21.63
144	1287	21.62	21.62
145	1296	21.60	21.60
146	1305	21.63	21.63
147	1314	21.63	21.63
148	1323	21.63	21.63
149	1332	21.64	21.64
150	1341	21.66	21.66
151	1350	21.65	21.65
152	1359	21.68	21.68
153	1368	21.66	21.66
154	1377	21.66	21.66
155	1386	21.67	21.67

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Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
156	1395	21.68	21.68
157	1404	21.68	21.68
158	1413	21.71	21.71
159	1422	21.72	21.72
160	1431	21.69	21.69
161	1440	21.67	21.67
162	1449	21.70	21.70
163	1458	21.70	21.70
164	1467	21.71	21.71
165	1476	21.72	21.72
166	1485	21.73	21.73
167	1494	21.73	21.73
168	1503	21.73	21.73
169	1512	21.74	21.74
170	1521	21.74	21.74
171	1530	21.76	21.76
172	1539	21.74	21.74
173	1548	21.73	21.73
174	1557	21.76	21.76
175	1566	21.76	21.76
176	1575	21.79	21.79
177	1584	21.77	21.77
178	1593	21.76	21.76
179	1602	21.78	21.78
180	1611	21.79	21.79
181	1620	21.79	21.79
182	1629	21.80	21.80
183	1638	21.82	21.82
184	1647	21.82	21.82
185	1656	21.82	21.82
186	1665	21.81	21.81

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Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
187	1674	21.81	21.81
188	1683	21.81	21.81
189	1692	21.84	21.84
190	1701	21.82	21.82
191	1710	21.84	21.84
192	1719	21.82	21.82
193	1728	21.84	21.84
194	1737	21.83	21.83
195	1746	21.83	21.83
196	1755	21.84	21.84
197	1764	21.85	21.85
198	1773	21.83	21.83
199	1782	21.85	21.85
200	1791	21.86	21.86
201	1800	21.85	21.85
202	1809	21.86	21.86
203	1818	21.86	21.86
204	1827	21.89	21.89
205	1836	21.89	21.89
206	1845	21.90	21.90
207	1854	21.91	21.91
208	1863	21.93	21.93
209	1872	21.89	21.89
210	1881	21.90	21.90
211	1890	21.89	21.89
212	1899	21.91	21.91
213	1908	21.92	21.92
214	1917	21.92	21.92
215	1926	21.92	21.92
216	1935	21.93	21.93
217	1944	21.94	21.94

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Recorded by:	LAW	Screen length:	40 [ft]
Date:	1/10/2003	Aquifer Thickness:	186.57 [ft]

	Discharge Rate: [U.S. gal/min]	Depth to WL [ft]	Drawdown [ft]
218	1953	21.94	21.94
219	1962	21.94	21.94
220	1971	21.94	21.94
221	1980	21.91	21.91
222	1989	21.96	21.96
223	1998	21.94	21.94
224	2007	21.94	21.94
225	2016	21.96	21.96
226	2025	21.96	21.96
227	2034	21.98	21.98
228	2043	21.97	21.97
229	2052	21.96	21.96
230	2061	21.98	21.98
231	2070	21.95	21.95
232	2079	21.99	21.99
233	2088	21.99	21.99
234	2097	21.99	21.99
235	2106	21.96	21.96
236	2115	22.01	22.01
237	2124	22.01	22.01
238	2133	21.99	21.99
239	2142	22.01	22.01
240	2151	22.01	22.01
241	2160	22.03	22.03
242	2169	22.01	22.01
243	2178	22.00	22.00
244	2187	22.02	22.02
245	2196	22.02	22.02
246	2205	22.03	22.03

MACTEC Engineering and Consulting, Inc.
3901 Carmichael Avenue
Jacksonville, FL 32207

JOB NO. _____ SHEET 1 OF _____
PHASE _____ TASK _____
JOB NAME ACOE LAKEBELT
BY ERS DATE _____
CHECKED BY _____ DATE _____

VERTICAL HYDRAULIC GRADIENTS $I_v = dh/dl$

STA.	TOC	DTW	TD	GW ELEV	SCRN MID PT.
CB-2A	7.00	5.00	114	2.00	(94+114)/2 = 104
CB-2B	5.90	4.25	146	1.65	(126+146)/2 = 136
CB-2C	7.30	4.53	190	2.77	(170+190)/2 = 180

CB2A/2B (2.00-1.65)/(136-104) = 0.0109 ↓
CB2B/2C (1.65-2.77)/(180-136) = -0.0255 ↑
CB2A/2C (2.00-2.77)/(180-104) = -0.0101 ↑
} GRADIENT (I_v)

STA.	TOC	DTW	TD	GW ELEV.	SCRN MID PT.
CB-4A	8.30	1.58	120	6.72	(100+120)/2 = 110
CB-4B	8.50	4.91	157	3.59	(127+157)/2 = 142
CB-4C	8.60	4.75	220	3.85	(160+220)/2 = 190

CB4A/4B (6.72-3.59)/(142-110) = 0.0978 ↓
CB4B/4C (3.59-3.85)/(190-142) = -0.0054 ↑
CB4A/4C (6.72-3.85)/(190-110) = 0.0359 ↓
} GRADIENT (I_v)

STA.	TOC	DTW	TD	GW ELEV.	SCRN MID PT.
CB-9A	7.90	4.33	120	3.57	(105+120)/2 = 112.5
CB-9B	7.70	3.25	145	4.45	(120+145)/2 = 132.5
CB-9C	8.10	4.67	190	3.43	(150+190)/2 = 170.-

CB9A/9B (3.57-4.45)/(132.5-112.5) = -0.0440 ↑
CB9B/9C (4.45-3.43)/(170.0-132.5) = 0.0272 ↓
CB9A/9C (3.57-3.43)/(170.0-112.5) = 0.0024 ↓
} GRADIENT (I_v)