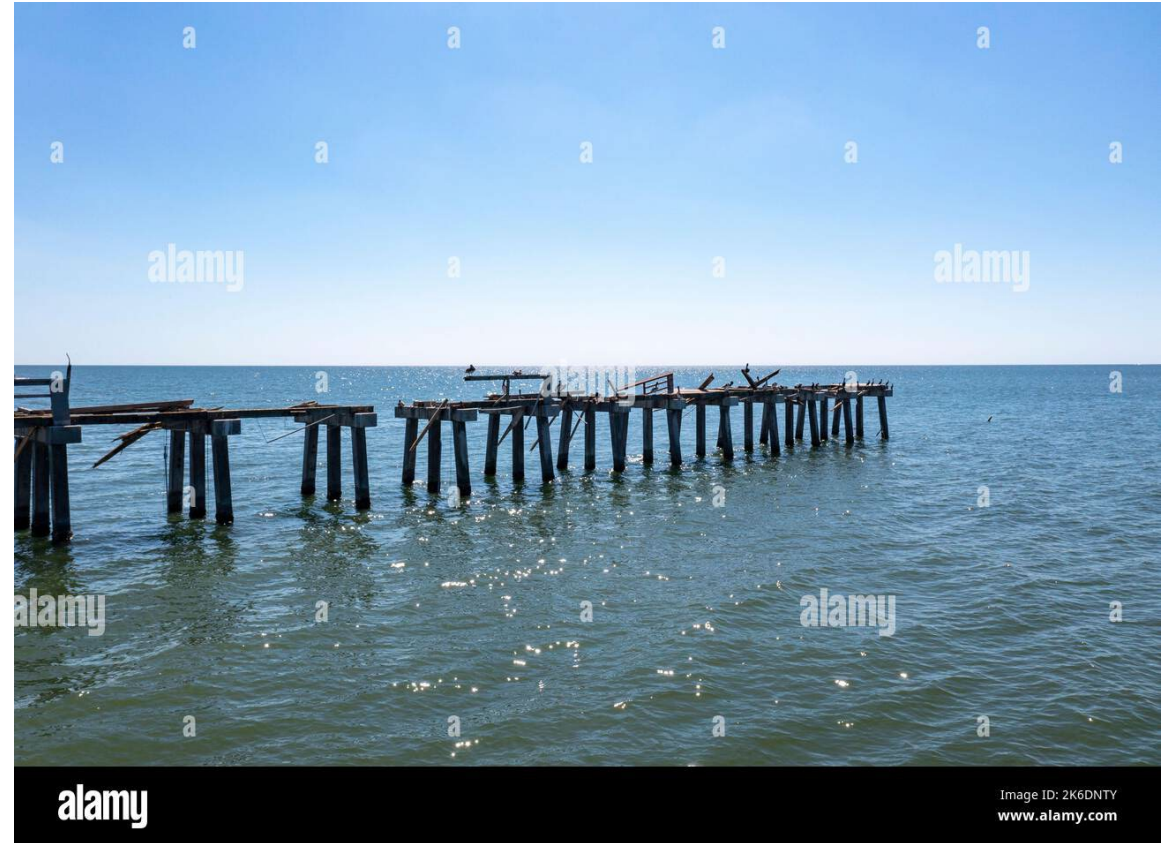


MHK  
ARCHITECTURE

# The Problem

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- The Naples Pier, a historic and popular tourist attraction, was **damaged by Hurricane Ian**.
- The storm lifted and slammed the pier, destroying a railing, supports, and pilings.
- About 460 feet of the pier, including a shelter, were torn out and submerged in the Gulf of Mexico.



# The Challenges

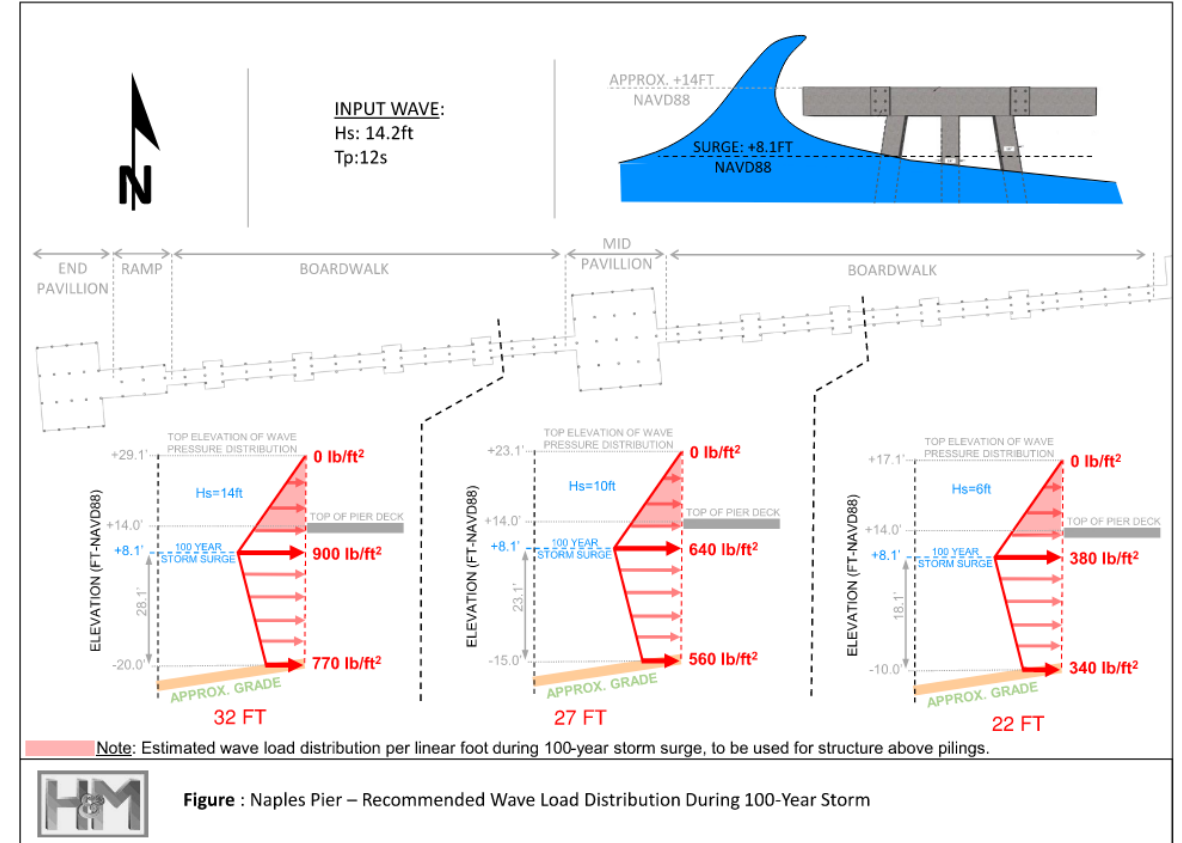
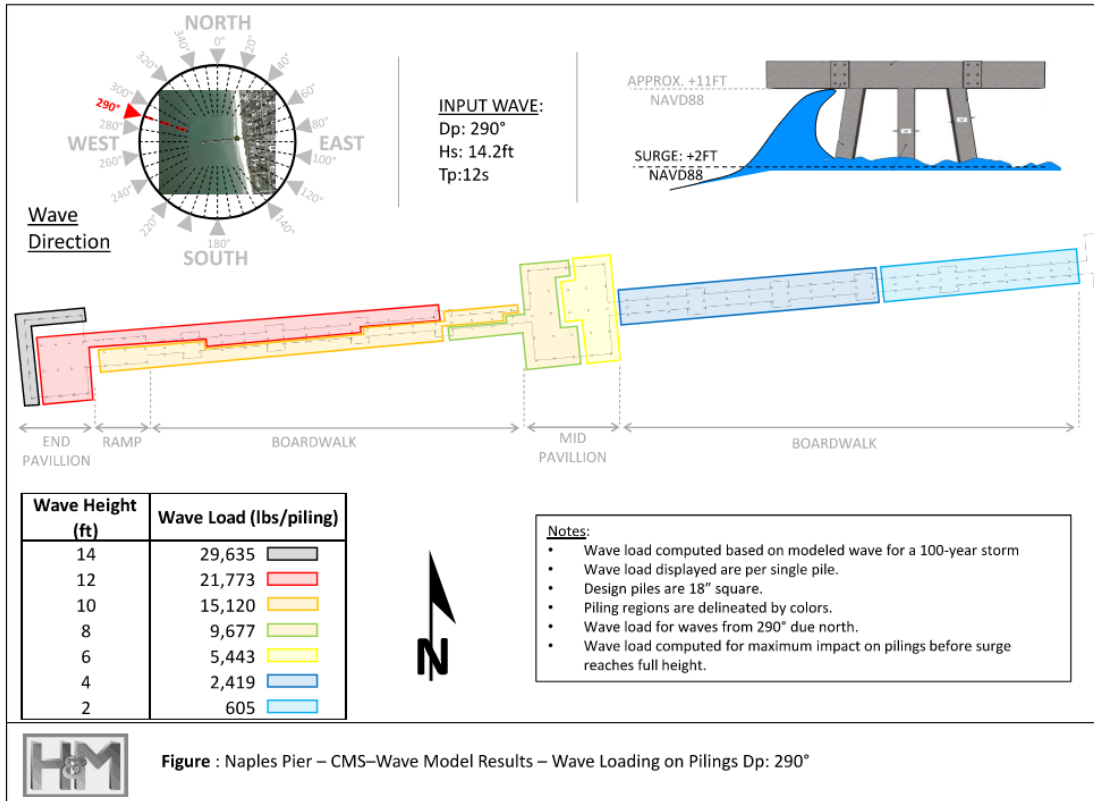
- Design the pier superstructure that can withstand a 100-500 year storm.
- Maintain the historic footprint and aesthetics of the Naples pier.
- Ensure the pier is constructable and durable.



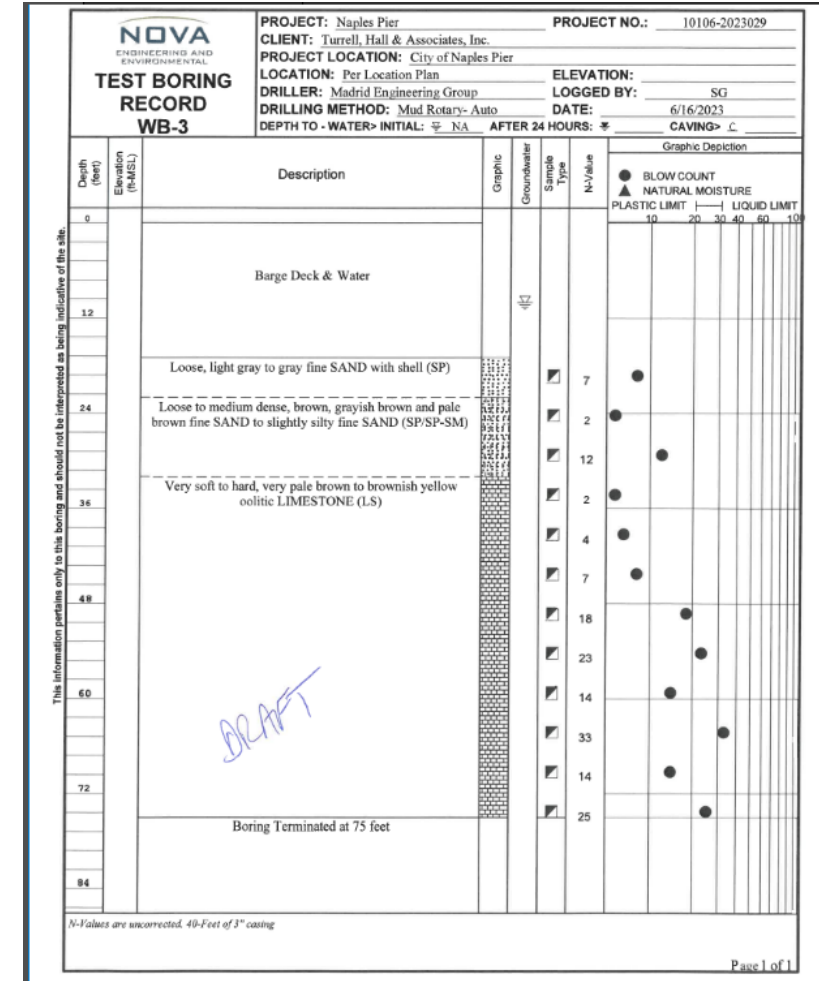
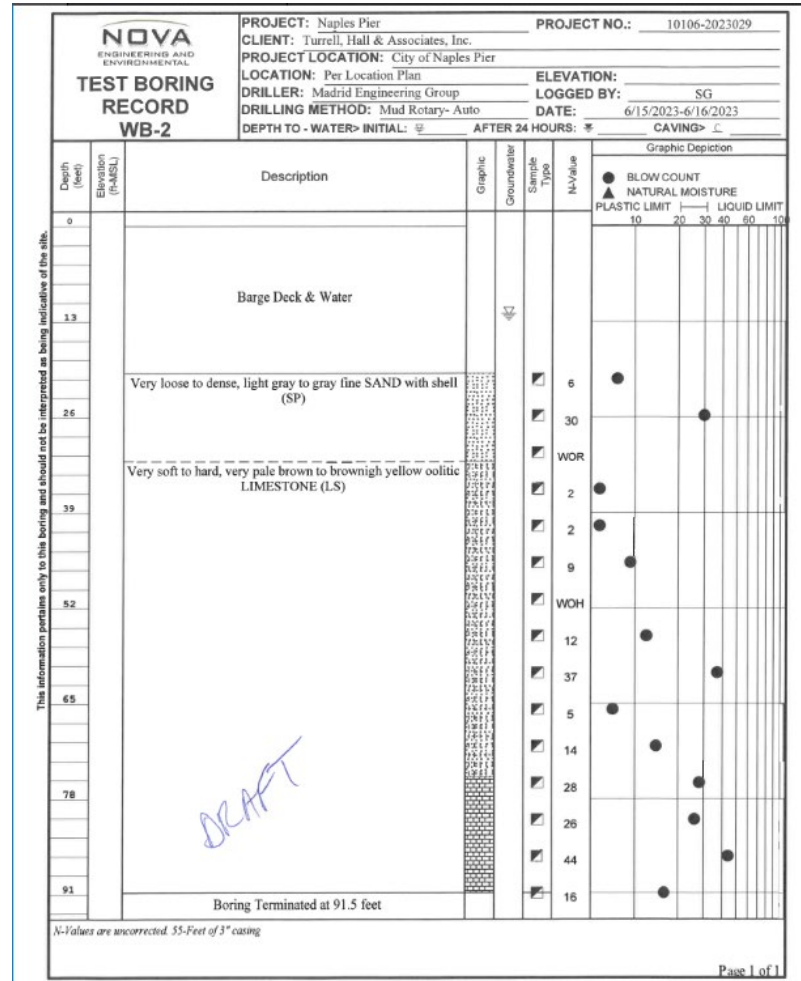
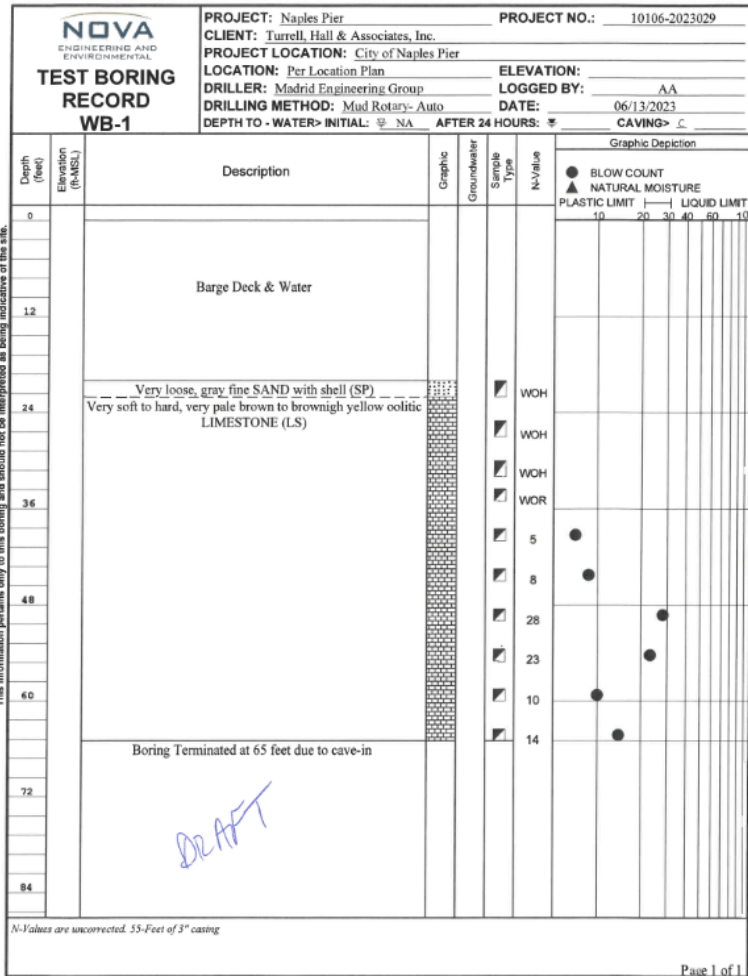
# Methodology

- Make a structural model for the piles and superstructure based on the initial design from MHK and the wave data for the 100-500 year storm from H&M.
- Work with the geotechs from Nova to determine pile size and lengths.
- Initial pile cross sections set to 18"X18" square prestressed concrete pile and 100' length (vs 14" Sq at ~60' length).

# Wave Data

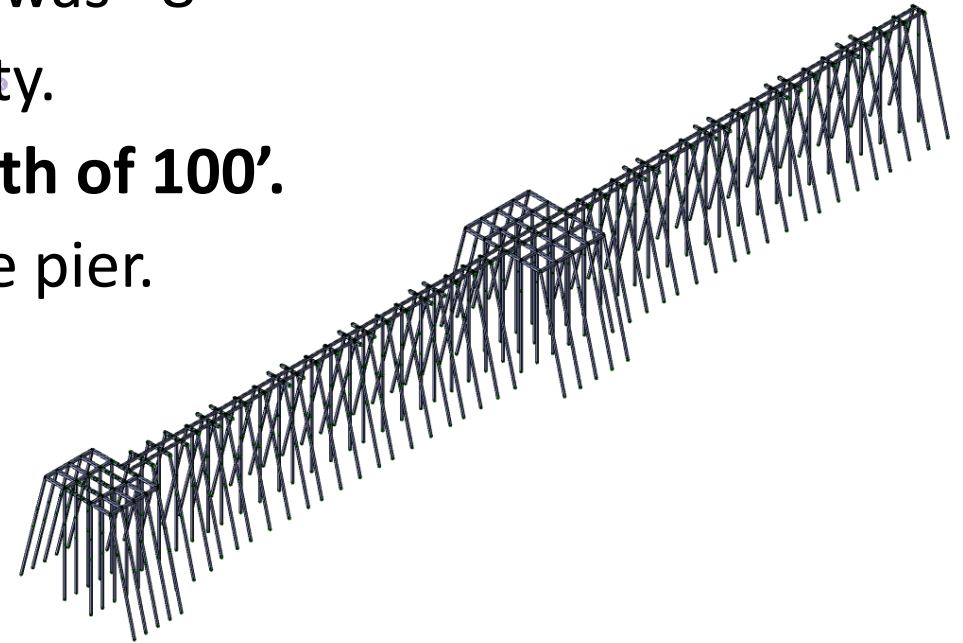


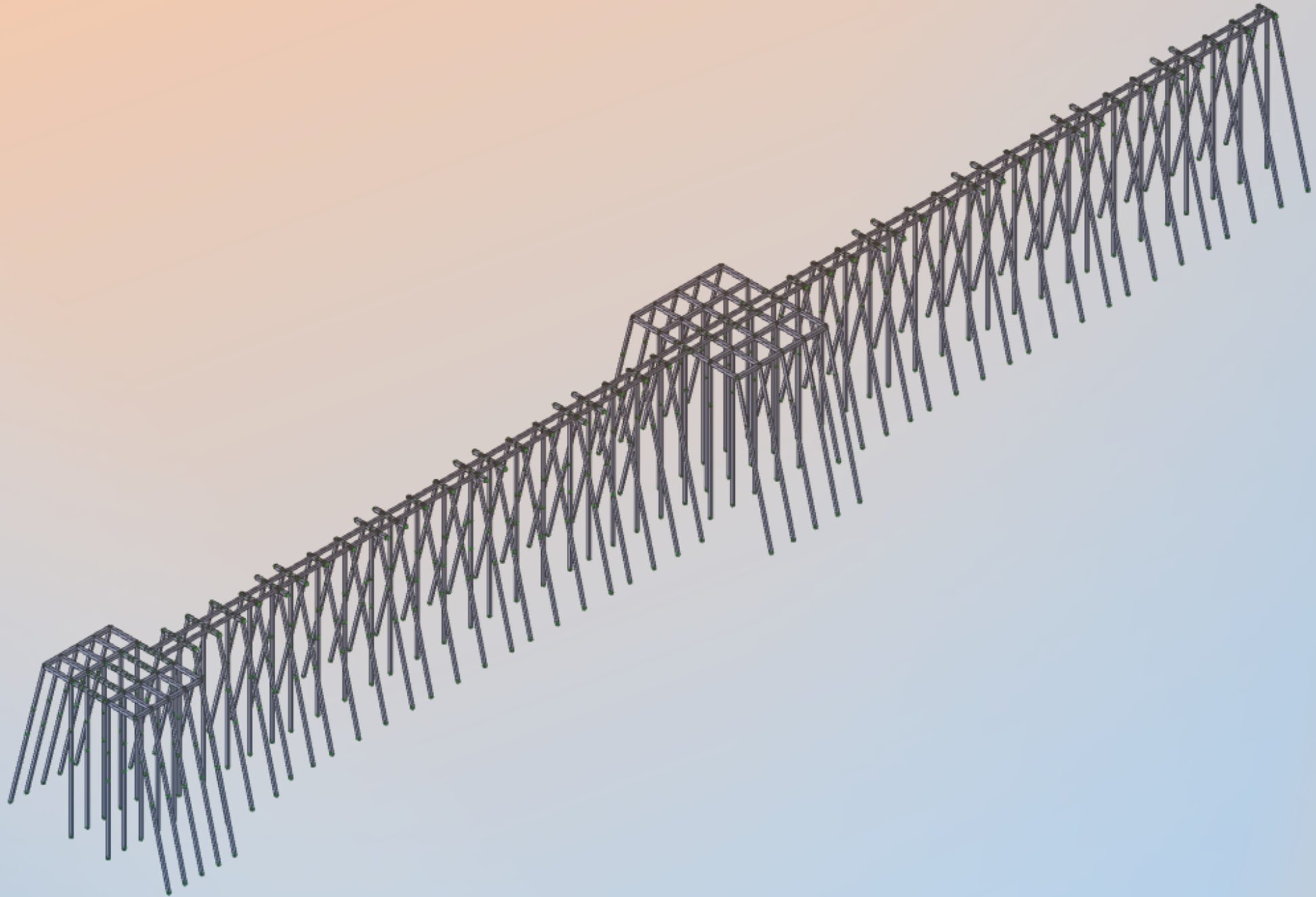
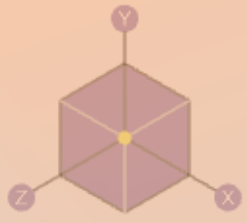
# Boring Logs



# Risa Model

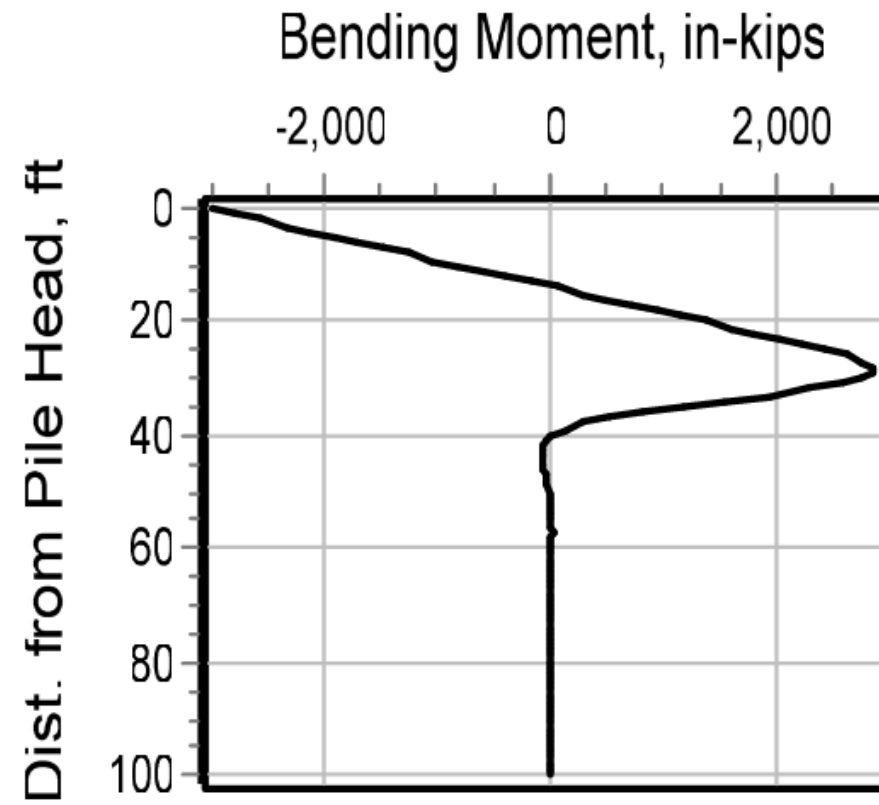
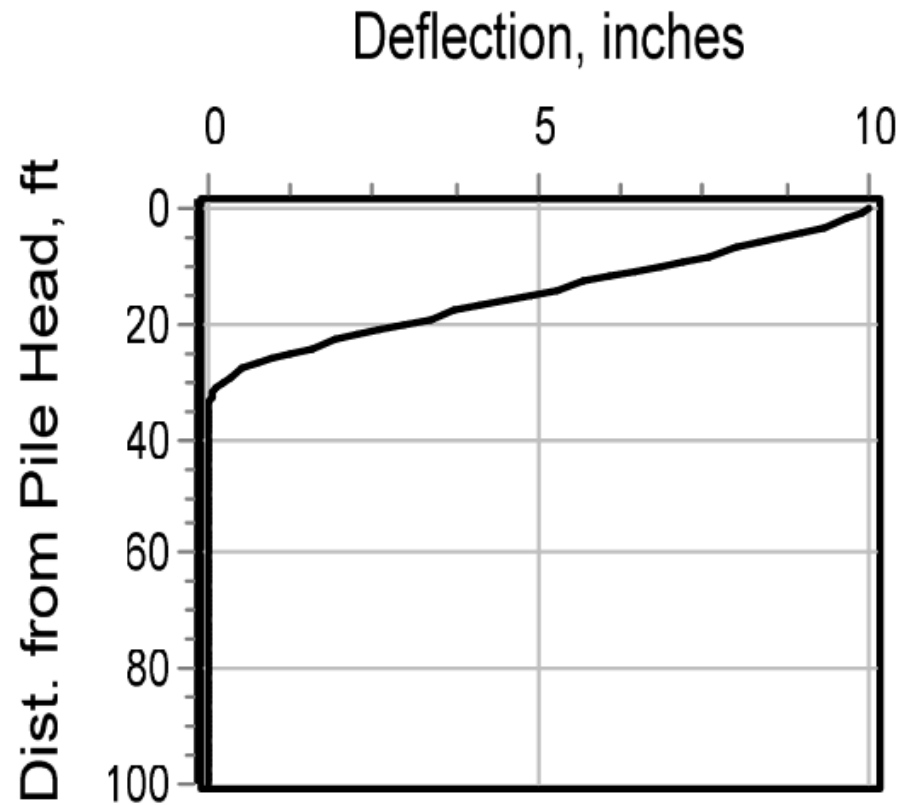
- Entered wave loads into a +800 member Risa 3D model.
- Obtained max reactions and deflections to give to the geotechs to design around.
- Max pile head deflection at the end of the pier was ~8"
- This data returned a piling size and point of fixity.
- **Geotechs verified 18" sq piles with a max length of 100'.**
- Pile length set to 70' for the eastern third of the pier.
- **Long'tl girders run the length of the structure.**



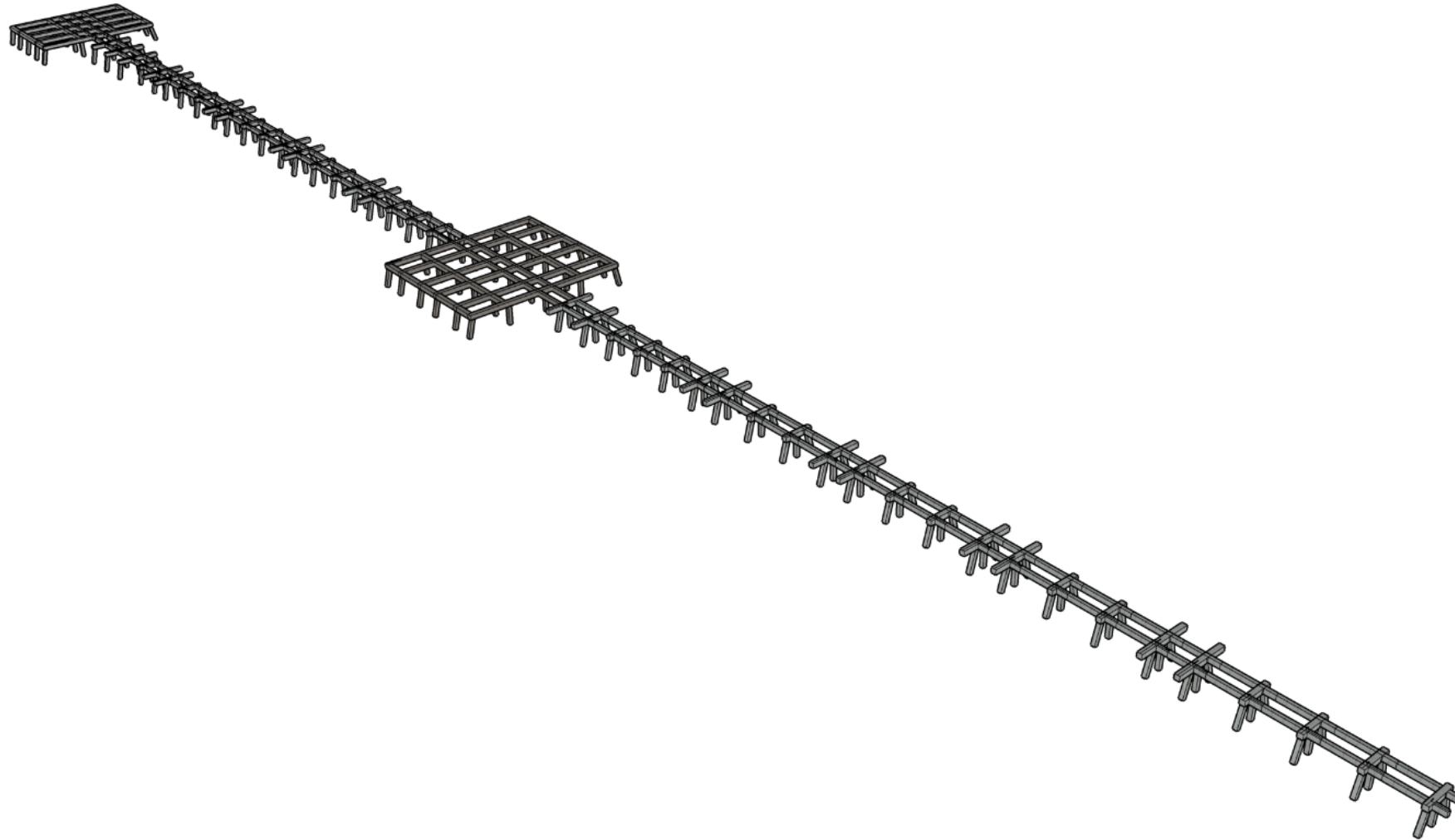




Lpile data with 10" deflection (Mudline Elv -10)  
(since updated to 8" def.)



# PIER OVERVIEW



**OSBORN**  
ENGINEERING  
102 Columbia Drive, Suite 105  
Cape Canaveral, FL 32920  
(321) 784-5811

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Rev	Detail	Date

NAPLES PIER  
NAPLES, FLORIDA

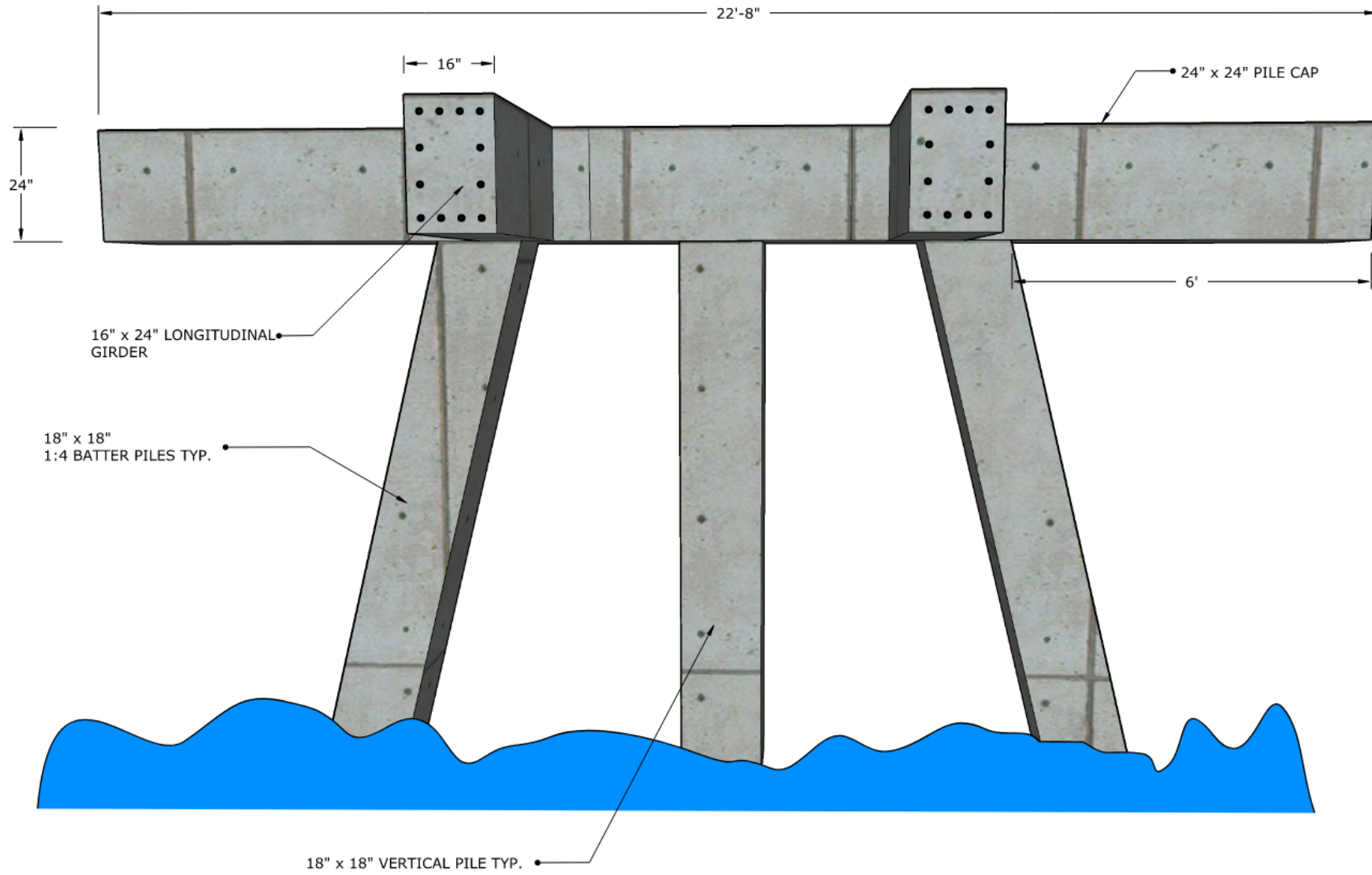
FOUNDATION  
DESIGN

PIER OVERVIEW

1 of 8

**Naples Pier**  
Proposed Foundation Design

# SEATING AREA




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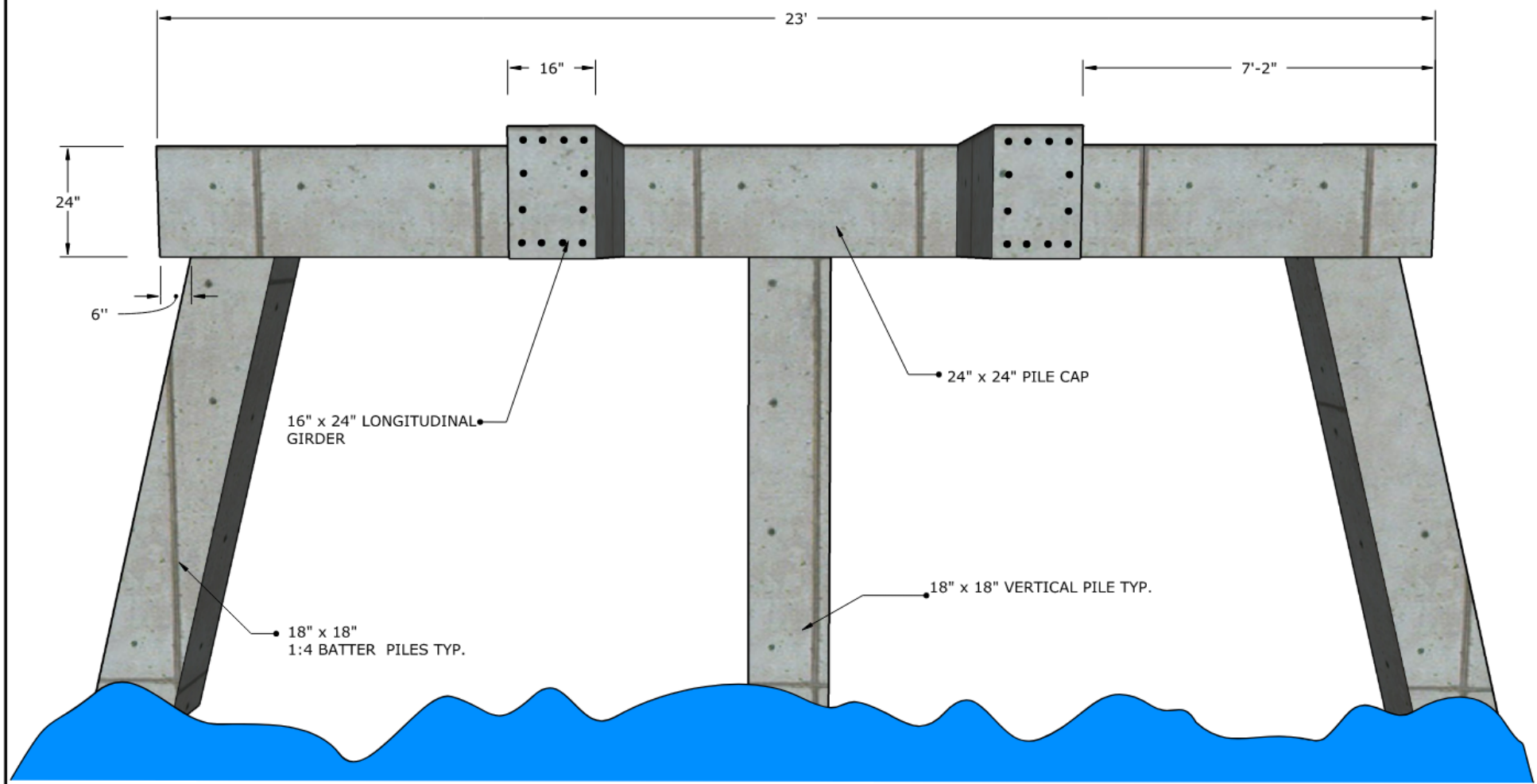
NAPLES PIER  
 NAPLES, FLORIDA

FOUNDATION  
 DESIGN

TYPICAL SEATING

3 of 8

# RAMP BENT



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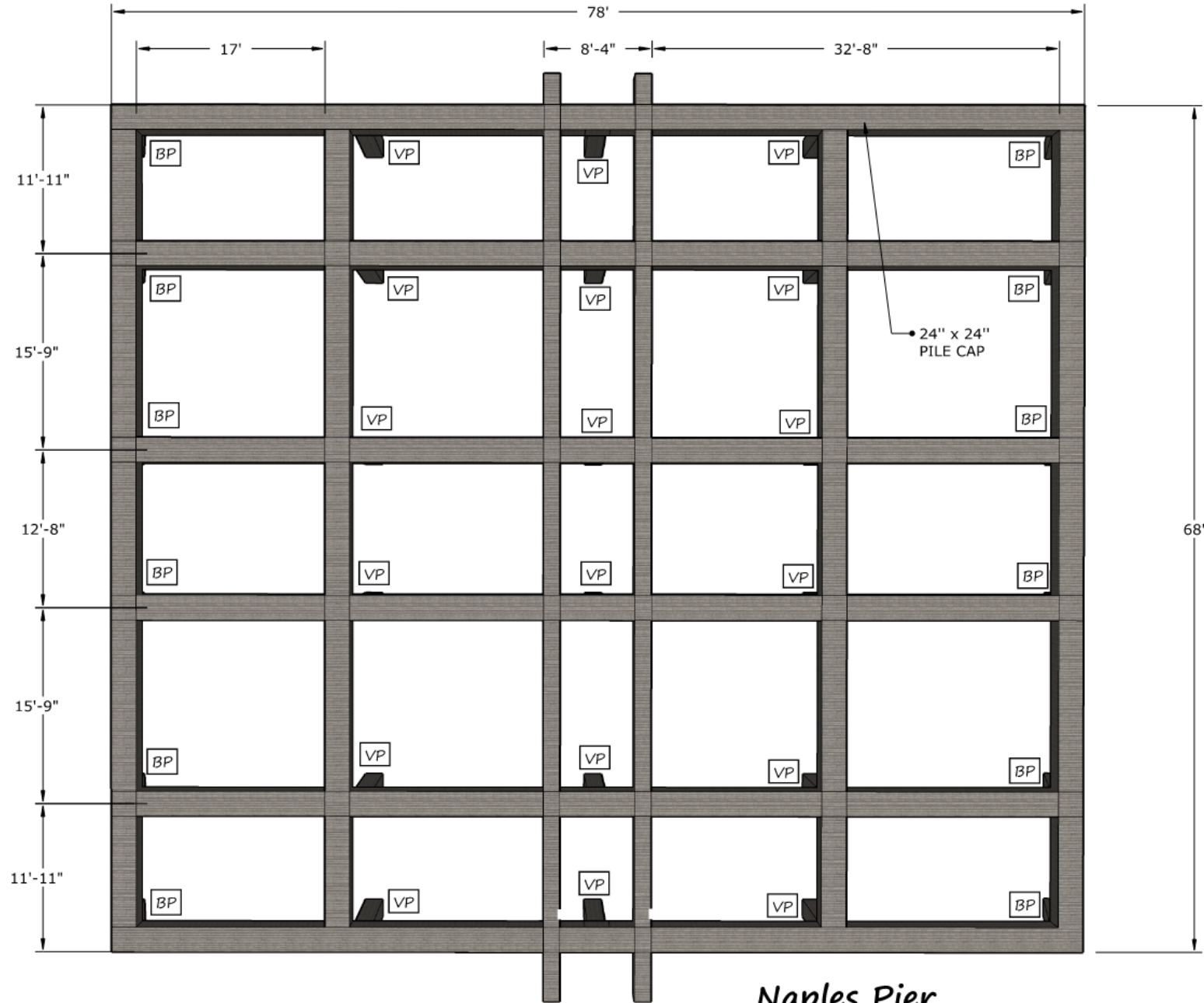
NAPLES PIER  
NAPLES, FLORIDA

FOUNDATION  
DESIGN

RAMP BENT D3-D5



4 of 8

# MID PAVILION PLAN VIEW




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**LEGEND:**

 VP : VERTICAL PILES  
 BP : BATTER PILES

8/21/2025

Rev	Detail	Date

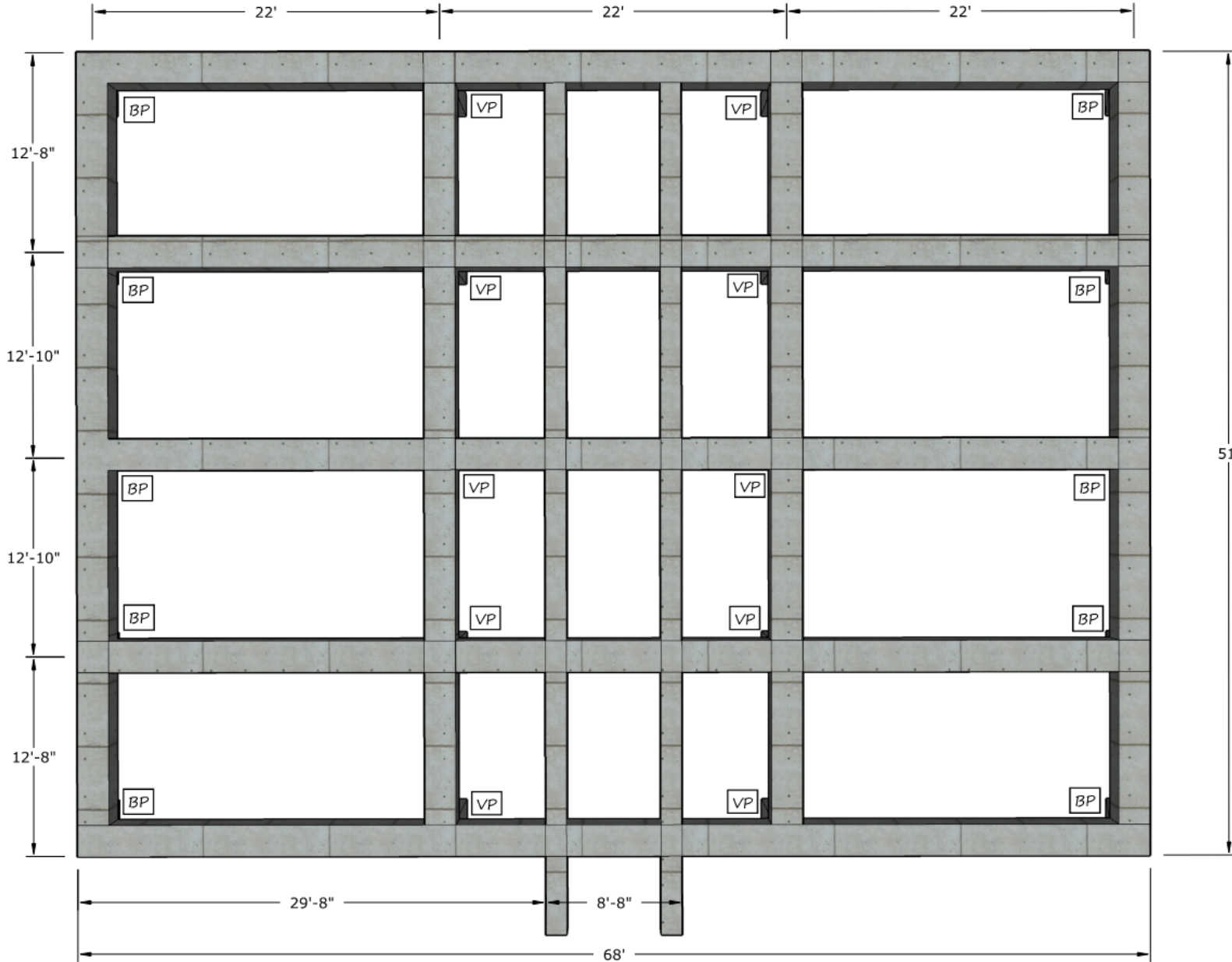
NAPLES PIER  
 NAPLES, FLORIDA  
 FOUNDATION  
 DESIGN

MID PAVILION  
024-028

5 of 8

**Naples Pier**  
 Proposed Foundation Design

END PAVILION PLAN VIEW



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 102 Columbia Drive, Suite 105  
 Cape Canaveral, FL 32920  
 (321) 784-5811

LEGEND:  
 VP: VERTICAL PILES  
 BP: BATTER PILES

8/2/2023

Rev	Detail	Date

NAPLES PIER  
 NAPLES, FLORIDA

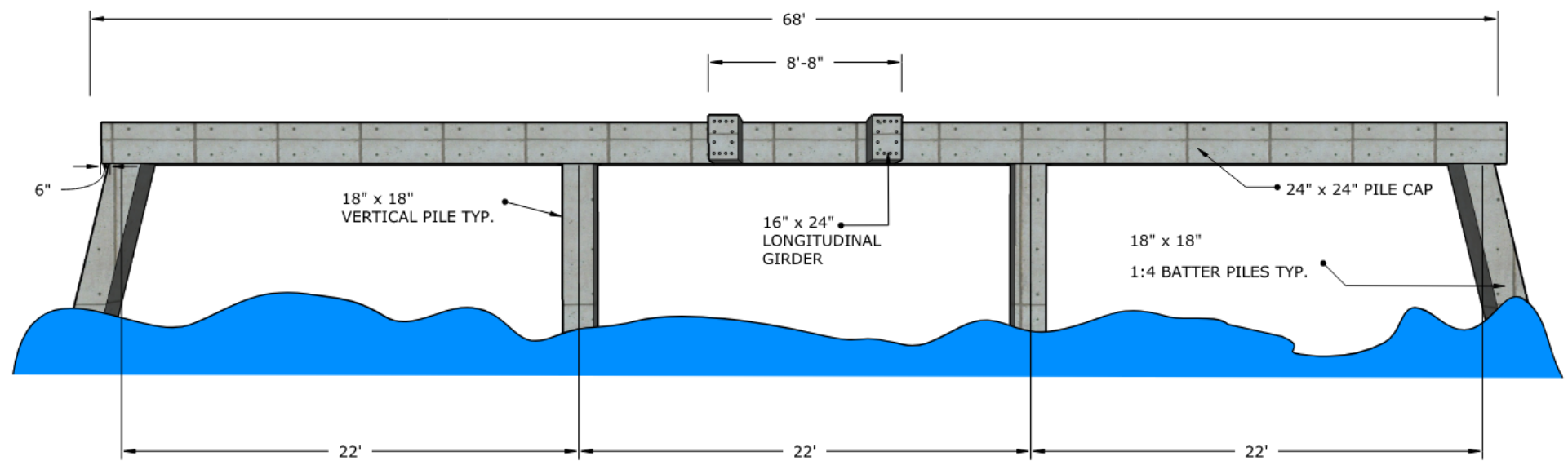
FOUNDATION  
 DESIGN

END PAVILION

7 of 8

**Naples Pier**  
 Proposed Foundation Design

# END PAVILION ELEVATION VIEW



8/2/2023

Rev	Detail	Date

NAPLES PIER  
NAPLES, FLORIDA

FOUNDATION  
DESIGN

END PAVILION

8 of 8