62nd Annual Alabama Transportation Conference

Pre-Bid Load Testing for the Mobile River Bridge and Bayway Public Private Partnership (P3) Project

W. Robert Thompson III, P.E., D.GE / Sam Sternberg III, P.E., D.GE
Dan Brown and Associates, PC

MOBILE RIVER BRIDGE & BAYWAY

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Today's Agenda

1. Project Overview
2. Decisions…Decisions…. (Factors for a Pre-Bid Load Test)
3. Load Test Program
4. Results
5. Going Forward….

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ALDOT Advisory Team

thompson ENGINEERING

HDR

MOTT MACDONALD

KPMG

CDM Smith

PRAG

SC

Shumer Consulting, LLC

PRR

MAYNARD COOPER GALE

AMES & GOUGH

MAYER·BROWN

DAN BROWN AND ASSOCIATES

Proposal Process – Proposing Teams (Concessionaires)

I-10 MOBILITY PARTNERS

MOBILE RIVER BRIDGE GROUP

GULF COAST CONNECTORS

1. Project Overview

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Project Overview

- The Mobile River Bridge and Bayway project will increase capacity on I-10 by:
  - Building a new six-lane bridge over the Mobile River
  - Replacing the existing Bayway with an eight-lane structure
  - Reconstructing seven interchanges along the corridor
- Facilitated through Public Private Partnership (P3)
- The Concession Agreement will be 55 years, including design, construction, maintenance and operations
- ALDOT estimates the cost at approximately $2 billion

Proposed Alignment

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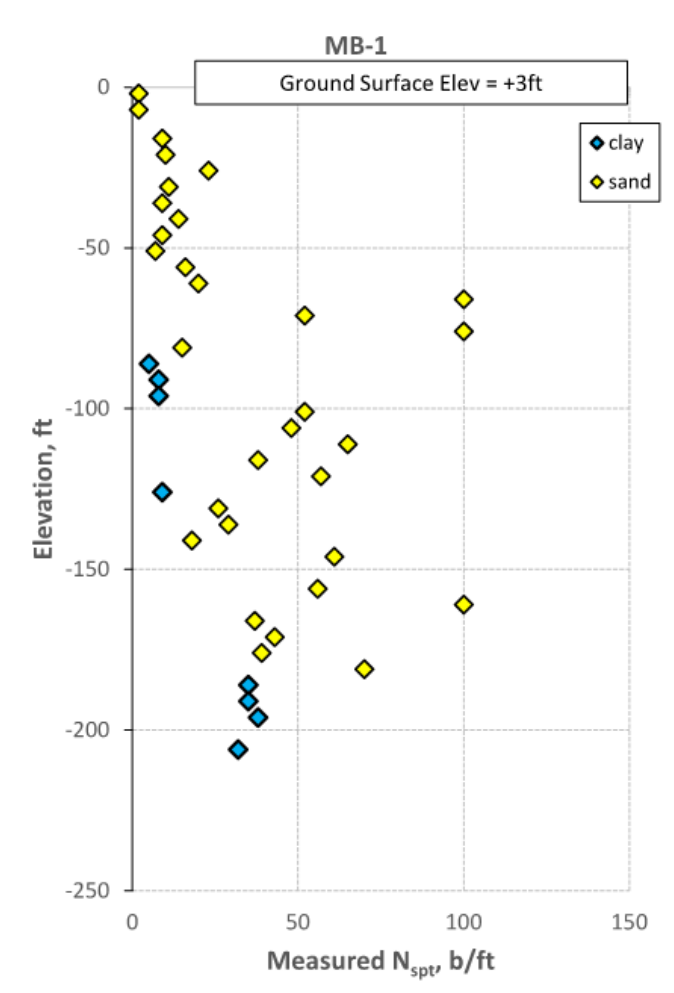
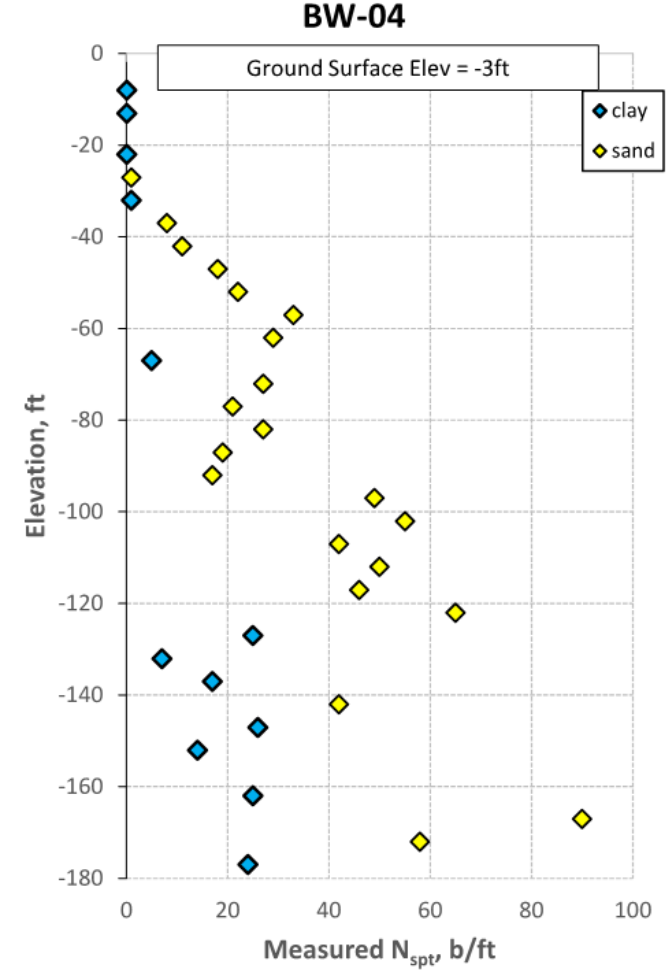
Subsurface Conditions





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2. Decisions.....Decisions (Factors for a Pre-Bid Load Test)

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Decisions…..Decisions…..

- Geotechnical Information Provided to the teams included over 24,000 ft of soil borings including up to 320 ft depths at the main piers in Subsurface Data Reports
  - Consolidation Information
  - Shear Strength of the Soils
  - Cone Penetrometer Data
  - Index Testing (Soil Classification)
- Post award Geotechnical Exploration by successful team
- Load Tests during Construction

IS THIS ENOUGH INFORMATION????????

Decisions…..Decisions…..

ALDOT Leadership

1. What are my project risks with foundations?

2. How much will it cost?
   (Better question: How much will this save us?)

3. Why is this important to the project?

1. What are my Project Risks with Foundations?

- Critical path item in the schedule for construction which has risk to engineering performance and construction
- High foundation loads including vessel impact, storm events, etc.
- Performance issues include axial side and base resistance values / lateral soil resistance in different soil strata
- Drivability, needs for pile driving aids, hammer size, required bearing without pile damage

2. How much will it cost?

- The ALDOT team estimated Foundation costs on could be as much as 40% of the total cost of the project.

Project Cost:	$1.5 billion
40% PC:	$600 million

If we save 1% of foundation cost……

$6.0 million

2. How much will it cost? (cont'd)

- Bayway – approximately 7 miles long (2 directions – 14 miles)
- Span lengths of 65 ft
- Assume 3 foundation piles per bent
- Assume piles are shortened 10 ft length (load test vs no load test)

Equates to over 34,000 ft of pile driving eliminated and cost savings to the project and schedule

3. Why is this important to this project?

- Provides information on performance of various foundation types
- Mitigation of Risk and Unknowns as it relates to installation techniques (Means and Methods)
- Provides information concerning unit side and base resistance
- Improves reliability therefore, reducing risk
- Reduces unknowns for the ALDOT and Concessionaire

3. Why is this important to the project? (cont'd)

- Evaluates long term pile setup and compare dynamic/static/statnamic testing for these soil conditions
- Assists in establishing specifications for the pile installation for different pile types
- Helps the teams reduces the amount of "contingency" put into the foundations
- Helps the teams in developing a foundation installation schedule
- Provides the same information to all of the teams

3. Load Test Program

Six Phases of a Project (PM 101)

1. Enthusiasm
2. Disillusionment
3. Panic
4. Search for the Guilty
5. Punishment of the Innocent
6. Praise and Honors for the non-participants

Load Test Program Schedule

Milestone	Anticipated Date
Load Test Proposal Submitted	August 2017
Load Test Approval by ALDOT	August 2017
Plans	October 2017
ALDOT Office Engineer	November 2017
Letting	December 2017
Notice To Proceed	January 2018
Complete Load Test Program	May/June 2018

Bids…..

Jordan Pile Driving	$3,398,815.00
Massman Construction	$4,216,156.25

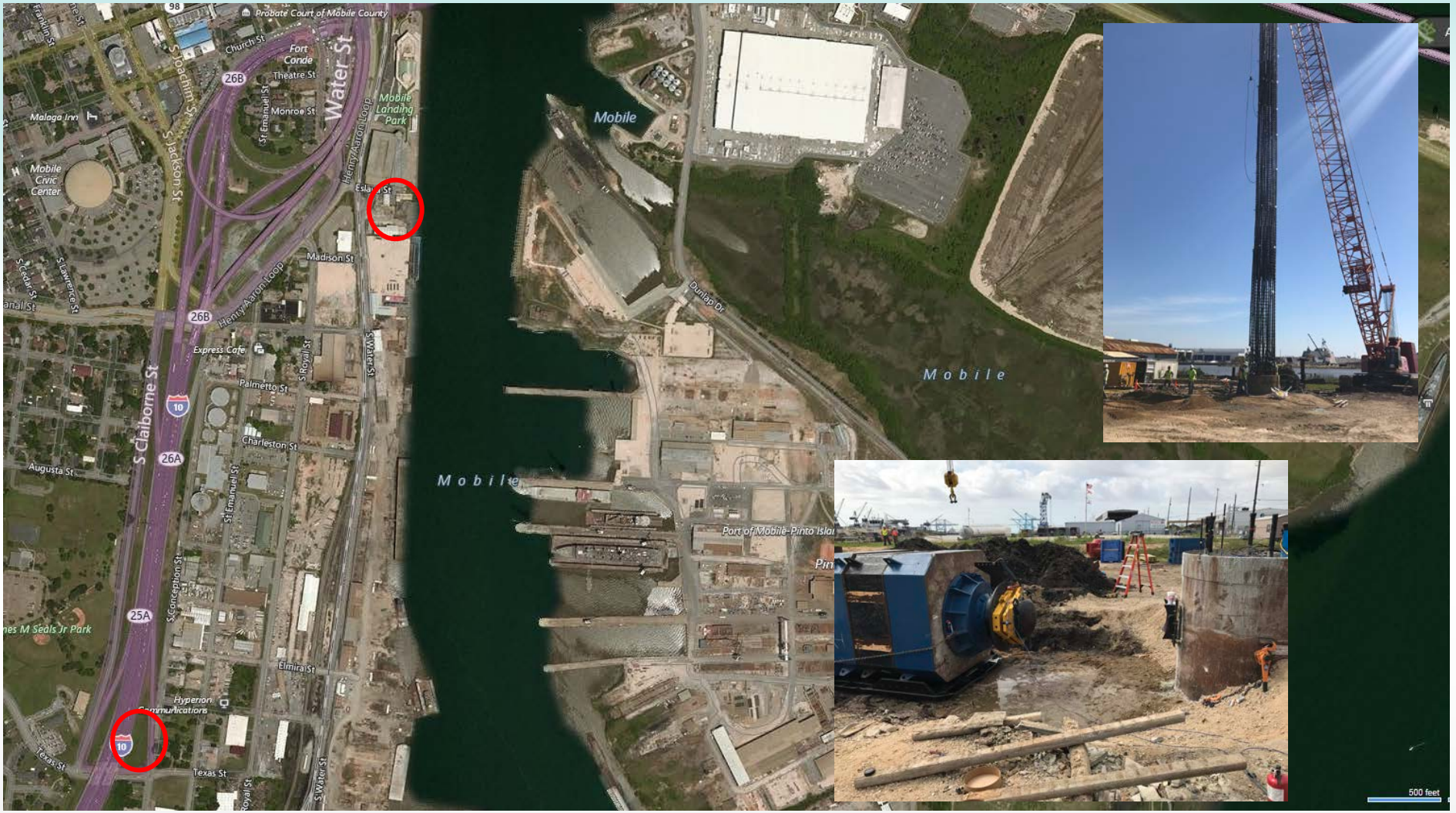
Load Test Program

- Drilled Shaft - 72in (with 78in steel casing)
  - Bi-directional (AFT Cell)
  - Lateral Rapid Load Testing

- Driven Piles
  - H-Piles 14x89 (2 Piles)
    - Dynamic Testing (EOD, 1 day, 7 day and 12 day restrikes)
    - Static Testing
  - PPC 18 inch Square (2 Piles)
    - Dynamic Testing (EOD, 1 day, 7 day and 13 day restrikes)
    - Static Testing

Load Test Program

- PPC 30 inch Square (1 Pile)
  - Dynamic Testing (EOD, 1 day, 7 day and 15 day restrikes)
  - Rapid Load Testing
- 54 in Concrete Cylinder Spun Cast Piles – (5 Piles)
  - 3 Locations along Bayway
  - Typical EOD, 1 day, 14 day restrikes
  - Rapid Load Testing (2100 ton device)
  - Jetting (required to a minimum elevation vs. allowed)
- 60 in Steel Pipe Pile - 175 ft in length (1 Pile)
  - Vibrated in 75 ft Section
  - Drive 100 ft Section
  - EOD and 13 day restrike
  - Rapid Load Testing (2100 ton device)



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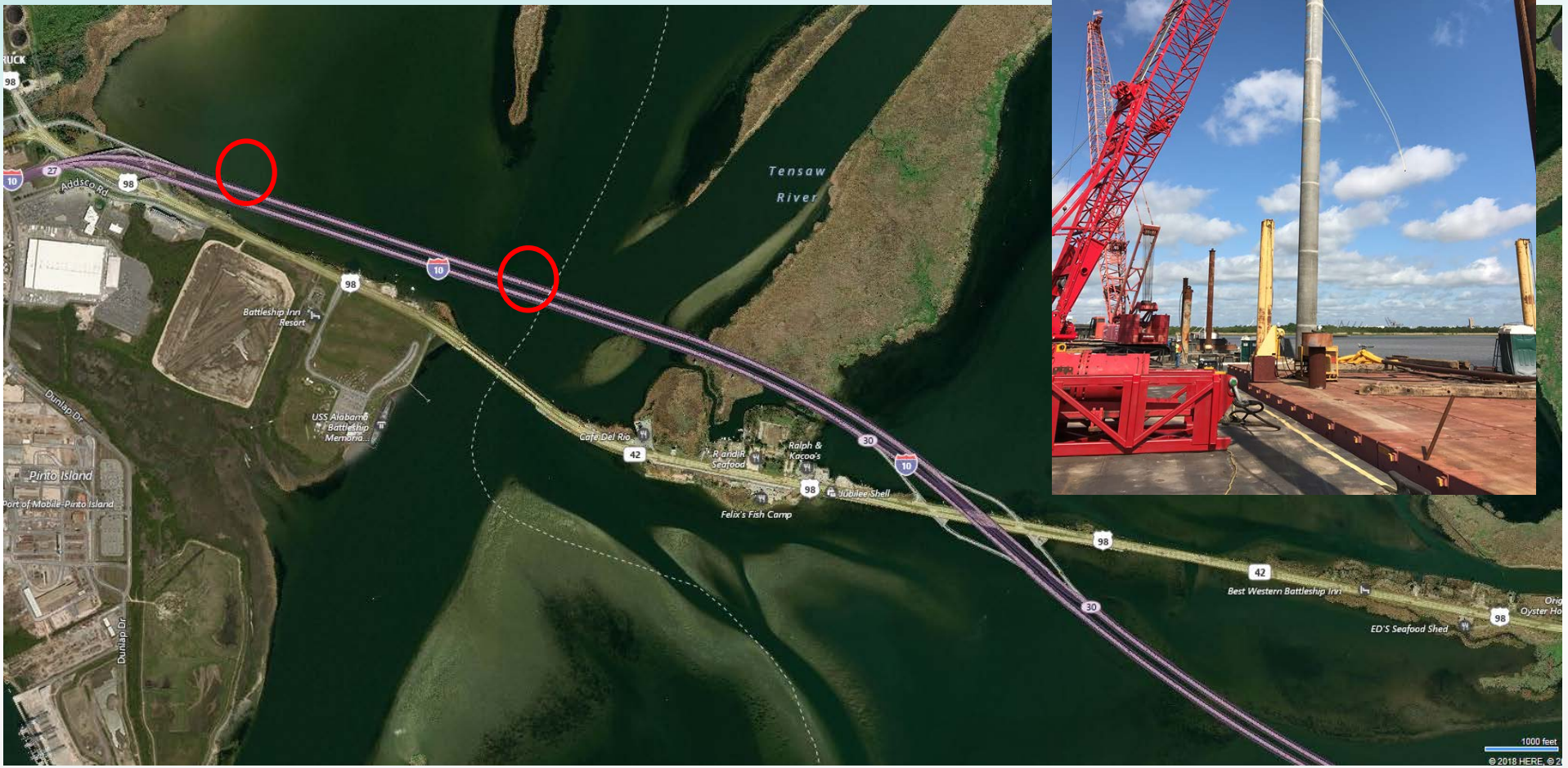

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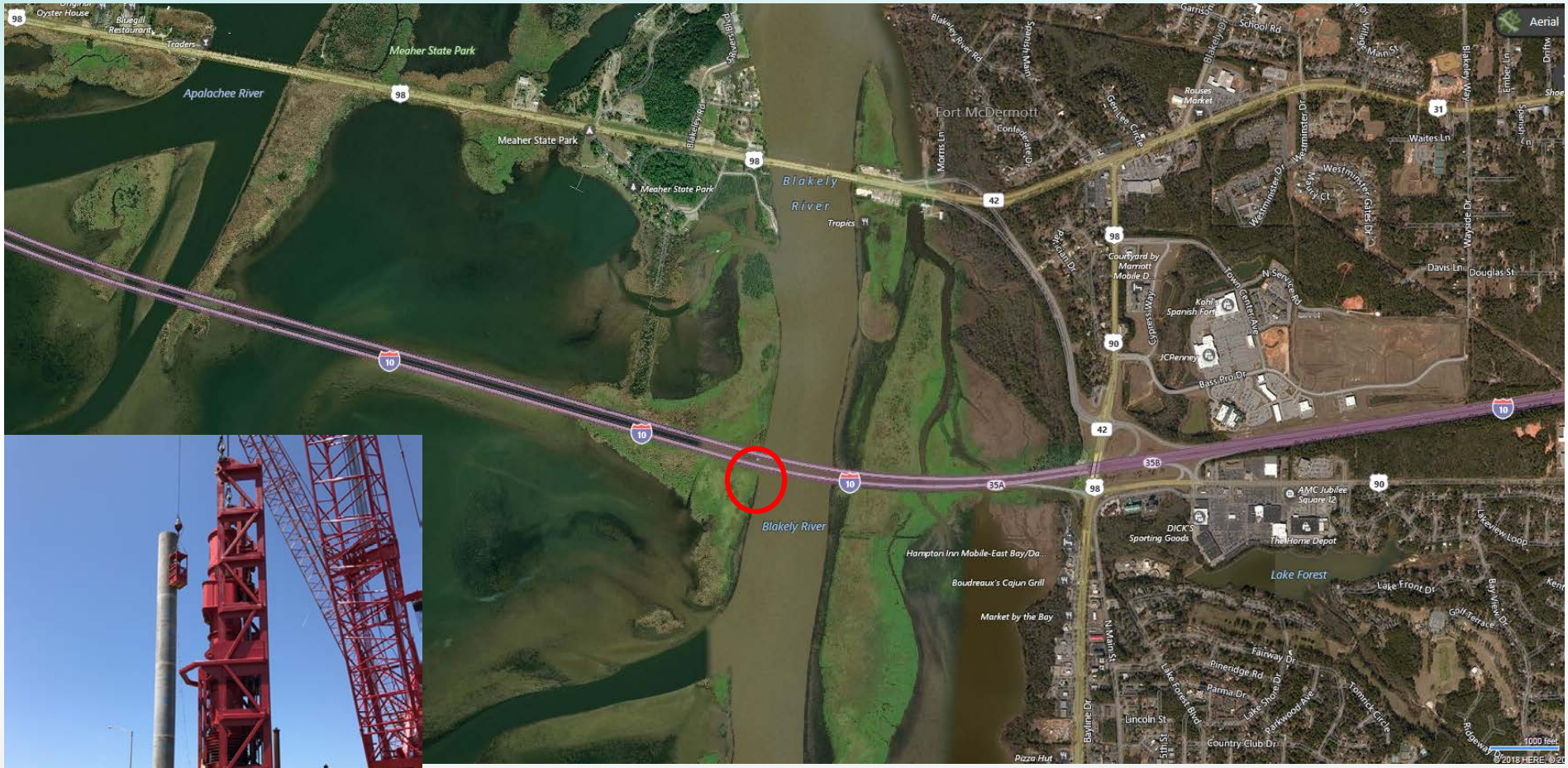

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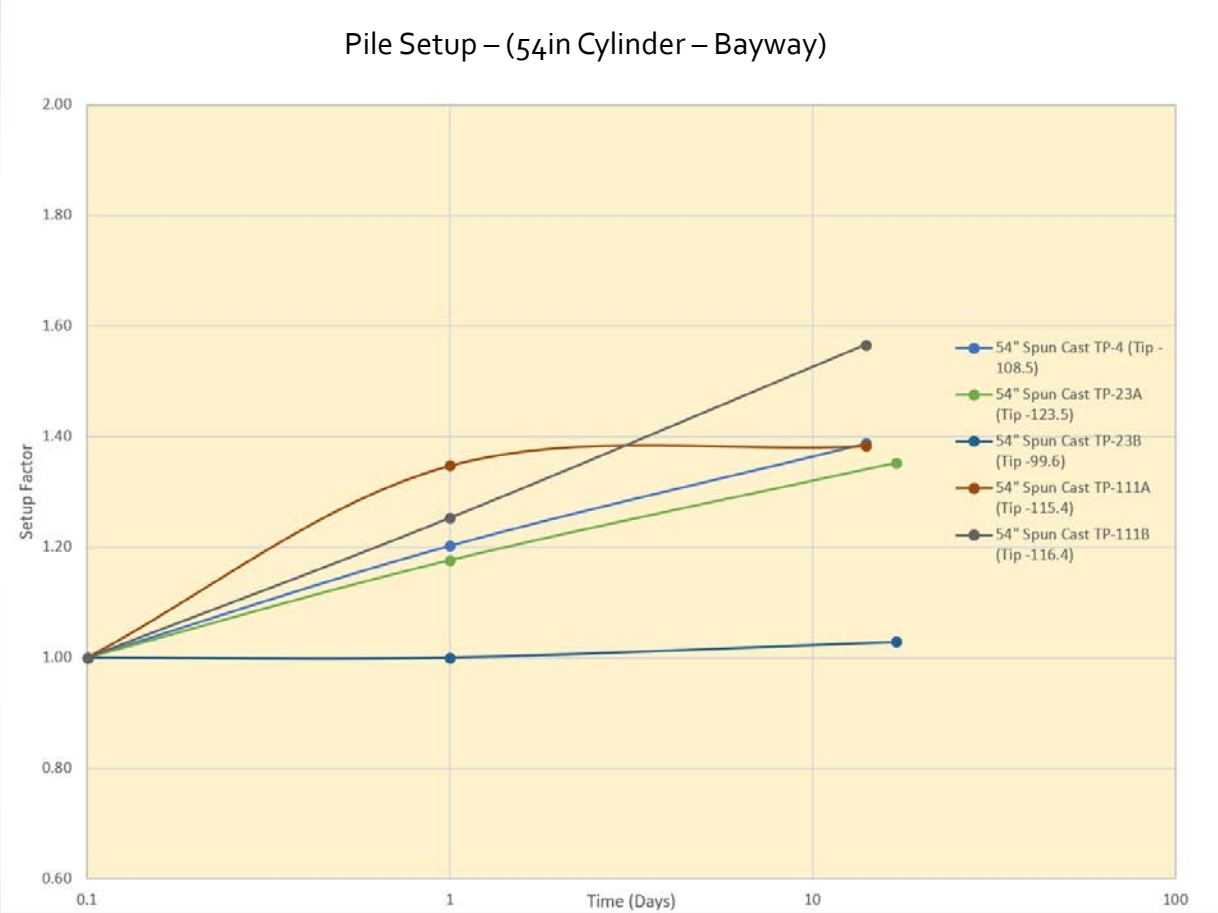
4. Results

Driven Pile Summary

Pile Number	Pile Type	Pile Tip Elevation	End of Drive Resistance (kips)-Dynamic	Max Restrike Resistance (kips)-Dynamic	Static Resistance (kips)	Statnamic Resistance (kips)
TP-10A-1	HP 14x89	-65.3	179	238	367	--
TP-10A-2	HP 14x89	-65.4	188	242	--	--
TP-10B-1	18" PPC	-59.8	355	510	--	--
TP-10B-2	18" PPC	-60.9	375	483	674	--
TP-4	54" Spun Cast Pipe Pile	-108.5	1081	1500	--	--
TP-23A	54" Spun Cast Pipe Pile	-123.5	1700	2300	--	2705
TP-23B	54" Spun Cast Pipe Pile	-99.6	1050	1080	--	1917
TP-23C	30" PPC Square	-97.6	440	770	--	1060
TP-111A	54" Spun Cast Pipe Pile	-115.4	1410	1950	--	--
TP-111B	54" Spun Cast Pipe Pile	-116.4	1437	2250	--	--
TP-WPA	60" Steel Pipe	-168	1850	2700	--	2980

Driven Pile Summary



Dynamic Setup

14x89 H-Piles (Landside)

- Up to 1.3

18 inch PPC Piles (Landside)

- Up to 1.4

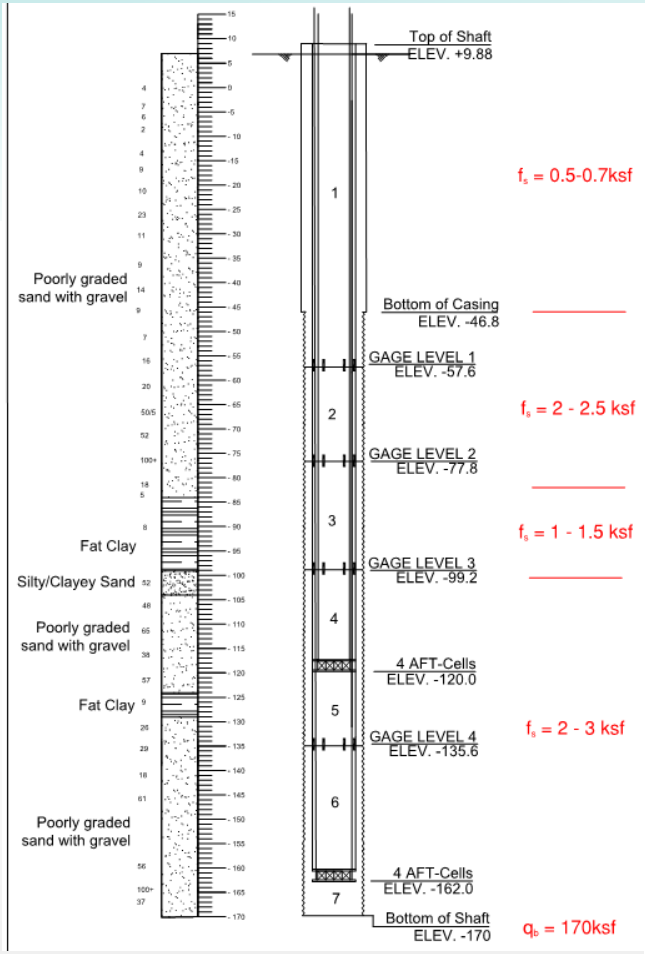
30 inch PPC Piles (Bayway)

- 1.8

60 inch Steel Pipe Pile (Landside)

- 1.5

Drilled Shaft Summary



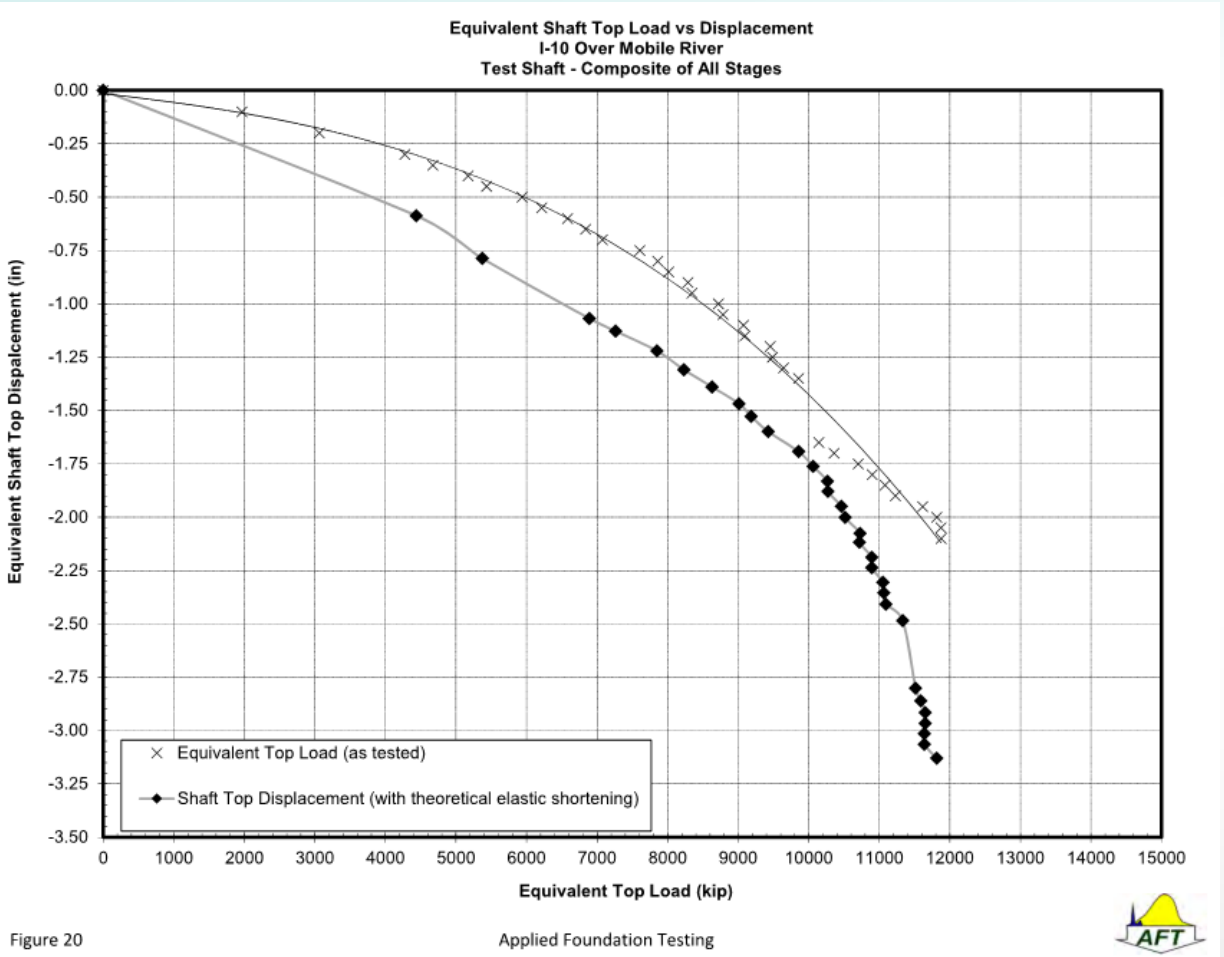


Figure 20

Applied Foundation Testing

AFT

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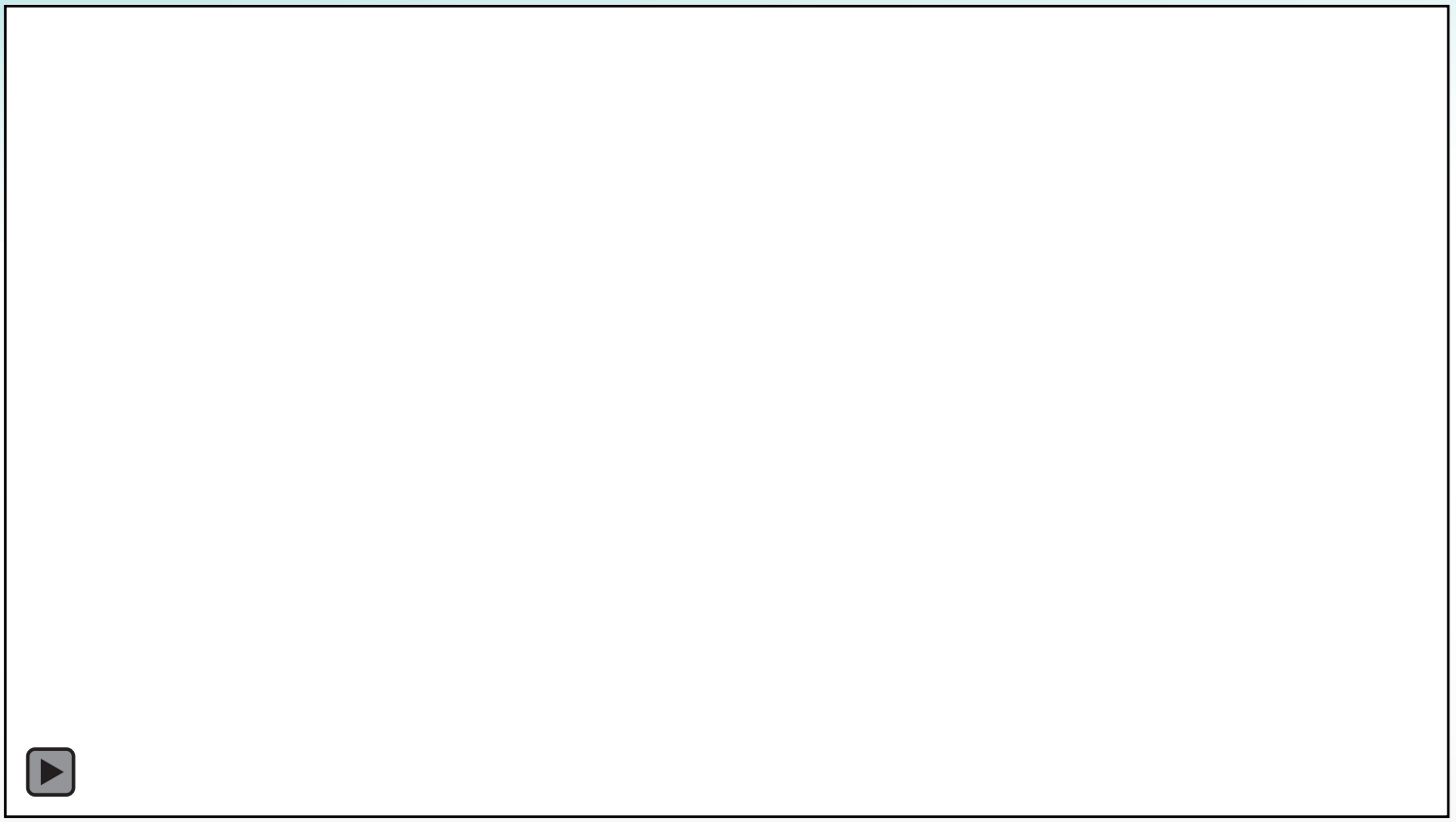

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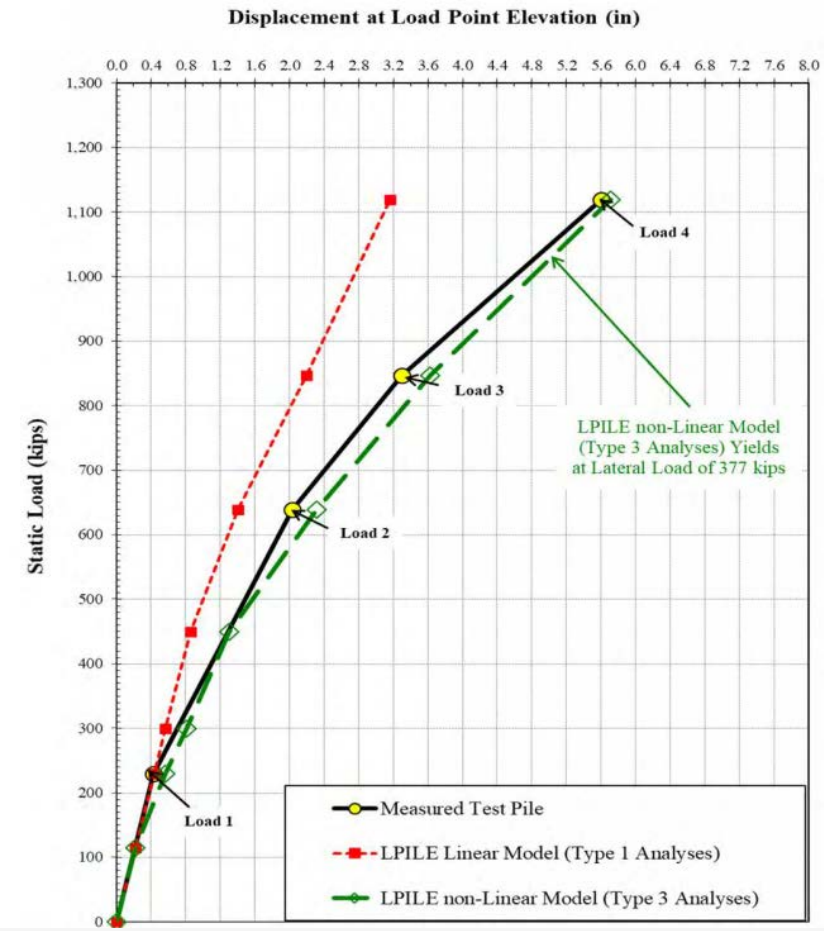
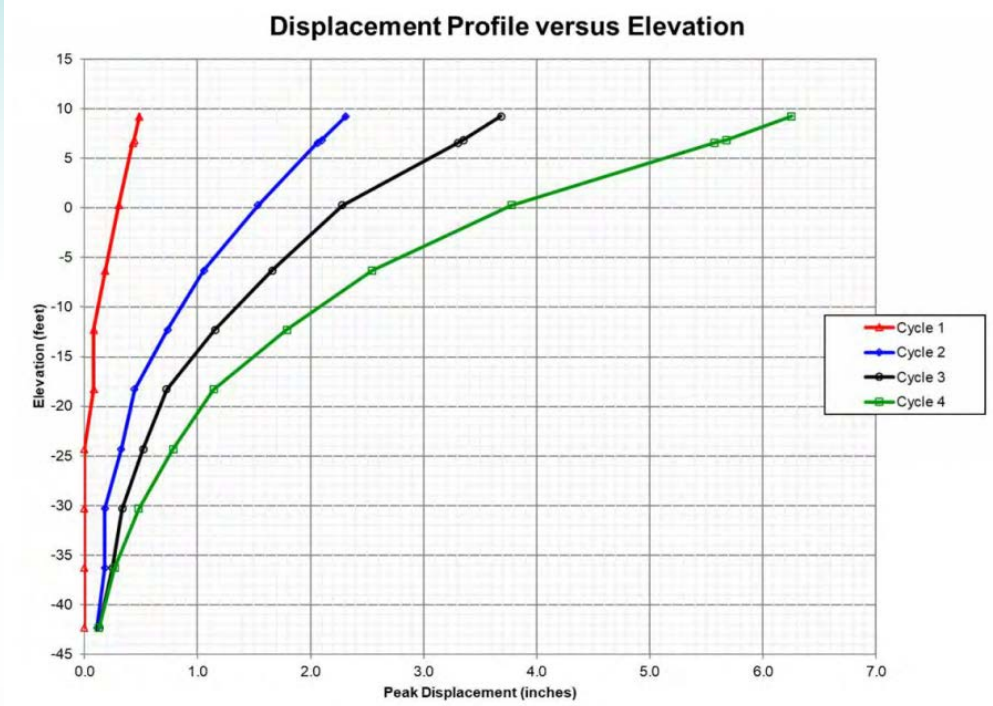
Drilled Shaft Summary





	Approximate Load	Approximate Top of Shaft Displacement
Load #1 (Cycle 1)	250 kips	0.5 in
Load #2 (Cycle 2)	800 kips	2.3 in
Load #3 (Cycle 3)	950 kips	3.6 in
Load #4 (Cycle 4)	1450 kips	6.2 in

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5. Going Forward….

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Going Forward

- Data has been provided to teams
- Schedule allows the teams to incorporate and use the data for their bids - using the load test for design rather than proof testing
- Selection of resistance factors by the team is still guided by AASHTO
- Technical Provisions still require additional loads tests for verification of design (pile driving equipment, installation means and methods, etc.)
- The teams have installation information (pile records, installation techniques, etc.) to better assess risk and reduce contingencies

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ALDOT

thompson ENGINEERING

JORDAN PILE DRIVING

Load Test Program Team

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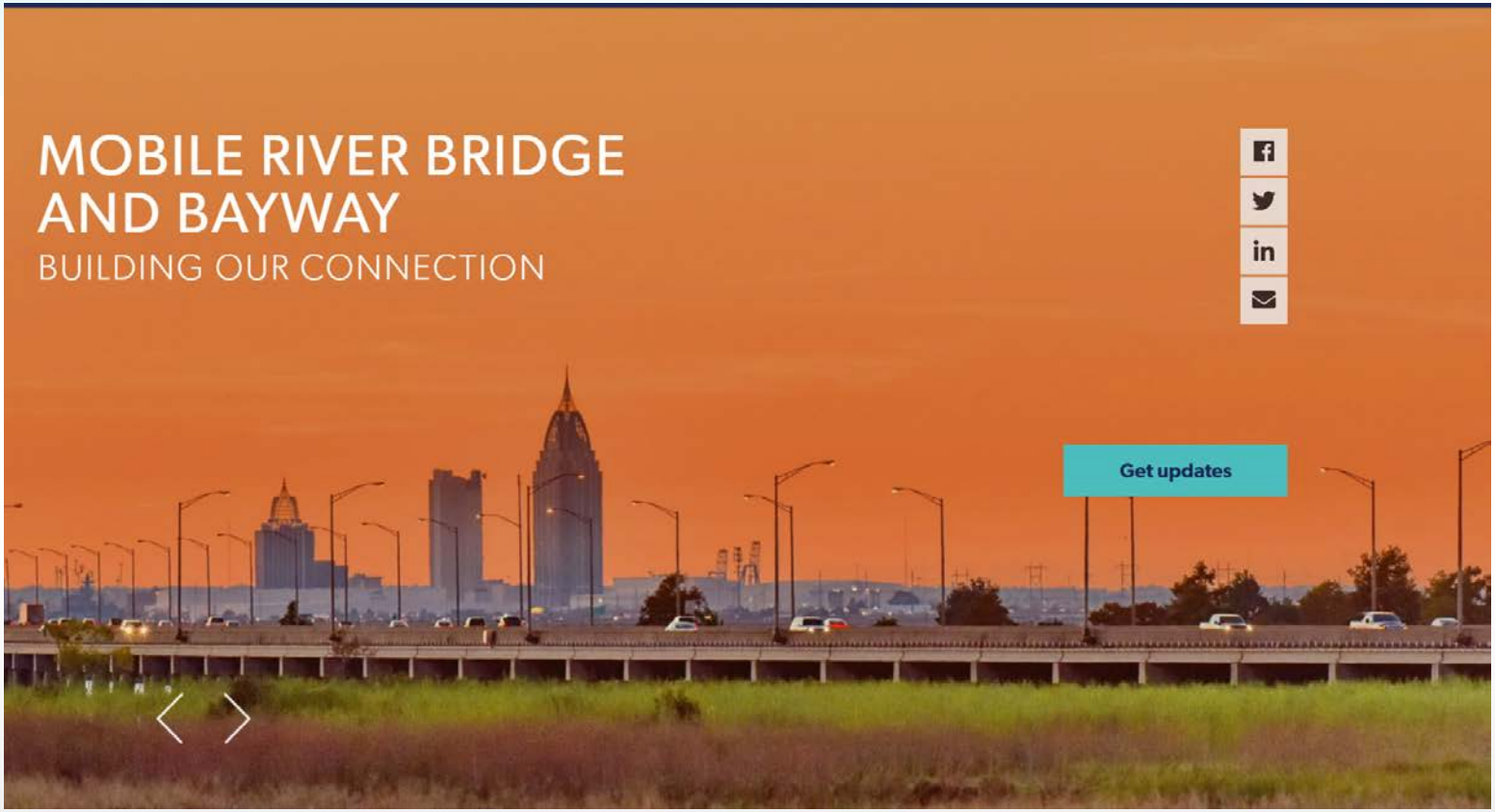

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Questions?

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