



Summary of Findings and Recommendations
Preliminary Geotechnical Services
The Cascades, Groveland
Lake County, Florida
PSI Project No. 757-45058

April 2, 2004

Levitt and Sons, Inc.
4037 Avalon Park East Boulevard
Orlando, Florida 32828

Attention: Mr. David M. Schmitt, P.E.
Vice President of Land Development

RE: Summary of Findings and Recommendations
Preliminary Geotechnical Services
The Cascades, Groveland
Lake County, Florida
PSI Project No. 757-45058

Dear Mr. Schmitt:

In accordance with our proposal dated January 30, 2004, including the February 13, 2004 supplement, Professional Service Industries, Inc. (PSI) has provided preliminary geotechnical engineering services in connection with the referenced project. Presented herein is an overview of the work performed by PSI to date, together with a summary of findings/recommendations.

Cascades is a planned residential development to be constructed by Levitt and Sons in Groveland, Lake County, Florida. The site is located to the south of the Lake Ridge Winery and the Florida Turnpike/U.S. Highway 27. Overall, the property occupies a plan area of approximately 800 acres. The property is located in portions of Sections 26, 27, 34 and 35 of Township 21 South, Range 25 East. In the central portions of the property is Schoolhouse Lake. A generalized plan view of the overall property is included on **Figure 1**.

The development is to include the construction of a series of residential lots, roadways, parks and stormwater management areas. A conceptual layout for the facility is shown on **Sheet 1**. The stormwater ponds will primarily be located around the perimeter of Schoolhouse Lake. It is our understanding that the peat in the existing lake bed/wetland is to be excavated/mined as part of the site development work.

Ground surface elevations at the site range between +85 and +160 feet NGVD. The ground is lowest around Schoolhouse Lake and other localized water bodies on the site. Higher ground elevations occur in the south and along the north central portion of the west property boundary. The ground cover for the most part comprises grasses and weeds with a scattering of trees. There are stands of trees in the east and in the southwest portion of the site.

The topography shown on **Figure 1** (USGS quadrangle map) is in line with the site specific ground surface elevations indicated on **Sheet 1**.

As part of our work effort on the assignment, we have referenced/reviewed the USDA Soil Survey for Lake County, Florida. The property falls within Map Sheet 51 of this publication. An extract from this particular map is provided as **Figure 2**. A review of **Figure 2** indicates 12 surficial soil groups to be present within the property. These groups and a general overview of the typical soil and groundwater conditions associated with each are as follows.

Nearly all of the surficial soil groups comprise fine sands that grade clean (SP material) and/or slightly silty to silty (SP/SM and SM materials) to depths of about 80 inches. Some clayey sands (SC materials) are noted to be locally present by the SCS. In the upland areas are Astatula, Apopka and Tavares fine sands, which are well draining soils (i.e. hydrologic group A) with the normal wet season high water table at depths typically in excess of 6 feet below grade.

Around the edges of the lake and isolated wetlands, including within the wetlands themselves are more poorly drained sands (hydrologic groups C and D) that tend to grade more silty and clayey (i.e. SP/SM, SM and SC materials). In these transitional soil groups, the seasonal high groundwater table is reported by the SCS to be at depths ranging from above the ground surface for periods of the year to a few feet below grade. The seasonal high water table is above grade in the wetlands and along the extreme edges of the lake.

At this time, we have drilled/sampled 20 auger borings at the site. The approximate locations at which the borings were drilled are shown on **Sheet 1**. The boring locations were established in the field with survey control by Bowyer-Singleton & Associates. Ground surface elevations at the boring sites are summarized on **Table 1**.

The borings were drilled on March 20 and 21, 2004, being advanced to depths in the range 20 to 40 feet below grade. The borings were drilled by advancing the auger to the required exploration depth. On extraction of the auger from the ground, samples were recovered from the flights for visual stratification and select testing. Samples were returned to our Orlando office and visually stratified following guidelines contained in the Unified Soil Classification System (USCS). Records of the materials encountered in the borings are presented as soil profiles on **Sheet 2**. **Sheet 2** includes a legend describing the subsoils in USCS format.

In addition to visually stratifying the soils, laboratory testing included moisture content determinations and Number 200 wash sieves on select samples. These tests were carried out following appropriate ASTM procedures. Results of the tests are included with the soil profiles on **Sheet 2** adjacent to the depth increment of the test specimen.

Adjacent to five borings, we recovered undisturbed tube samples for laboratory permeability testing. The permeability tests were carried out using falling head procedures. Permeability test results and pertinent sample information are included on the next page.



Boring Number	Sample Depth (feet)	Kv (feet/day)	Percent Fines Passing No. 200 Sieve
AB-5	4	4	2.6
AB-8	2	5	5.1
AB-12	1	3	9.1
AB-15	3	36	2.7
AB-18	5	73	2.7

A review of the soil profiles on **Sheet 2** indicates subsoils to comprise a varying sequence of fine sands in the depth interval drilled. The sands grade from being relatively clean to slightly silty and silty/clayey in composition (i.e. SP, SP/SM, SM and SC materials). In general, the sands become more finer grained with depth.

Groundwater level measurements were made in the borings at the time of drilling. These measurements disclosed the water table at depths in the range 1.5 feet below grade to in excess of 30 feet below grade. The variations are primarily as a result of the variations in the ground surface elevations at the boring sites. In those borings drilled around Schoolhouse Lake, the water level in the ground was at or slightly above that of the lake.

Water levels will vary seasonally in response to rainfall or lack thereof. Based on our review of the borings, results of our laboratory tests and from the SCS Soil Survey, we estimate that the normal wet season high water table will range from being at the ground surface immediately adjacent to the lake and isolated water bodies to depths significantly in excess of 6 feet in the upland areas of the site.

Some temporary perching is likely to be experienced atop the more silty/clayey sand layers following periods of prolonged or heavy rainfall. Observed and estimated normal wet season high groundwater table depths and elevations are included on **Table 1**. Within and immediately adjacent to Schoolhouse Lake, water levels may be higher than noted in flood conditions.

The preliminary borings have disclosed soil and groundwater conditions that are considered generally suitable for residential development. Fairly significant grading is likely to occur to shape/contour the site for residential lots, roadways and ponds. Some degree of soil sorting/mixing may be required so that the more clayey/silty sands are not present within the top two to three feet of building pads and roadway subgrades. These fine-grained soils should also be removed from the bottom of dry retention areas.

The stormwater facilities should be designed/constructed in accordance with Water Management District criteria. As design proceeds on this project we will work with your Civil Engineer in evaluating the ponds and preliminary grading, etc. Additionally, as the project moves forward, we will carry out additional borings and testing as indicated in our proposal.



REPORT LIMITATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the investigation was intended to evaluate relatively shallow soil and groundwater conditions across the site to aid site grading and stormwater pond design and does not include an evaluation of potential deep soil problems such as sinkholes. The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered.

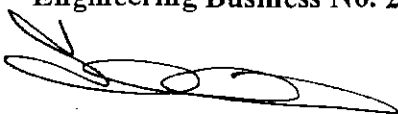
The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

CLOSURE

We appreciate the opportunity to be of service on this project and we trust that the foregoing is of assistance to you and your consultants at this time. In the event that you have any questions or if you require additional information, please call.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.
Engineering Business No. 2094



Ian Kinnear, P.E.
Chief Geotechnical Engineer
FL Registration No. 32614

IK:cd:IK\75745058(The Cascades)402.doc

cc: Mr. Dave Ouellette, P.E. – Bowyer-Singleton & Associates

Attachments

- Table 1
- Figures 1 and 2
- Sheets 1 through 4

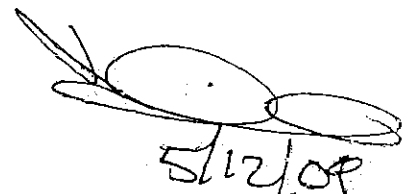
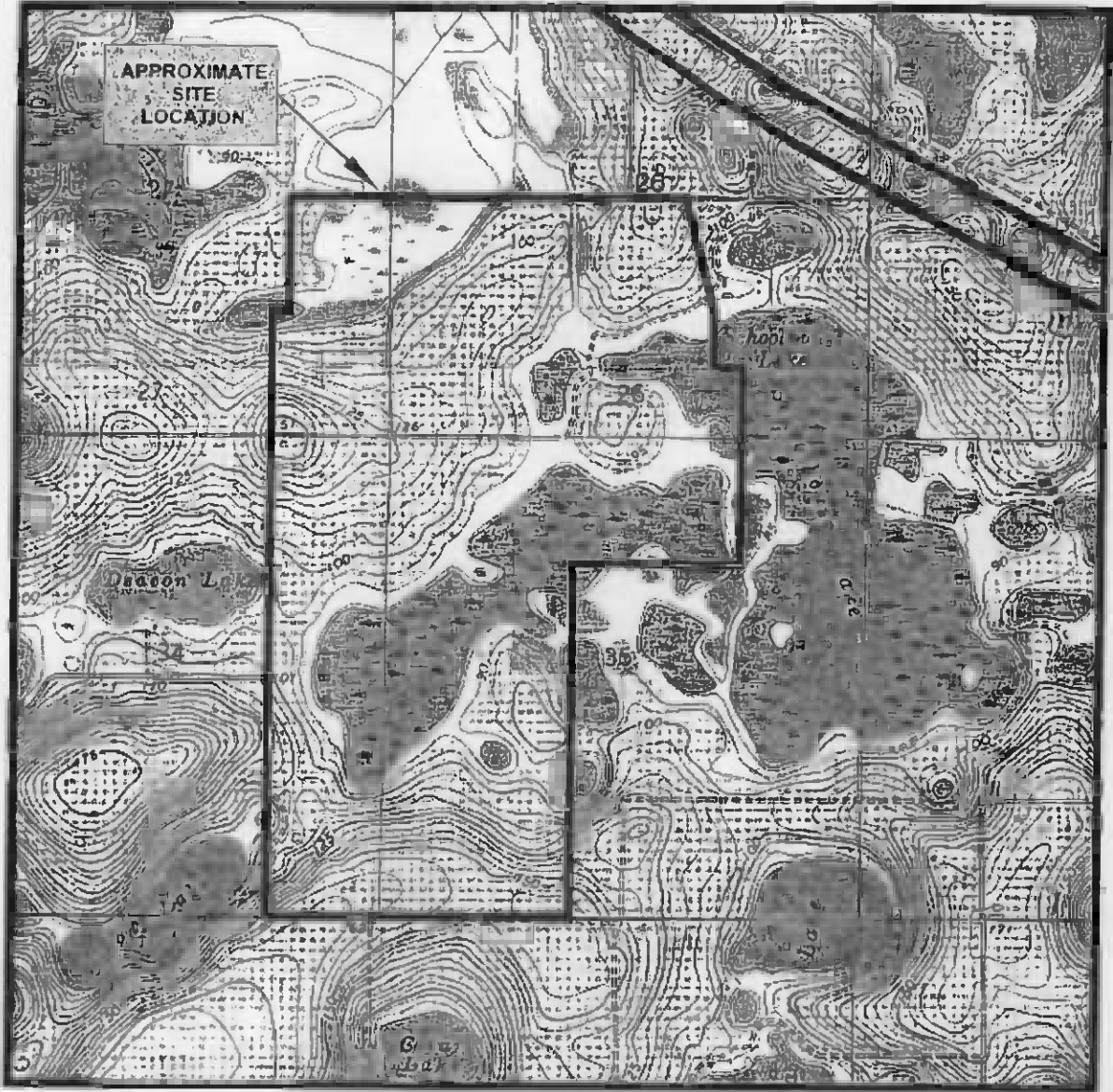


TABLE 1
Summary of Observed and Estimated Seasonal High
Water Table Depths and Elevations
The Cascades, Groveland, Lake County, Florida

Boring Number	Ground Surface	Location	Water Depth	Water Elevation	Estimated H2O High	
					Depth	Elevation
AB-1	88.40	Pond	7.1	81.3	3.5	85
AB-2	118.74	Upland	>30	<89	>6	
AB-3	88.40	Pond	7.0	81.4	3.5	85
AB-4	86.39	Pond	2.5	83.9	1.0	85
AB-5	85.14	Pond	3.0	82.1	1.0	84
AB-6	113.71	Upland	>30	<84	>6	
AB-7	84.26	Pond	2.0	82.3	0.0	84
AB-8	85.16	Pond	2.5	82.7	1.0	84
AB-9	89.37	Pond	6.8	82.6	5.0	84
AB-10	86.91	Pond	4.7	82.2	2.5	84
AB-11	88.64	Pond	5.0	83.6	3.0	86
AB-12	86.51	Pond	1.5	85.0	1.0	86
AB-13	87.59	Pond	2.5	85.1	1.0	87
AB-14	87.82	Pond	2.0	85.8	1.0	87
AB-15	88.81	Pond	3.8	85.0	2.0	87
AB-16	87.82	Pond	3.0	84.8	1.0	87
AB-17	87.79	Pond	3.0	84.8	1.0	87
AB-18	93.90	Pond	9.0	84.9	6.0	88
AB-19	89.44	Pond	3.4	86.0	2.0	87
AB-20	133	Upland	>40	<93	>6	

Ground surface elevations provided by Bowyer Singleton
Elevation at AB-20 estimated from site plan





REFERENCE: U.S.G.S. "HOWEY IN THE HILLS & CLERMONT WEST, FL." QUAD. MAPS
SECTION: 26,27,34 & 35 ISSUED: 1969
TOWNSHIP: 21 SOUTH PHOTOREVISED: N/A
RANGE: 25 EAST SCALE: 1" = 2000'

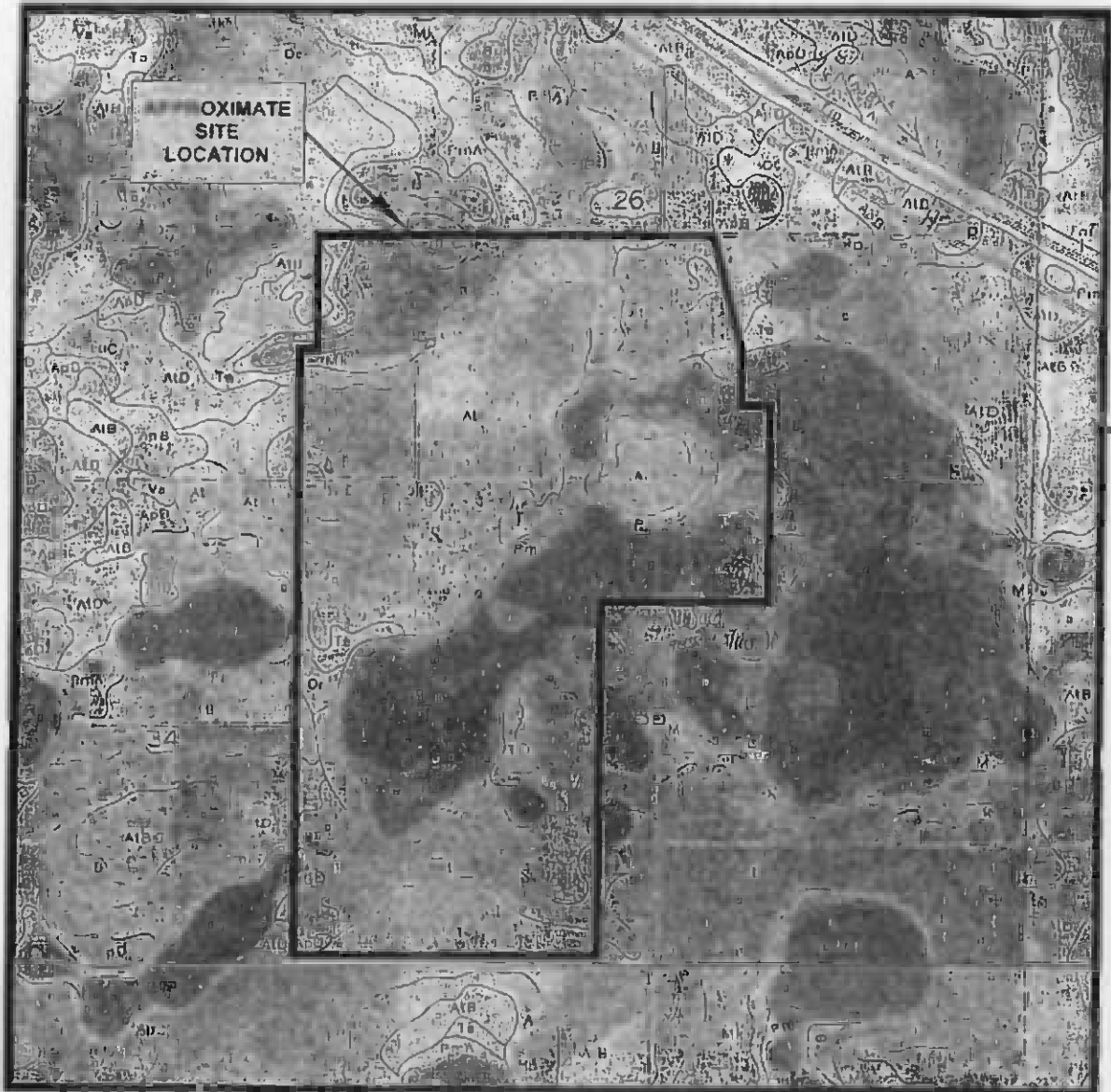
VICINITY MAP

THE CASCADES

GROVELAND, LAKE COUNTY, FLORIDA

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<u>DRAWN:</u> DJW	<u>SCALE:</u> NOTED	<u>PROJ NO:</u> 757-4505B
<u>CHKD:</u> IK	<u>DATE:</u> 3-19-04	<u>FIGURE:</u> 1



REFERENCE: U.S.D.A.-S.C.S. "LAKE COUNTY, FLORIDA" SOILS MAP

SECTION: 26,27,34 & 35

TOWNSHIP: 21 SOUTH

RANGE: 25 EAST

ISSUED: APRIL 1975

SCALE: 1"=2000'

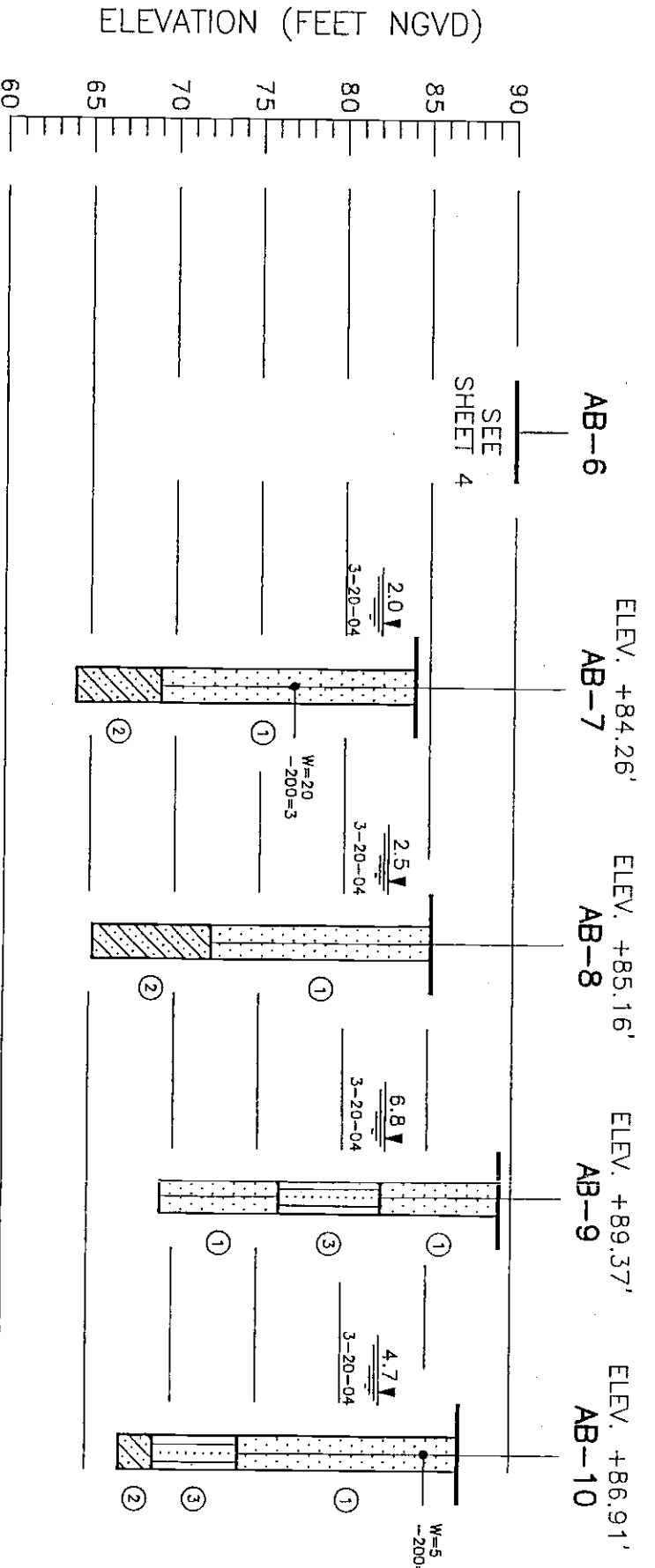
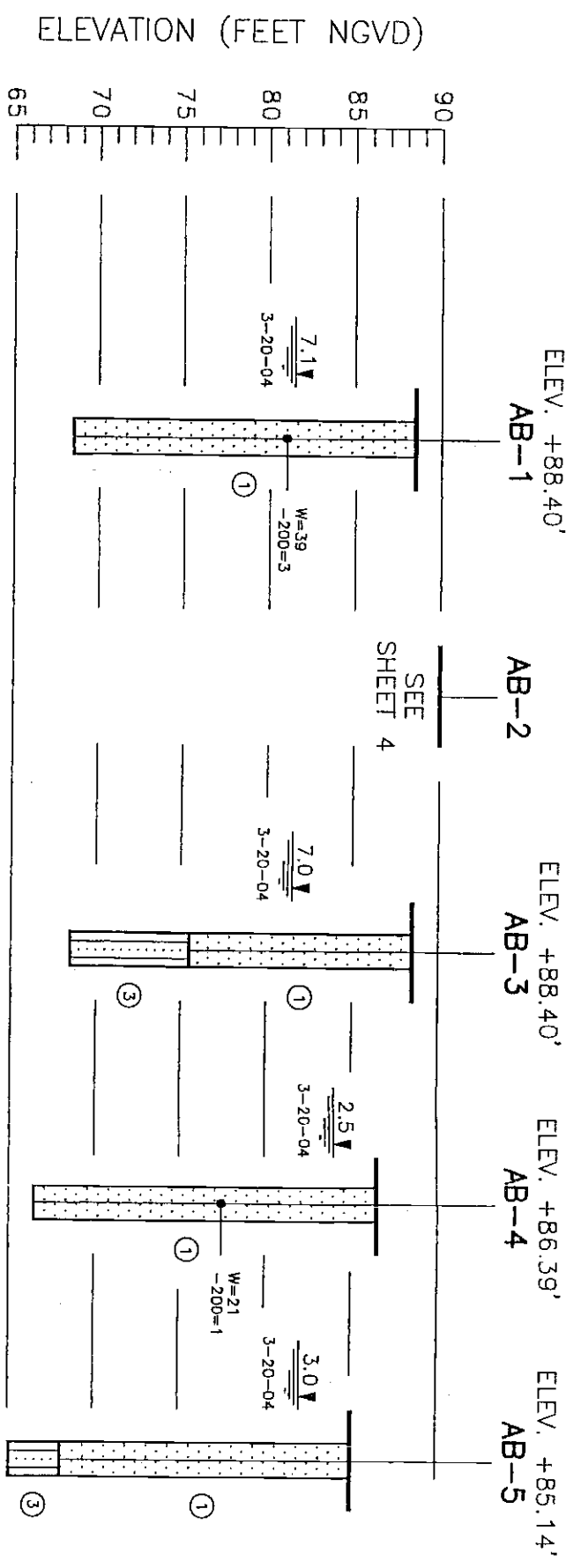
SOILS LEGEND

- ApB APOPKA SAND, 0 TO 5 PERCENT SLOPES
- ApD APOPKA SAND, 5 TO 12 PERCENT SLOPES
- AIB ASTATULA SAND, DARK SURFACE, 0 TO 5 PERCENT SLOPES
- AID ASTATULA SAND, DARK SURFACE, 5 TO 12 PERCENT SLOPES
- Mk MYAKKA SAND
- Oc OCILLA SAND
- Or ORLANDO FINE SAND
- Pe PLACID SAND
- Pg PLACID SAND, SLIGHTLY WET
- PmA PLACID AND MYAKKA SANDS, 0 TO 2 PERCENT SLOPES
- Pn POMELLA SAND
- To TAVARES SAND

SOILS MAP
THE CASCADES
GROVELAND, LAKE COUNTY, FLORIDA

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DRAWN: DJW	SCALE: NOTED	PROJ. NO: 757-4505B
CHKD: IK	DATE: 3-19-04	FIGURE: 2

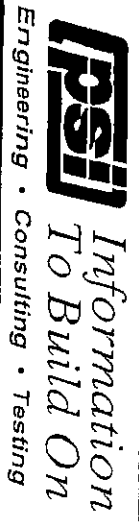


- LEGEND**
- ① LIGHT GRAY-BROWN TO DARK BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)
 - ② LIGHT BROWN TO ORANGE-BROWN CLAYEY FINE SAND, (SC)
 - ③ LIGHT ORANGE-BROWN TO BROWN SILTY FINE SAND, (SM)
 - ④ LIGHT BROWN TO ORANGE-BROWN SANDY CLAY, (CL)

- (SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL
- 7.0' DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING
- 3-20-04
- GNE GROUNDWATER NOT EVIDENT
- W NATURAL MOISTURE CONTENT IN PERCENT
- 200 FINES PASSING #200 SIEVE IN PERCENT

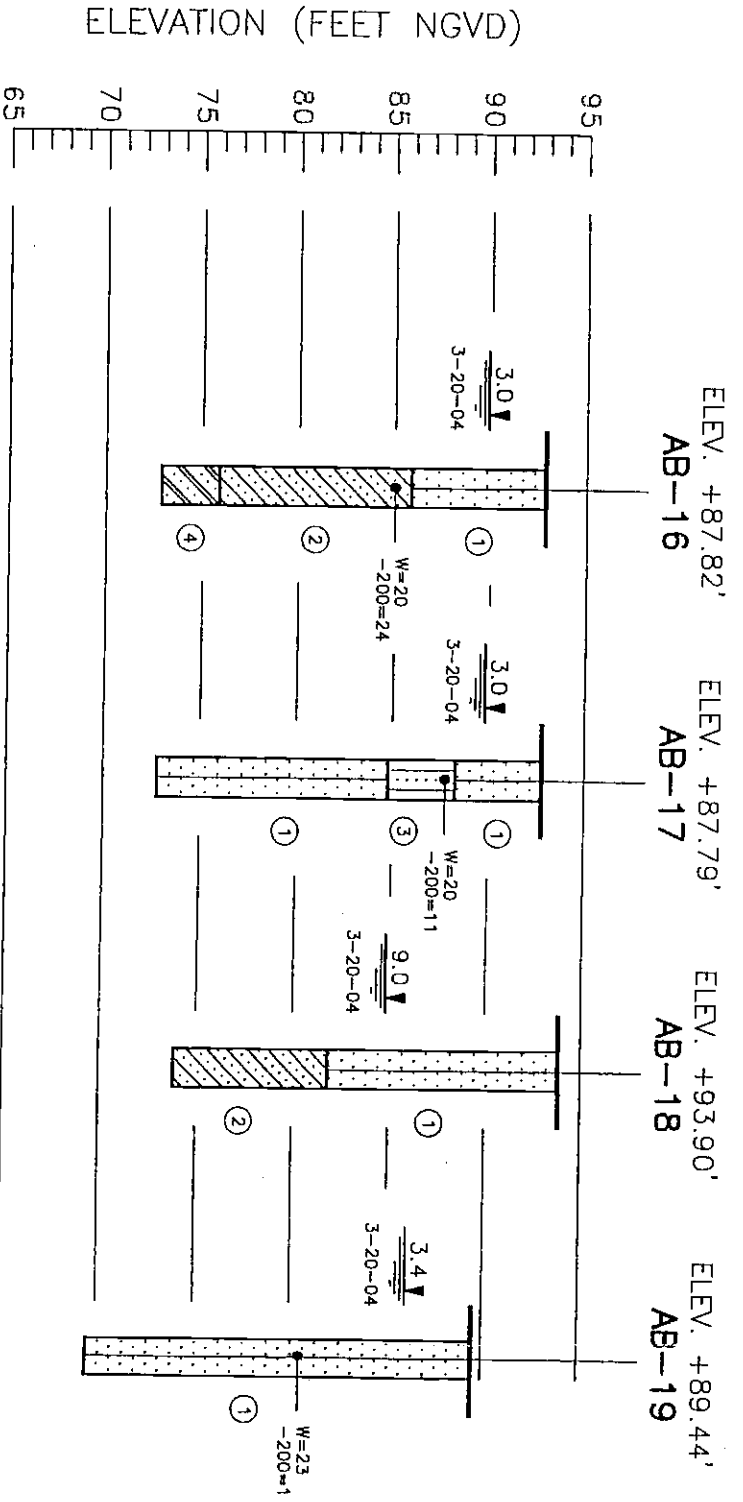
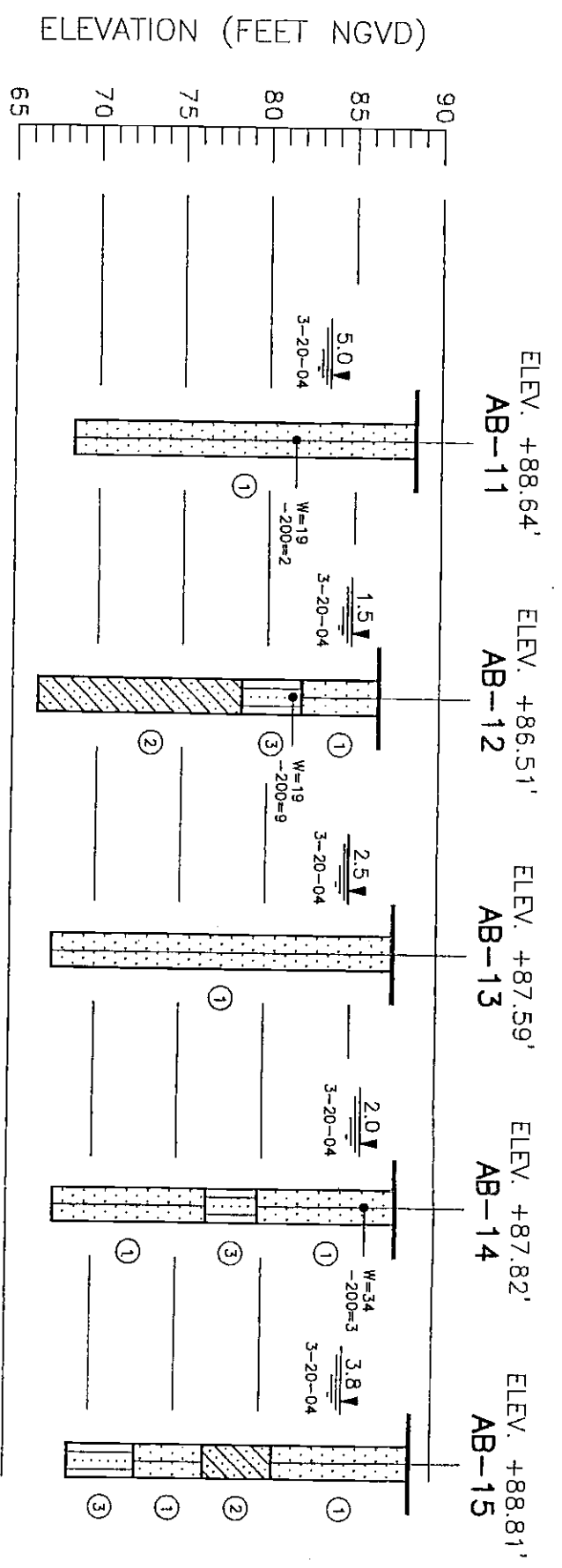
SOIL PROFILES
SCALE: 1"=10'

GEOTECHNICAL ENGINEERING SERVICES
THE CASCADES
 GROVELAND, LAKE COUNTY, FLORIDA



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DRAWN: DJW	SCALE: NOTED	PROJ. NO: 757-45058
CHKD: IK	DATE: 3-24-04	SHEET: 2



LEGEND

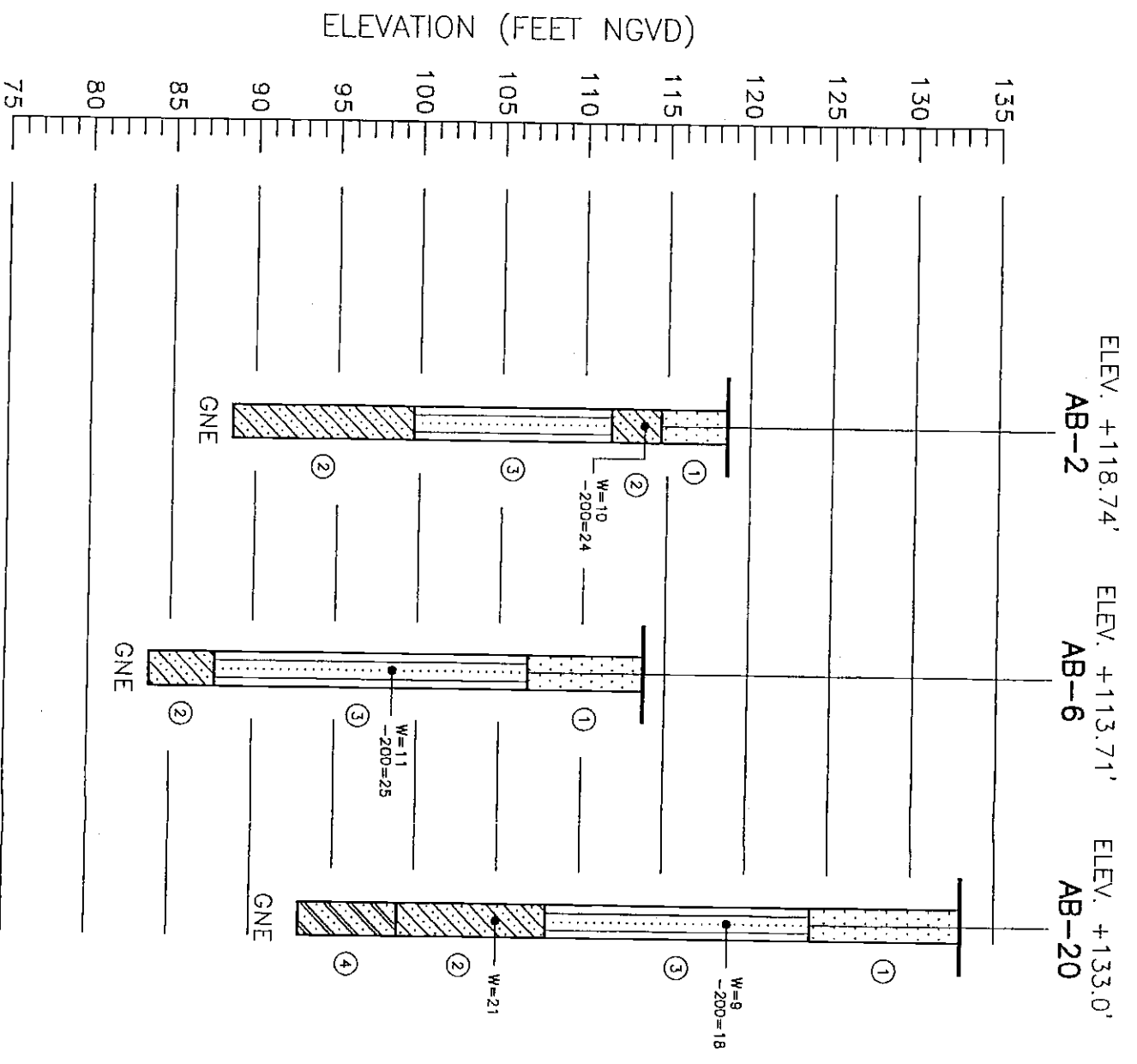
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SOIL PROFILES
SCALE: 1"=10'

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 GROVELAND, LAKE COUNTY, FLORIDA

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CHKD: IK	DATE: 3-24-04	SHEET: 3



SOIL PROFILES
SCALE: 1"=10'

LEGEND

- ① LIGHT GRAY-BROWN TO DARK BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)
- ② LIGHT BROWN TO ORANGE-BROWN CLAYEY FINE SAND, (SC)
- ③ LIGHT ORANGE-BROWN TO BROWN SILTY FINE SAND, (SM)
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- W NATURAL MOISTURE CONTENT IN PERCENT
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