Project Number: 07572583
May 18, 2021

Professional Service Industries, Inc.
1748 33rd Street, Orlando, FL 32839
Phone: (407) 304-5560
Fax: (407) 304-5561

Ms. Kelly Lincoln
Project Manager
**Walt Disney World Co.**
Facility Asset Management
P.O. Box 10,000
Lake Buena Vista, Florida 32830

RE: Summary of Findings & Recommendations
Geotechnical Engineering Services
MK Park 2 Roadside Modifications
Disney's Magic Kingdom
Walt Disney World, Florida

Dear Ms. Lincoln:

In general accordance with our proposal to you dated March 4, 2021, and Budget Increase Requests dated April 8 and May 13, 2021, Professional Service Industries, Inc. (PSI), has been providing geotechnical engineering services in connection with the referenced project. This letter presents a summary of findings of our work effort on the assignment to date, plus provides our thoughts on groundwater levels in the area of the proposed improvements.

The project includes improvements and some new development to be constructed south of Floridian Way and west of World Drive in the northern limits of Magic Kingdom near Park 2. We understand the improvements and modifications will result in the need for compensating storage as a result of the modifications/improvements impacting the flood plain. The areas under consideration for compensating storage for the most part comprise undeveloped wooded and wetland areas, with some of the proposed improvements being at the edges of developed areas that have undergone filling (i.e. berms, roadways, fireworks staging area and MK engineering services facility/former firehouse). A generalized plan view of the project site is included on **Sheets 1A** and **1B**.

Based on the topographic survey information provided to PSI, current ground surface elevations in the general area of interest and requested boring locations are in the approximate range +92 to +96 feet. The Soil Survey for Orange County indicates the project area to be mapped as Soil Group 41 Samsula-Hontoon-Basinger association depressional. These soils are all wetland type surficial soils with the normal wet season high water table occurring at the ground surface or slightly above the ground surface.

To evaluate soil and groundwater conditions in the area of the planned improvements, PSI has drilled/sampled a total of 10 manual auger borings, plus completed soil probing at select boring locations where the buried organic soils persisted below the bottom of the auger. The borings/probes were extended to depths in the range 5 to 9.3 feet below existing grade, being completed at the approximate locations shown on **Sheets 1A** and **1B**. The fieldwork was performed over two phases to meet the needs of the project team. PSI also completed a

series of 4 hand auger borings plus a stormwater recovery analysis for the same for a potential stormwater pond/swale to be built immediately west of the MK engineering services facility/former firehouse. The results of this work effort were provided to you under separate cover.

The soil probes were performed by advancing a one-half inch diameter steel rod into the ground/bottom of borehole by hand and measuring the depth to refusal of manual penetration of the rod. This depth to refusal is measured and recorded as the thickness of the buried organic soils. It should be noted that manual penetration of the probe can be stopped by roots, sand lenses, or other obstructions that could result in the underestimation of the thickness of organic soils.

Records of the materials observed in the borings/probes are presented in the form of soil profiles on **Sheets 2** and **3**. These sheets include a legend describing the subsoils in Unified Soil Classification System (USCS) format. The measured groundwater levels from the borings are also included with the soil profiles, plus the terminal limits of the soil probes where applicable.

A review of **Sheets 2** and **3** indicates subsoils from the ground surface to depths of 5 to 9.3 feet below grade (terminal limits of the borings/probes) comprise a series of fine sands with a buried layer of organic soils present. The sands grade relatively clean to slightly silty and occasionally silty in composition (i.e. SP, SP-SM and SM materials), with the buried organic soils consisting of organic silt to peat (i.e. OL and PT material). The top of the buried organic soil layer was disclosed at depths in the range 1 to 4.5 feet below existing grade with the thickness of these materials being some 1 to 7+ feet thick as determined by augering or probing. Underlying the organic soils are sands. Intermixed in the upper foot or so of the borings are trace amounts of roots associated with the current groundcover of mixed low vegetation.

Groundwater was observed in the borings at depths in the range 2.5 to 5.4 feet below grade at the time of drilling. Due to the need to backfill the borings relatively quickly after drilling, the noted water levels are not indicative of fully stabilized conditions. Water levels will fluctuate seasonally in response to rainfall of lack thereof. It should be noted that the borings were generally completed during a period of relatively low rainfall in Central Florida, toward the end of the traditional dry season.

Our review of the historic topographic quadrangle map entitled ”Windermere, Florida” published by the USGS in 1953 and as available on the internet indicates that prior to development of Disney World and Magic Kingdom, the overall area of interest was formerly a contiguous swamp/wooded wetland with natural ground surface elevations on the order of +90 to +95 feet NGVD29 (the wetland is now bisected by Floridian Way). Additionally, a review of existing geotechnical data available to PSI that was obtained for the construction of Magic Kingdom in the late 1960’s indicates that the average natural/predevelopment water level in the vicinity of the park including the current area of interest was on the order of +94.2 feet in December 1967.

Given the foregoing and based on the results of our recent borings, we estimate the normal wet season high water level for the potential compensating storage areas will occur at an elevation of approximately +94 feet. The presence of buried organic soils should be taken into consideration during design and construction of the proposed improvements. In particular, the relatively low permeability of such organic soils plus the potential for consolidation/settlement of the same under load should be borne in mind with respect to grading and the construction of new structures/improvements such as outfalls, culverts or piping and the like.

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

Sincerely,
**PROFESSIONAL SERVICE INDUSTRIES, INC.**
**Certificate of Authorization No. 3684**

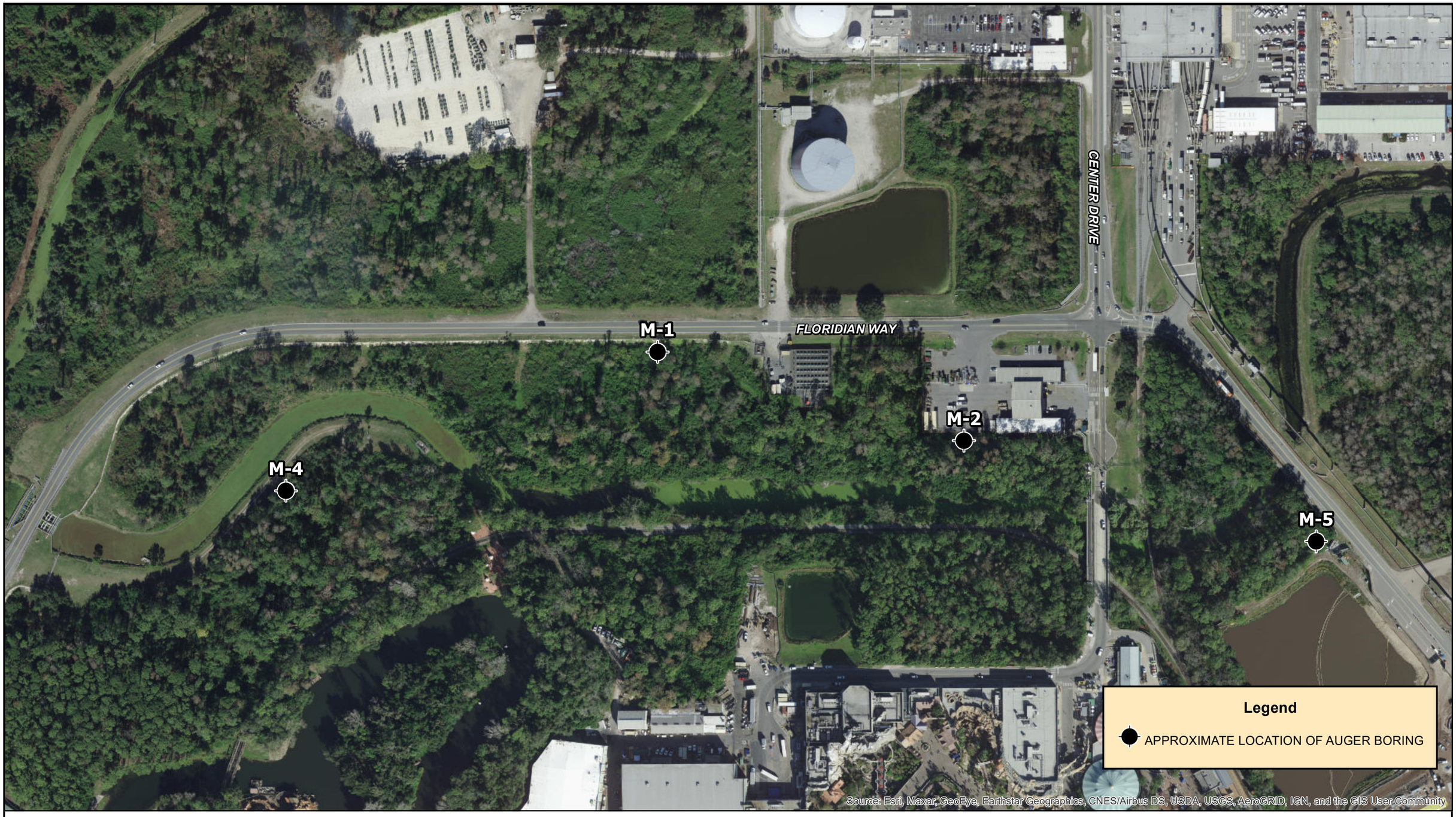
Max S. McGahan, P.E.
Project Engineer
Florida License No. 86580

Ian Kinnear, P.E.
Chief Geotechnical Engineer
Florida License No. 32614

07572583 (Summary of Findings & Recommendations, MK Park 2 Roadside Modifications)

Attachments

- Sheets 1A and 1B – Boring Location Plan
- Sheets 2 and 3 – Boring Profiles

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| PROJECT NO.<br>**07572583**<br>SCALE:<br>**NOTED**<br>DATE CREATED<br>**5-17-21** | intertek psi<br>1748 33rd Street<br>Orlando, FL 32839<br>(407)304-5560<br>(407)304-5561 fax | GEOTECHNICAL ENGINEERING SERVICES<br>**MK PARK 2 ROADSIDE MODIFICATIONS**<br>**DISNEY'S MAGIC KINGDOM**<br>WALT DISNEY WORLD, FLORIDA | SHEET:<br>**1A**<br>DRAWN:<br>**DJW**<br>CHECKED:<br>**MM** | 0 50 100 200 Feet<br>1 inch = 200 feet<br>N |


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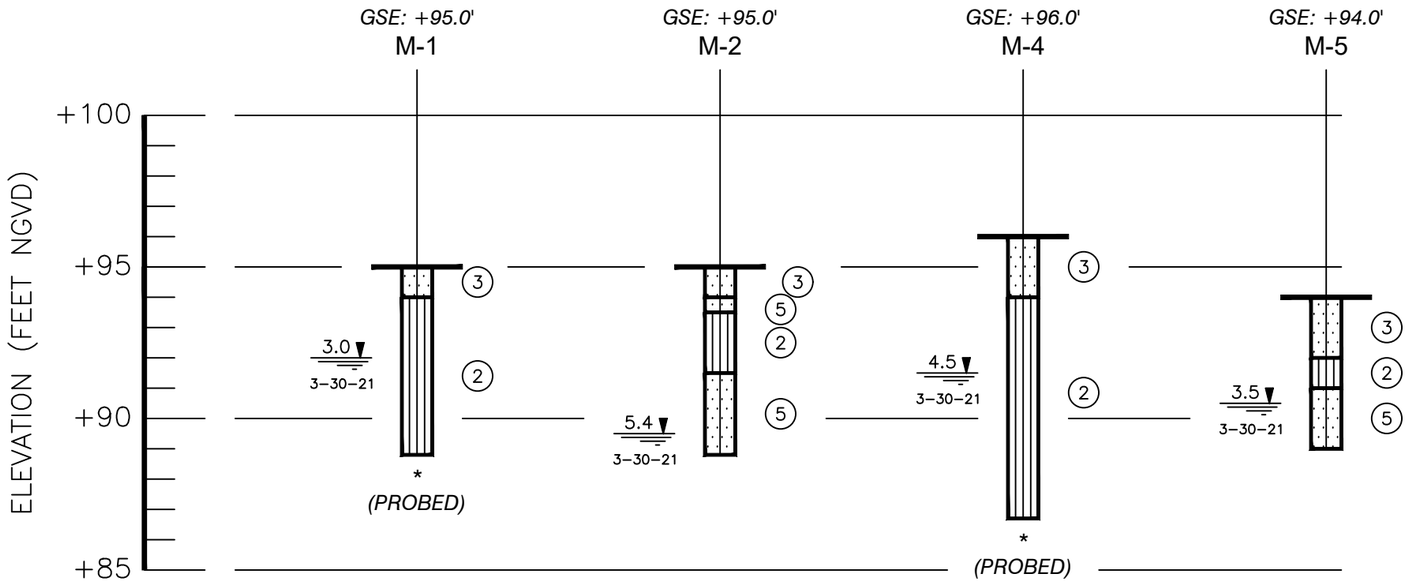


**SOIL PROFILES**

*SCALE: 1"=5'*

## LEGEND

| | |
|---|---|
| ① | *DARK GRAY-BROWN SILTY FINE SAND, (SM)* |
| ② | *DARK BROWN ORGANIC SILT TO PEAT, (OL), (PT)* |
| ③ | *GRAY-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)* |
| ④ | *GRAY-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, TRACE CRUSHED ROCK, (SP), (SP-SM)* |
| ⑤ | *BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)* |
| *(SP)* | *UNIFIED SOIL CLASSIFICATION GROUP SYMBOL* |
| 2.8 / 4-14-21 | *DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING* |
| *W* | *NATURAL MOISTURE CONTENT IN PERCENT* |
| *-200* | *FINES PASSING #200 SIEVE IN PERCENT* |

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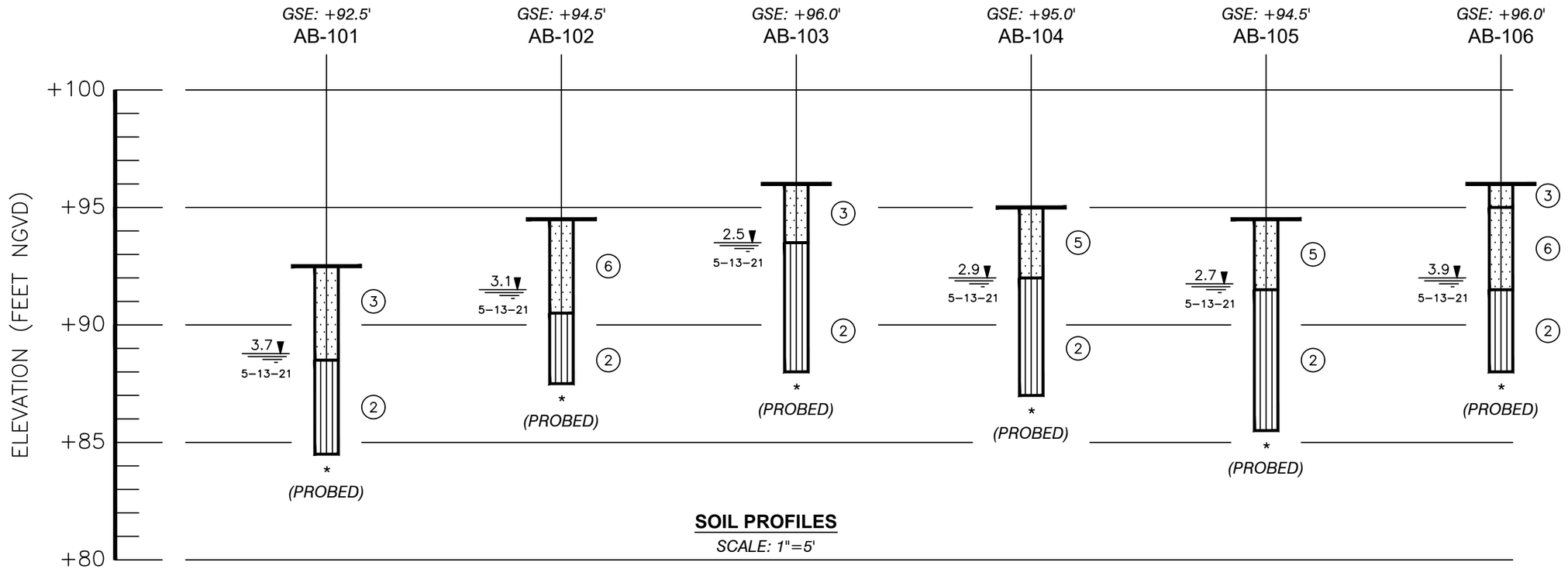
| PROJECT NO. 07572583 | intertek psi | 1748 33rd Street<br>Orlando, FL 32839<br>(407)304-5560<br>(407)304-5561 fax | GEOTECHNICAL ENGINEERING SERVICES<br>**MK PARK 2 ROADSIDE MODIFICATIONS**<br>**DISNEY'S MAGIC KINGDOM**<br>WALT DISNEY WORLD, FLORIDA | SHEET: 2 |
| SCALE: NOTED | | | | DRAWN: DJW |
| DATE CREATED: 5-17-21 | | | | CHECKED: MM |




## SOIL PROFILES

*SCALE: 1"=5'*

## LEGEND

| | | | |
|---|---|---|---|
| ① | *DARK GRAY-BROWN SILTY FINE SAND, (SM)* | *(SP)* | *UNIFIED SOIL CLASSIFICATION GROUP SYMBOL* |
| ② | *DARK BROWN ORGANIC SILT TO PEAT, (OL), (PT)* | 3.7 ▼ 5–13–21 | *DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING* |
| ③ | *GRAY-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)* | *W* | *NATURAL MOISTURE CONTENT IN PERCENT* |
| ④ | *GRAY-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, TRACE CRUSHED ROCK, (SP), (SP-SM)* | *-200* | *FINES PASSING #200 SIEVE IN PERCENT* |
| ⑤ | *BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)* | | |
| ⑥ | *LIGHT GRAY FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)* | | |

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GEOTECHNICAL ENGINEERING SERVICES

**MK PARK 2 ROADSIDE MODIFICATIONS**
**DISNEY'S MAGIC KINGDOM**

WALT DISNEY WORLD, FLORIDA

SHEET: 3
DRAWN: DJW
CHECKED: MM