



Savannah, Georgia
July 20, 2026



Geotechnical Challenges and Foundation Innovations

HMGMA (Hyundai Motor Group Metaplant America) Project

Ellabell, Georgia

Guoming Lin, Ph.D., G.E., BC.GE
Vice President/Senior Consultant



Bryan County Mega Site (August 2022)

Joint Development Authority (JDA)
(Chatham, Effingham, Bryan & Bullock)
3000 acres



Hyundai Motor Group Metaplant America (December 2024)

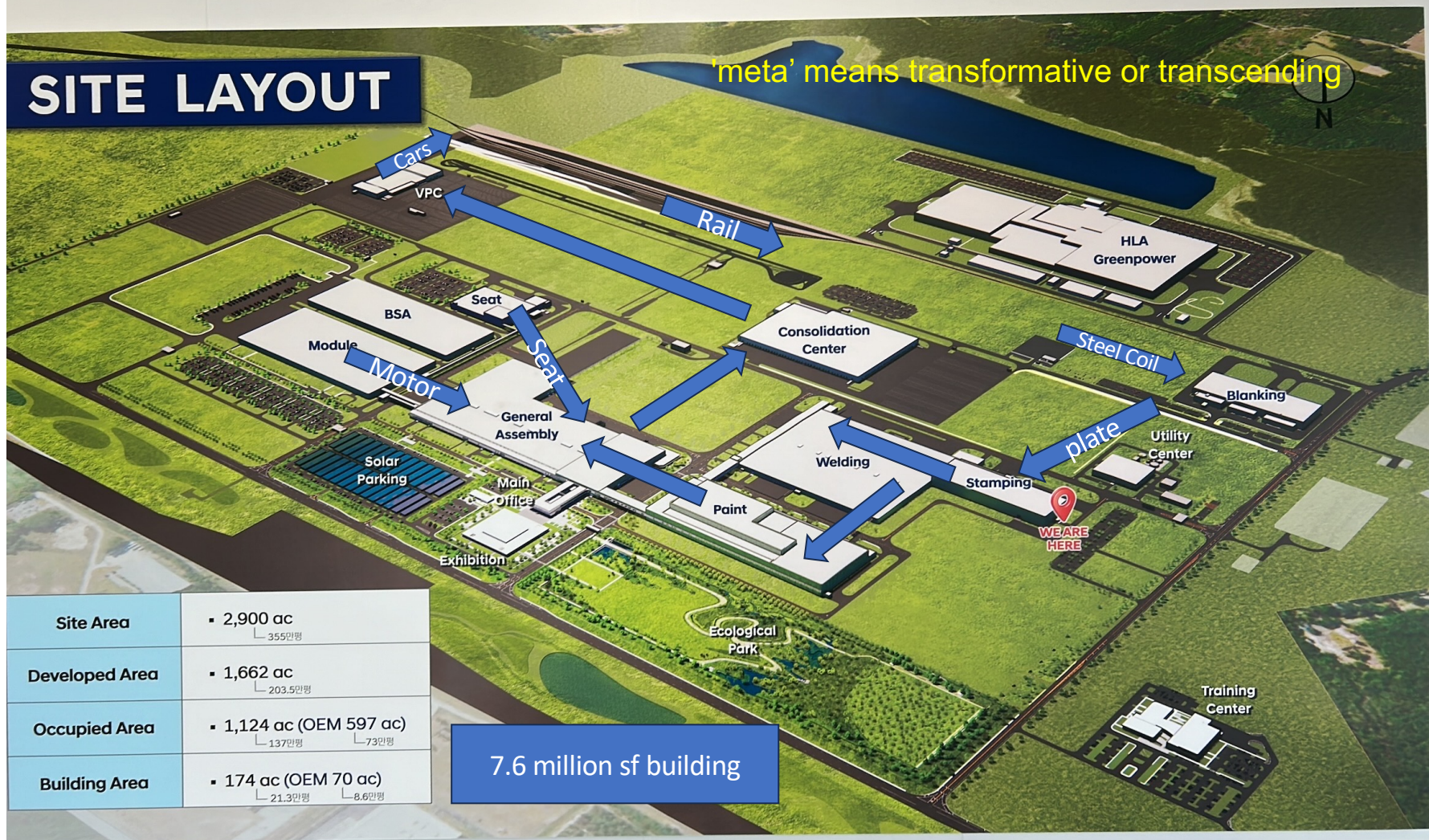


Outline

- **Project Overview**
 - Site Layout & Construction Process
- **Geotechnical Investigation**
 - Geological Setting
 - Geotechnical Exploration and Findings
 - Geophysical Testing and Seismic Issues
 - Foundations
- **Challenges & Innovations**
 - Site Construction
 - Pile Construction
- **Summary**

SITE LAYOUT

'meta' means transformative or transcending



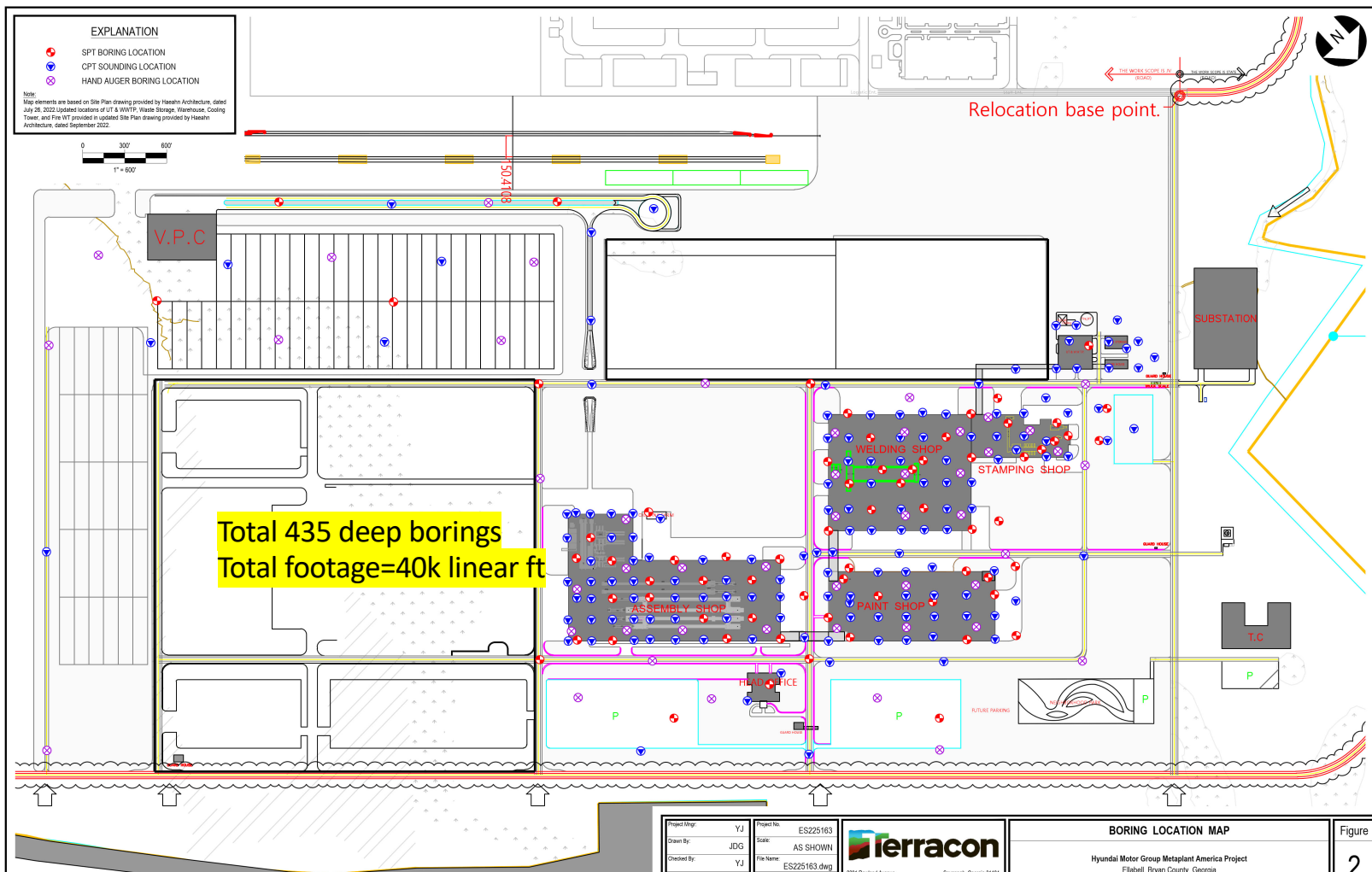
Site Area	▪ 2,900 ac └ 355만평
Developed Area	▪ 1,662 ac └ 203.5만평
Occupied Area	▪ 1,124 ac (OEM 597 ac) └ 137만평 └ 73만평
Building Area	▪ 174 ac (OEM 70 ac) └ 21.3만평 └ 8.6만평

7.6 million sf building

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Mud rotary drilling



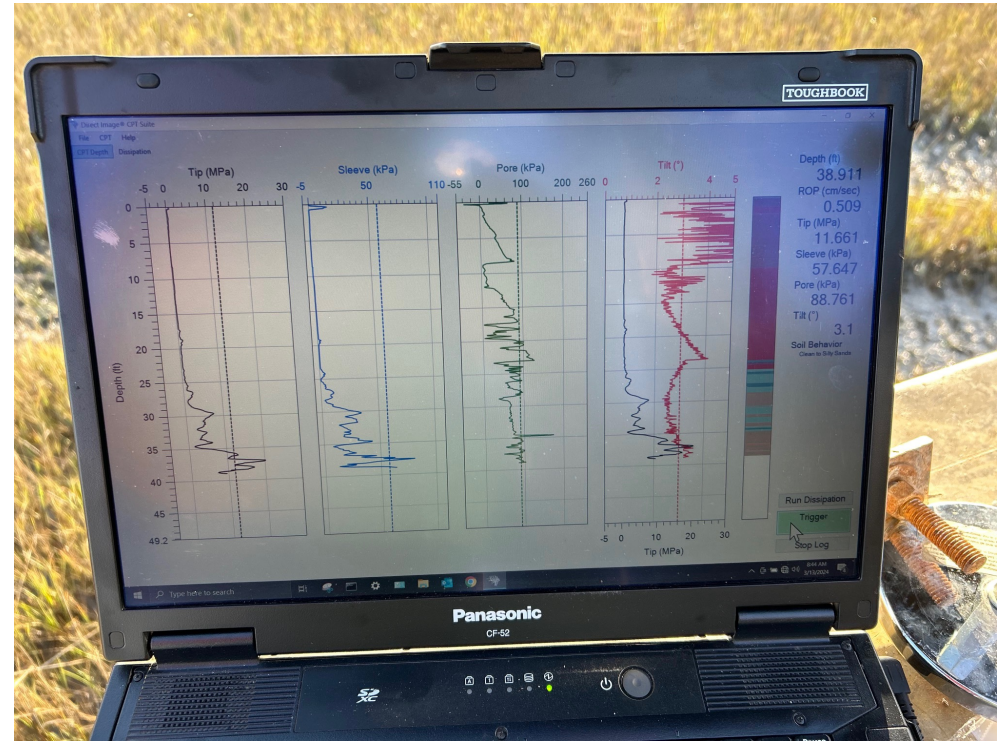
Light brown and orange fine to coarse grained sand with silt (SP-SM)



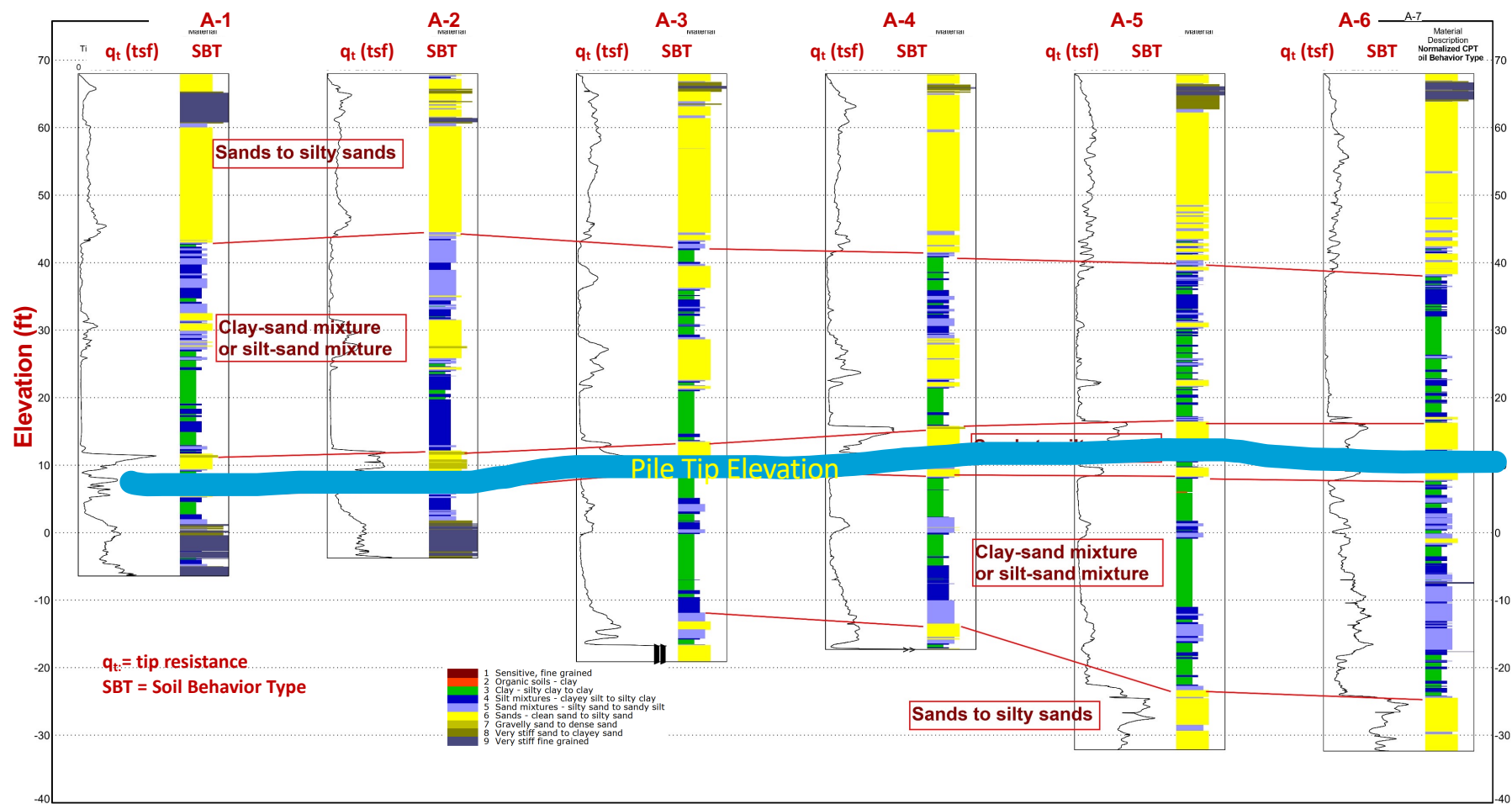
Greenish-gray sandy silt (ML)



Three sensors (load cells) inside the probe



Cone Penetration Test (CPT)



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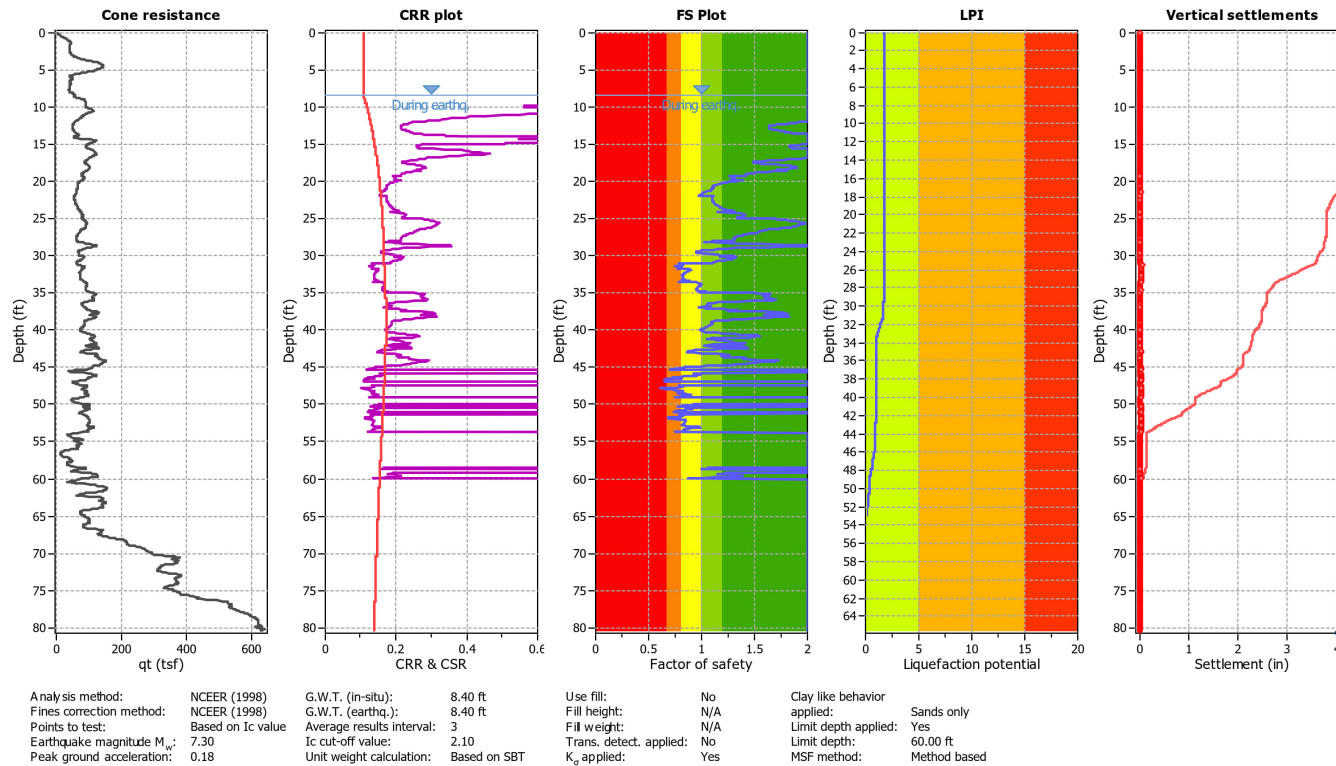


Terracon Consultants, Inc.
Savannah, GA

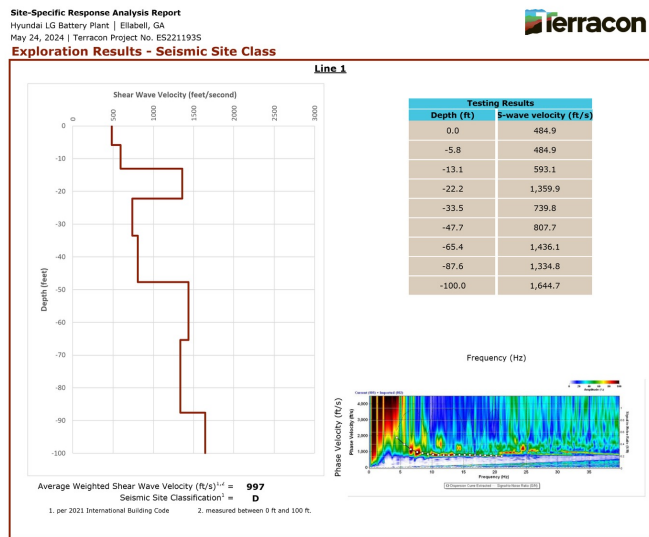
Project: Hyundai Motor Group Metaplant America Project - Paint Shop
Location: Ellabell, GA

CPT: J.10-60.00

Total depth: 80.38 ft



4"
Liquefaction



Shear Wave Velocity (Vs) Comparison		
	Seismic CPT	MASW
Paint Plant	872 (ft/s)	990 (ft/s)
HL Battery Plant	837 (ft/s) (average of 2 profiles)	952 (ft/s) (average of 4 profiles)

Seismic Evaluation

- The site has sandy soils and a shallow water table;
- Some localized zones have potential for soil liquefaction;
- Site Class **D or F** – have a major impact on schedule and cost in design and construction;
- Shear wave velocity profiles-seismic CPT and MASW-similar results—Site Class **D**;
- Considered soil aging in liquefaction analysis (Pleistocene, not Holocene);
- Pile supported in the below liquefiable zones to prevent building collapse during an earthquake

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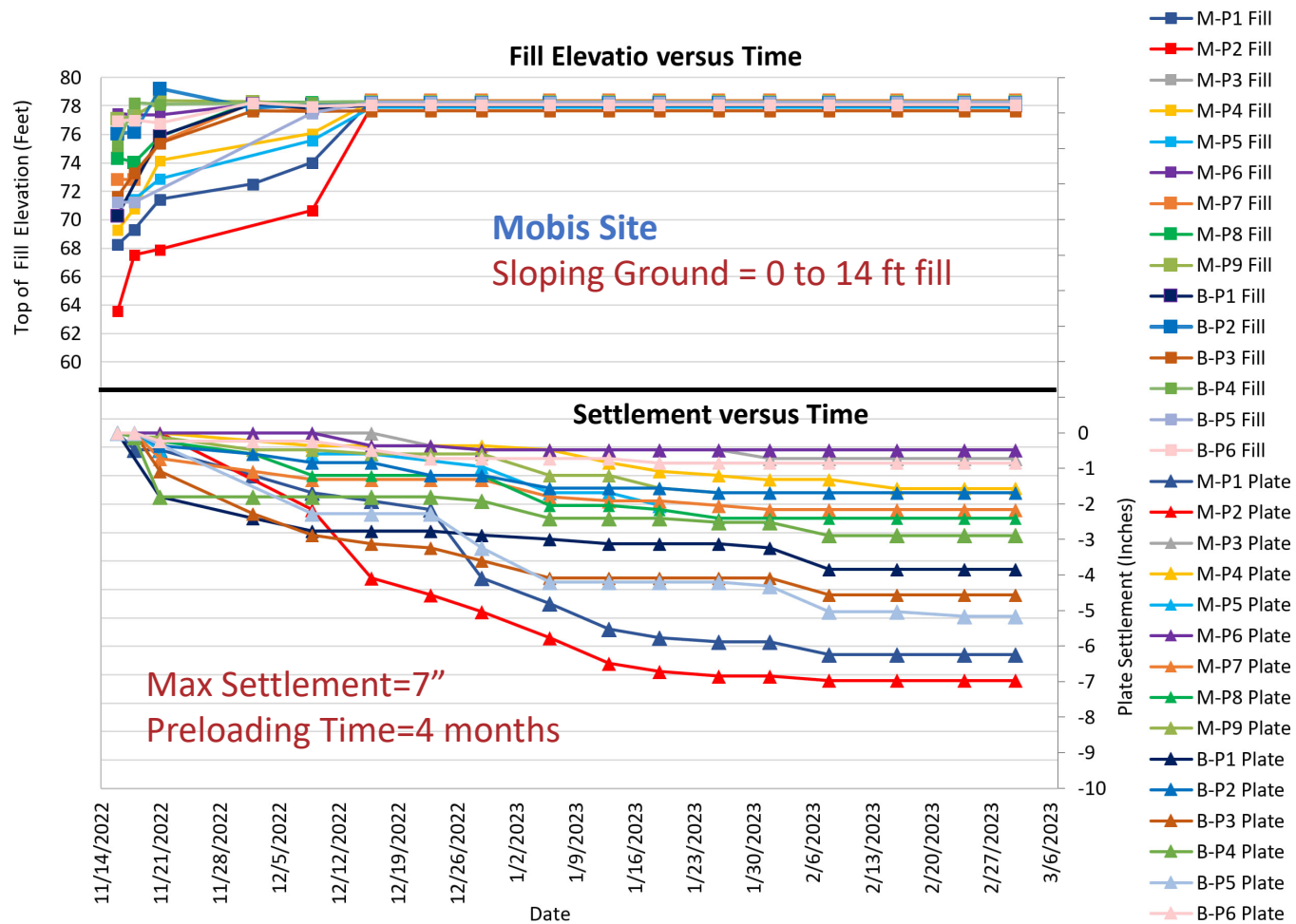
Foundation Options

- Settlements-Static Loads and Earthquake-induced Soil Liquefaction
- Shallow foundation - Deep Foundation - Ground Improvement;
- Pile types: driven prestressed concrete piles, timber piles, steel pipe piles or H piles, auger cast piles;
- Auger cast piles: cheaper and quicker than driven piles. Less uncertainty in quality;
- Slabs: AGV operation requiring flatness and levelness;
- Rigid inclusions for slabs with high loads—to control settlement;



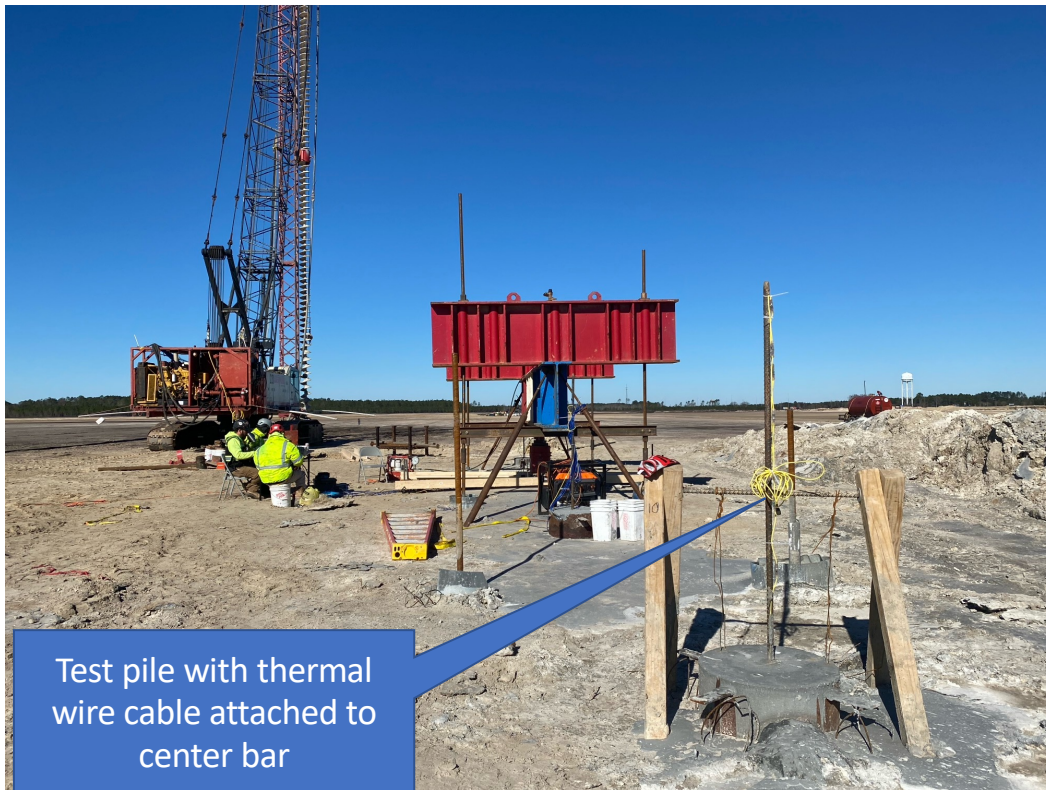
East End of the site

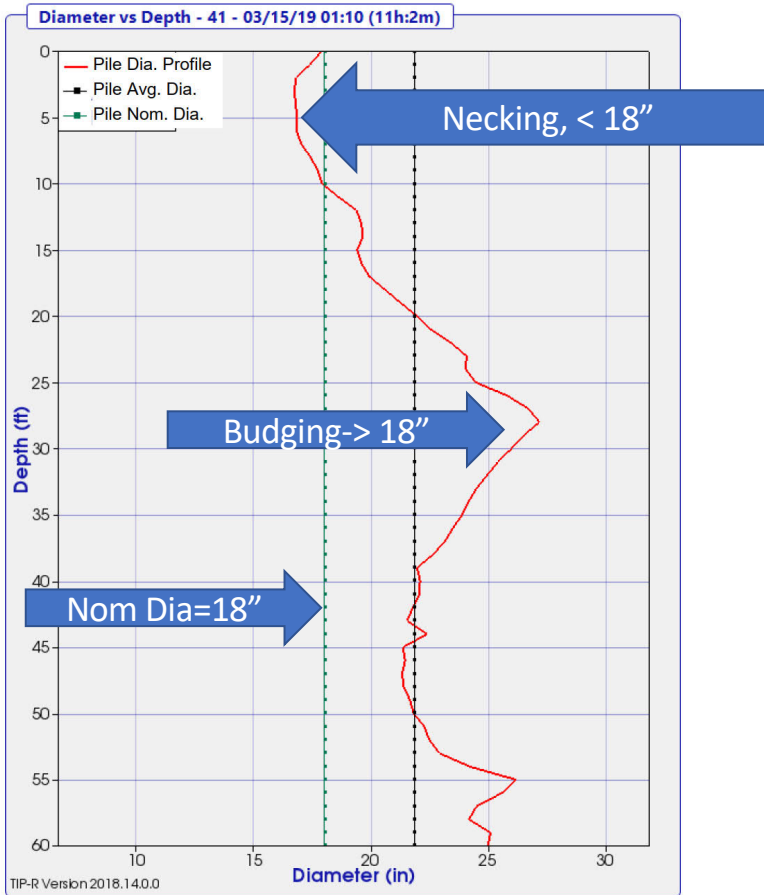
Mobis and VPC Buildings



Pile Integrity Testing using Thermal Integrity Profiling (TIP)

- Evaluate pile cross-section based on the temperature of heat from concrete curing.





Responsive ■ Resourceful ■ Reliable

Exhibit A-3-3

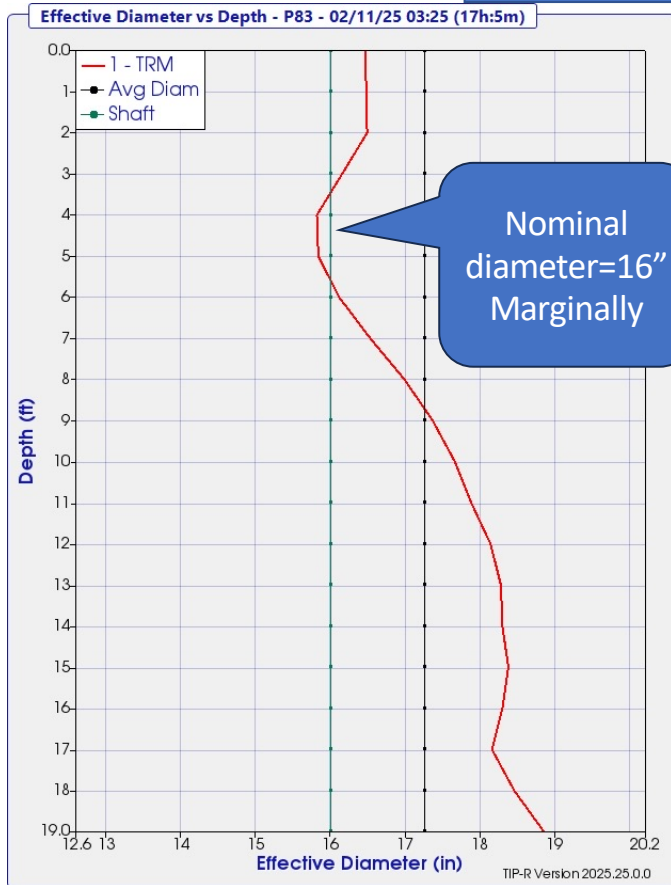
Southeast Georgia Hospital Thermal Integrity Profiling (TIP)



TIP Results were confirmed



GPA M&O Buildings

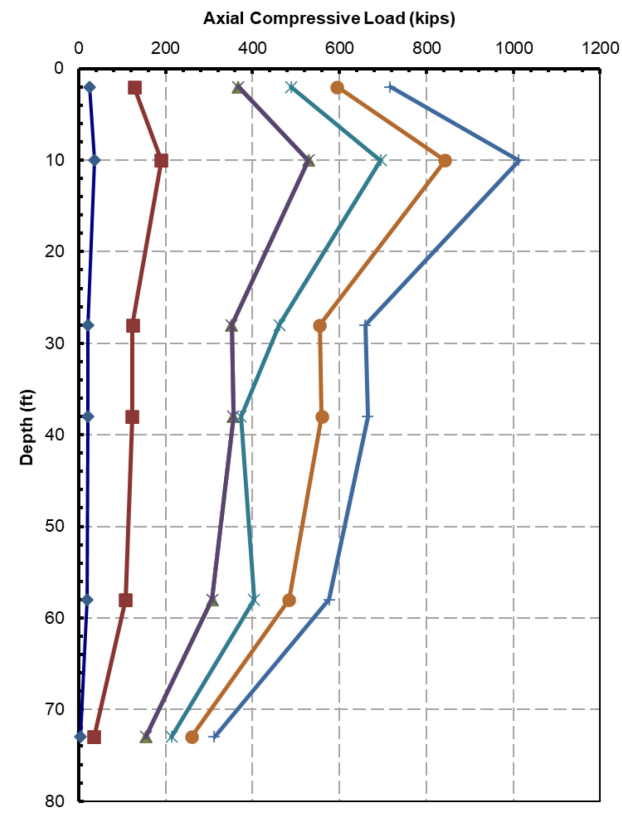
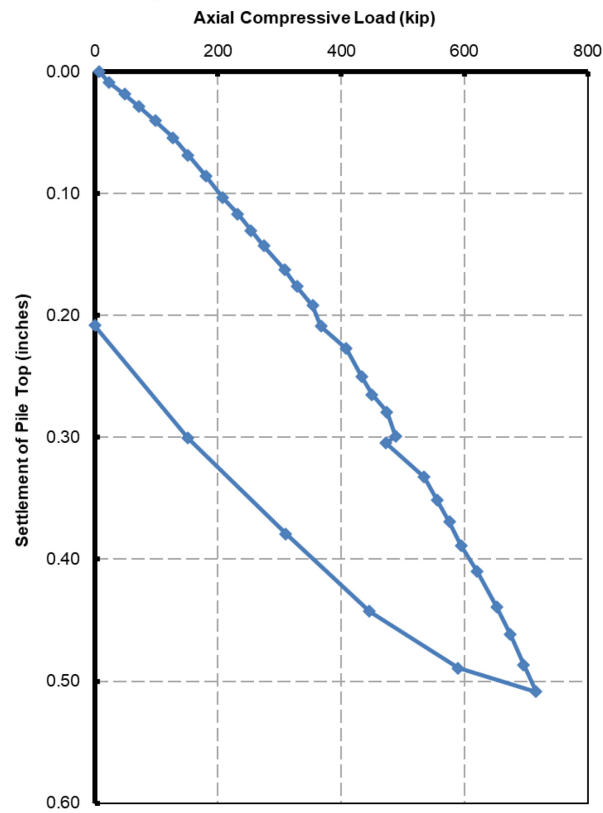


Measured circumference
Back-calculated diameter=16.23"



Strain Gages

18" ACIP Compression Test



Ultimate Capacity (kips) 715
Design Capacity (kips) 245
Factor of Safety 2.9
Grout Factor 1.45

Project Manager: YJ
 Drawn by: YJ
 Checked by: GL
 Approved by: GL

Project No. ES221193
 Scale: N.T.S.
 File Name:
 Date: 1/19/2023



COMPRESSION TEST RESULT

Hyundai Paint Shop
 Ellabell, Georgia

Exhibit:



30+ drill rigs operated
simultaneously

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Site Work

Contracted by JDA

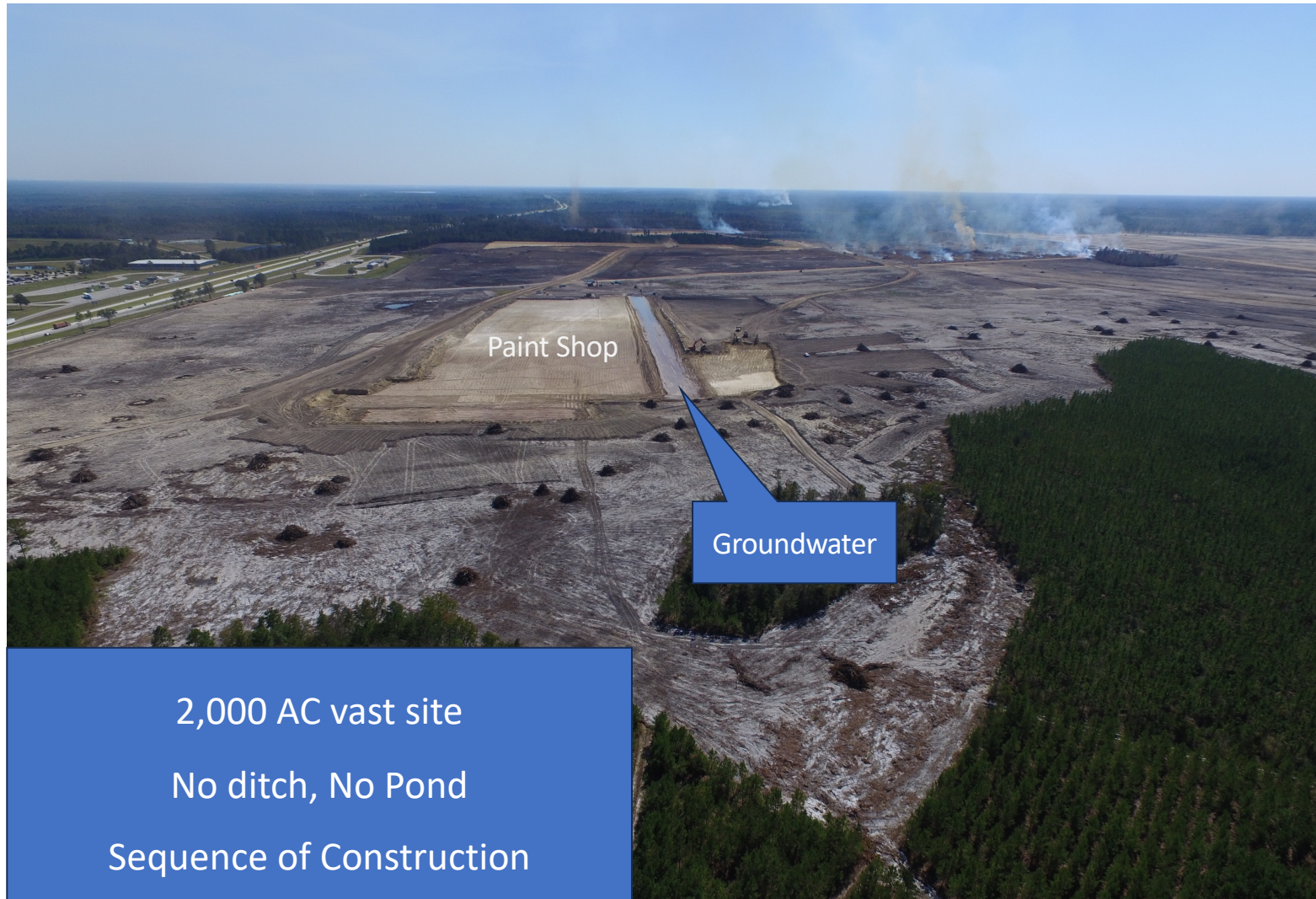
- 11 million CY—5m cut and fill, 6m the pond
- 60 offroad trucks
- 18 excavators
- 10 dozers
- Fuel: 12,500 gallons per day

Challenges by the schedule

- Logistics
- Grade Control
- Moisture and Perched Water Table
- Coordination with Building Contractors
- Drainage-No ditches and the pond is not ready

- Balanced cut and fill
- On-site soils: sands and clayey sands
- Soil moisture affecting compaction





Paint Shop

Groundwater

2,000 AC vast site
No ditch, No Pond
Sequence of Construction



Sandy Soil
Severe erosion



Foundation Construction

Pile Cap Excavation



Dewatering in each pile cap

Over-excavate and 12" No. 57 Stone or Flowable Fill

Foundation Construction

Dewatering and # 57 Stone



Flowable fill and pile cut off.



Stamping Plant
Pits and Tunnels



Steel pipe piles as rigid
inclusions to survive excavation
collapse after rainstorms





Washout of subgrade soils
To where?

Likely through open joints in the nearby storm drains

Erosion under pavements
By Hurricanes Debby (Aug 5, 2024) and Helene (Sept 2024)

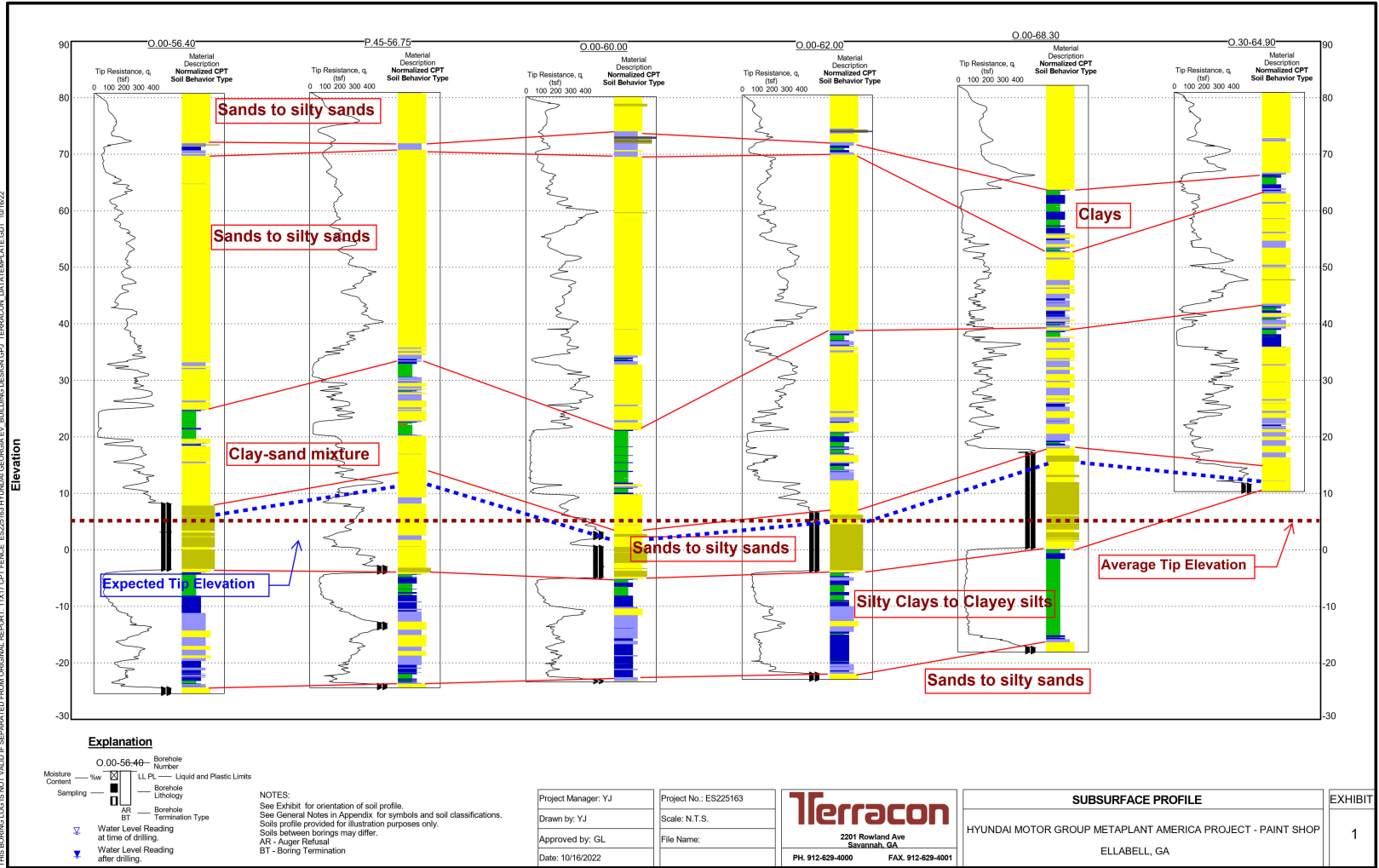




25,000+ piles were used.
350 miles of pile length

Any out of box innovation???

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 11X17 CPT FENCE ES225163 HYUNDAI GEORGIA EV BUILDING DESIGN.GPJ TERRACON DATA TEMPLATE.GDT 10/16/22

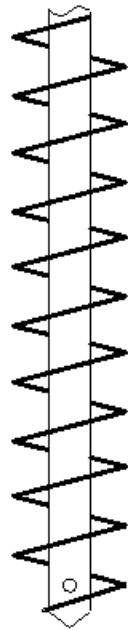




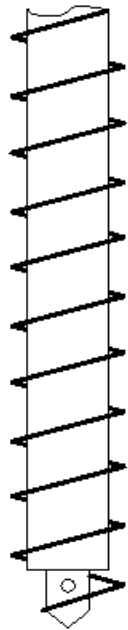
- Displacement auger cast piles
- Push soil lateral to densify sands
- No soil cutting to the surface



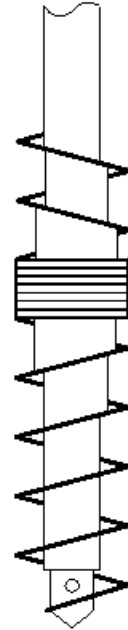
- Auger cast piles
- Continuous flight auger piles
- Soil cutting to the surface



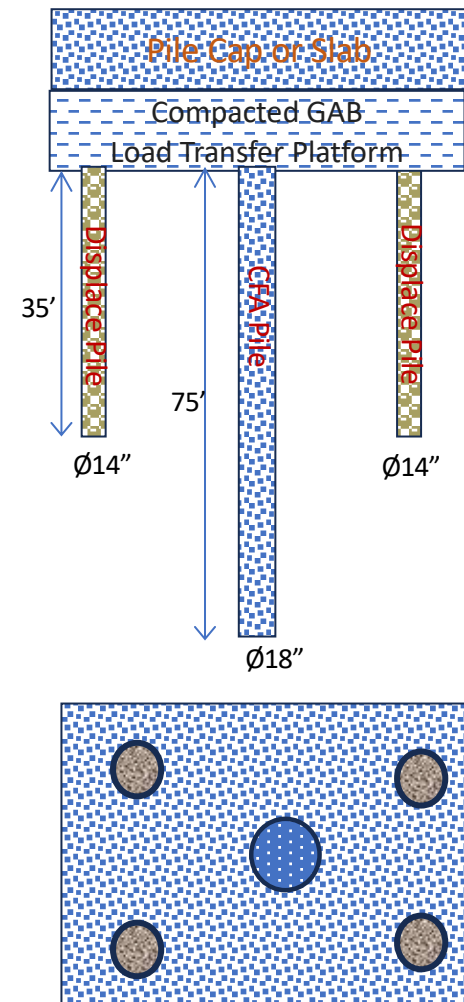
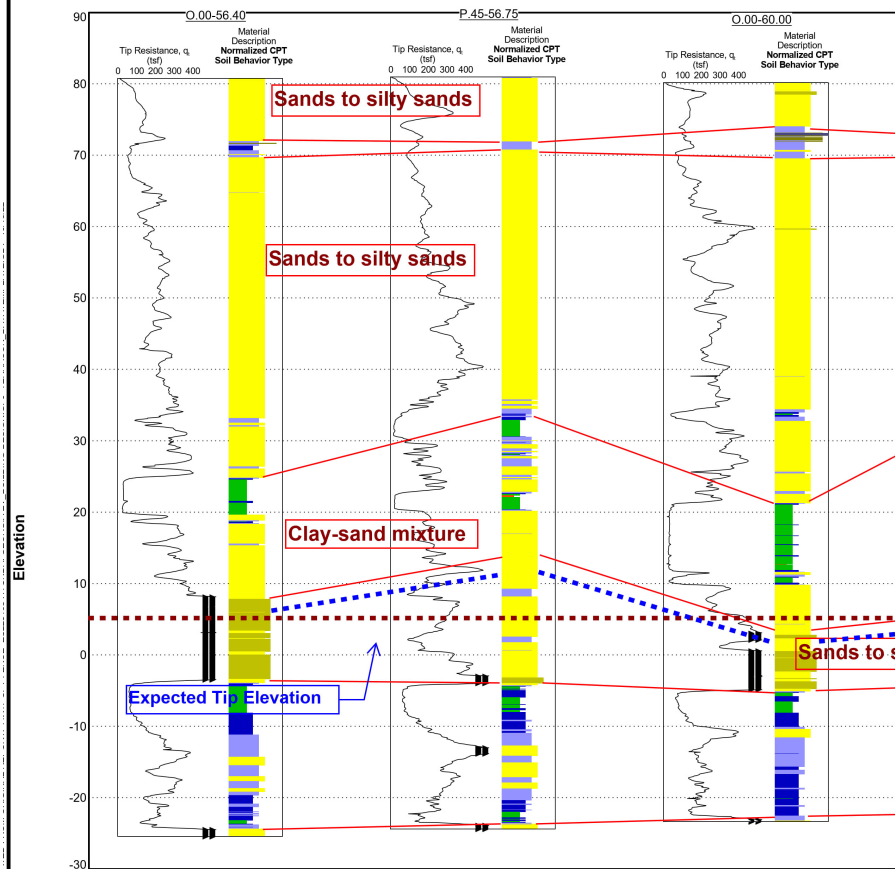
CONVENTIONAL AUGERCAST
AUGER



INTERMEDIATE DISPLACEMENT
PILE TOOL



BERKEL DISPLACEMENT
PILE TOOL



Credit: Berkel



Last piece of steel raised at
the HL-GA Battery Site



- Very clean;
- Software-defined, AI-first; EV-native smart factory;
- Super flat slabs;
- Stringent settlement tolerance

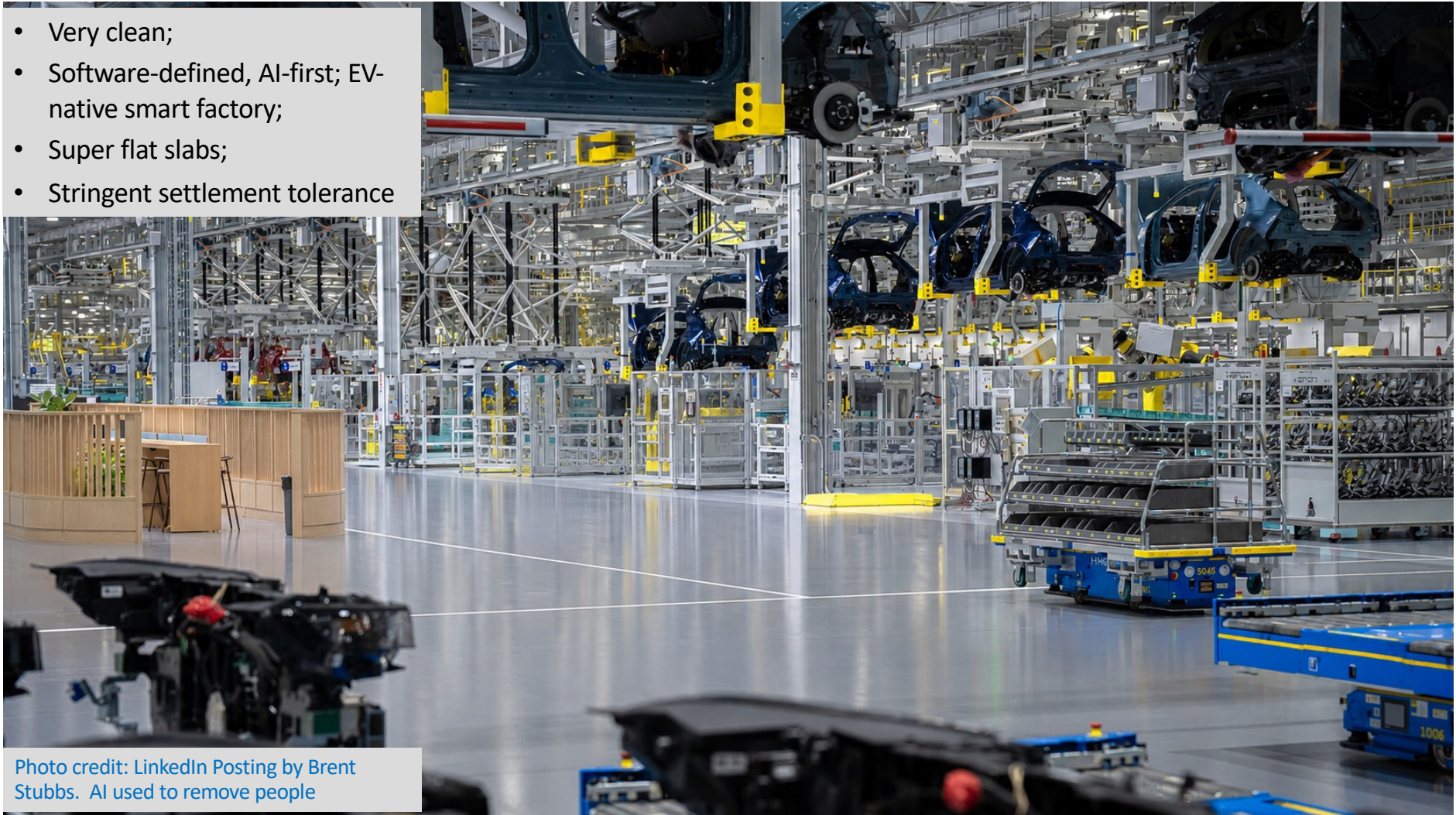


Photo credit: LinkedIn Posting by Brent Stubbs. AI used to remove people



Summary

- The project is the largest industrial development in Georgia, 3,000-acre site, 11 million cy of earth moving, 14 buildings;
- Expedited schedule-two years from groundbreaking to car production-two quarters ahead of schedule;
- The site has more favorite soils relative to the soft mud of Hutchinson Island and Pooler Gumbo clays. But sandy soils present challenges due to erosion;
- Surcharge preloading was used for buildings at the eastern end due to high fill (Mobis and PVC buildings);
- Auger cast piles were used to address settlement by static loads and prevent building collapse during an earthquake;
- Rigid inclusions were used for mitigating settlement by heavy floor loads; settlement control;
- Close collaboration with JDA, Hyundai Engineering, and other design engineers and contractors was key to the project's success.

Acknowledgments



Thank you!

Guoming Lin, Ph.D., G.E., BC.GE.

Vice President/Senior Consultant

(912) 200 9114

Guoming.Lin@terracon.com

