

Elliott Bay  Seawall  
Project

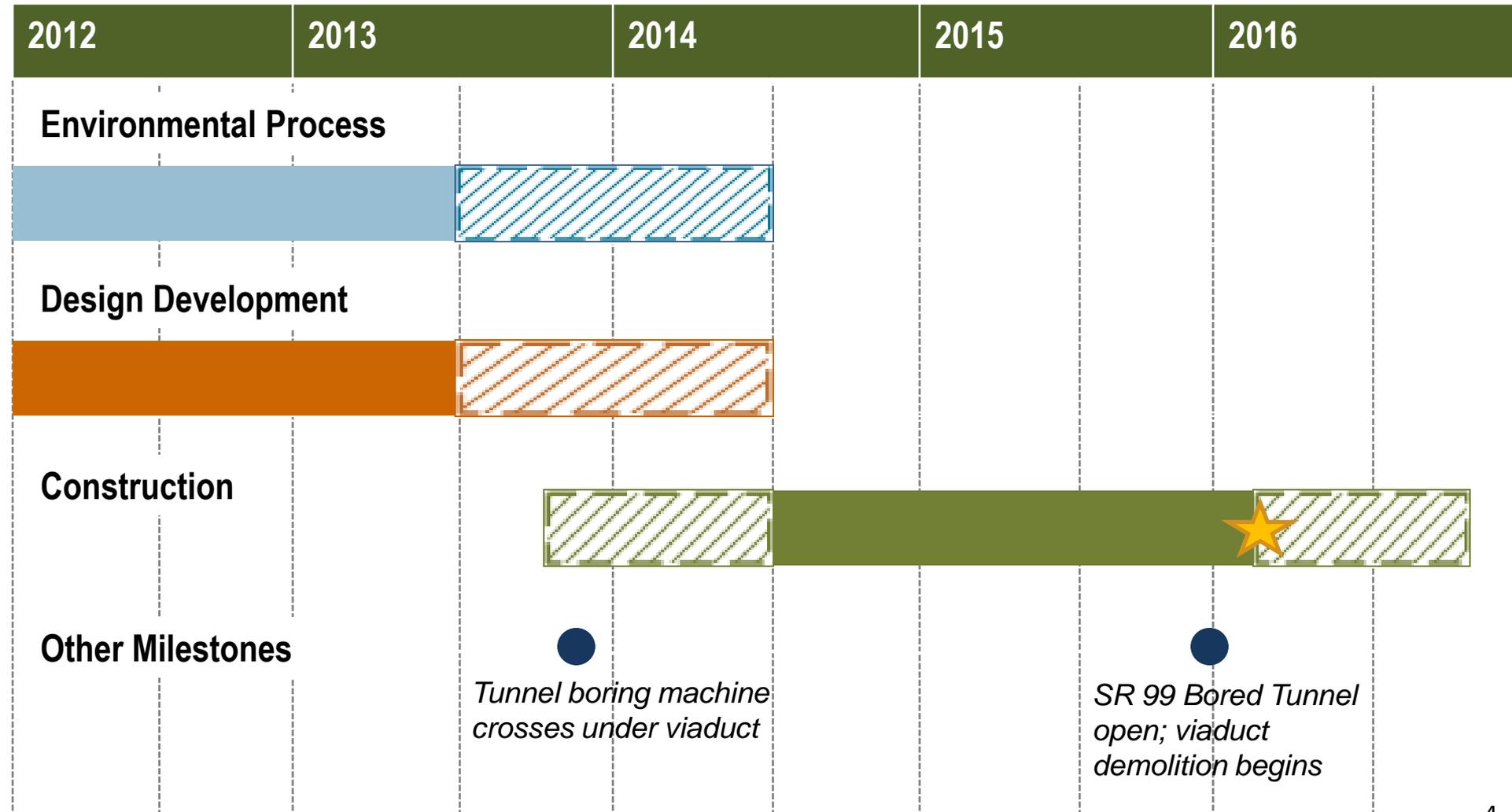
***Seattle City Council  
Special Committee Briefing  
May 14, 2012***

# Topics Today

- U.S. Army Corps of Engineers update
- Introduction of project team
- In-depth briefing on structural systems

# ***U.S. Army Corps of Engineers Update***

# Schedule Drivers



# “Parallel Paths” In Action

## *In the last week:*

- **Regulatory Branch:** Launching NEPA process with Environmental Assessment (EA) for Section 404 permit
- **Planning Branch:** Held Feasibility Scoping Meeting on May 7, 2012

## *Next steps:*

- **Regulatory Branch:** Begin NEPA process
  - Public notice anticipated in next 45 days
  - Formally initiate ESA and Section 106 consultations
- **Planning Branch:** Issue resolution conferences
  - Future without project conditions
  - Design and construction credit

# *Introduction of Project Team*

# Seawall Project Organization

## Delivering the Elliott Bay Seawall Project

### *Corps Planning and Federal Strategy*

- Ongoing feasibility study
- Credit for advance construction

### *Environmental Analysis and Permitting*

- Local, state, and federal permits
- Environmental documentation

### *Design and Engineering*

- Take project from 35% design to final design and bid package
- Project coordination

### *Outreach and Engagement*

- Integrated outreach
- Project-wide communications

# Final Design Contract

## *Design and Engineering* (May 2012 – June 2013)

- Experienced, diverse team
- Skilled in major plan production, with design and construction management experience, especially in jet grouting
- Collaborative partner with SDOT staff, other waterfront projects, City departments, agencies, and current seawall team
- Responsive to stakeholder interests and concerns
- Effective communicators
- Ready to hit the ground running

# Final Design Team

- Build an interdisciplinary team
- Bring local, regional, national, and international experience
- Focus on creating a collaborative process
- Coordinate early and frequently with Waterfront Seattle and other area projects
- Approach project challenges with creative solutions

**PARSONS**



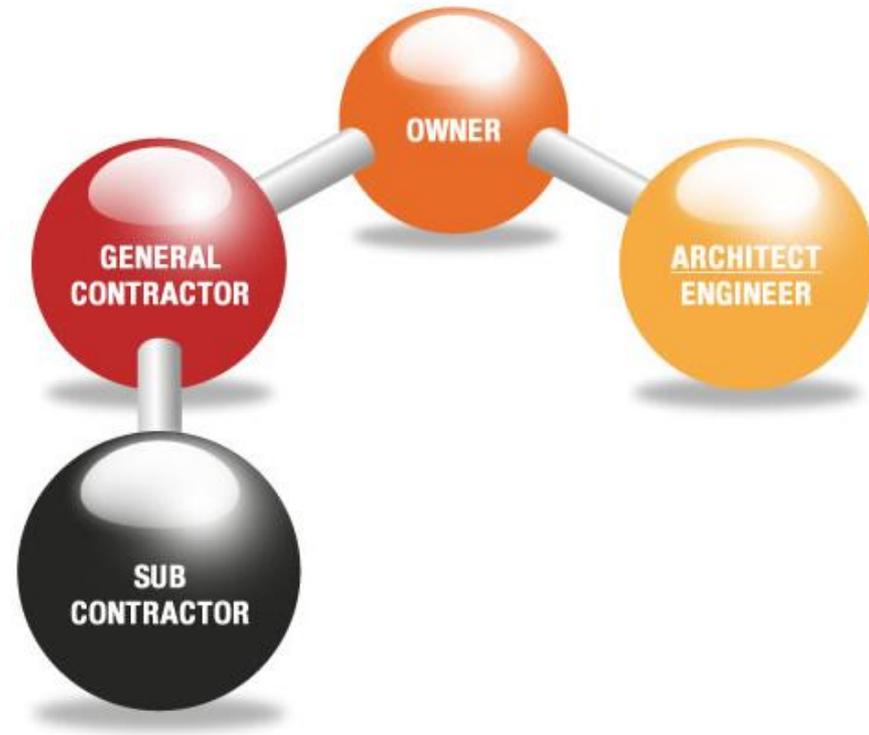
# First 60 Days of Work

- Cost / risk assessment
- Value engineering
- Contractor workshops
- Construction contracting method assessment
- Surveying (aerial, in-water, topographic, utilities)
- Project management and controls
- Approach to coordination



# Construction Contracting Workshop

- Construction contract will be City's largest to date
- Evaluate construction contracting methods to reduce City's risk
- Workshop with City and other local experts in late May
- Pre-meetings with contractors will inform discussions
- Options include design-bid-build and general contractor-construction manager

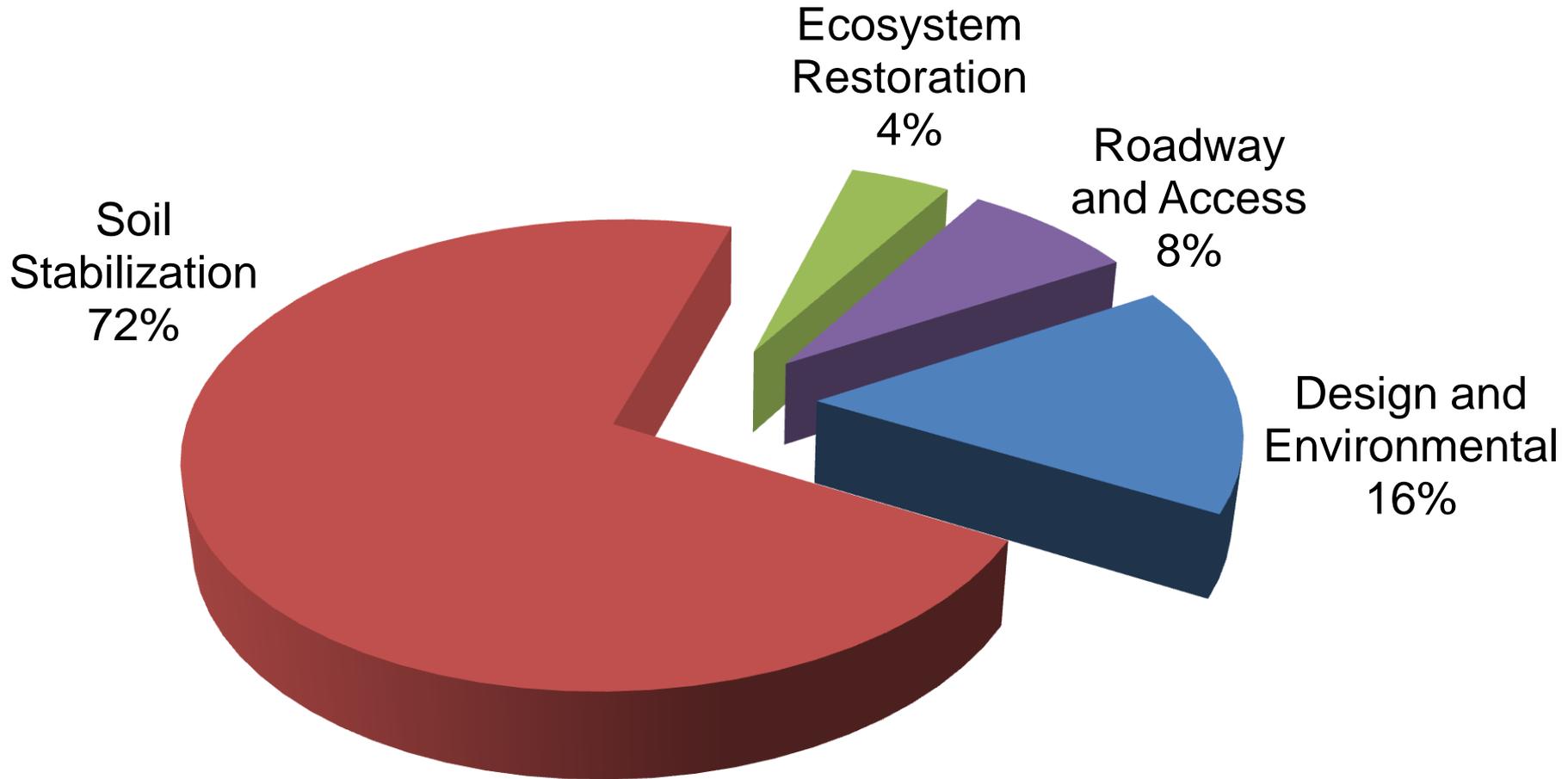


# *Structural Systems Overview*

# Central Seawall Costs – 35% Design

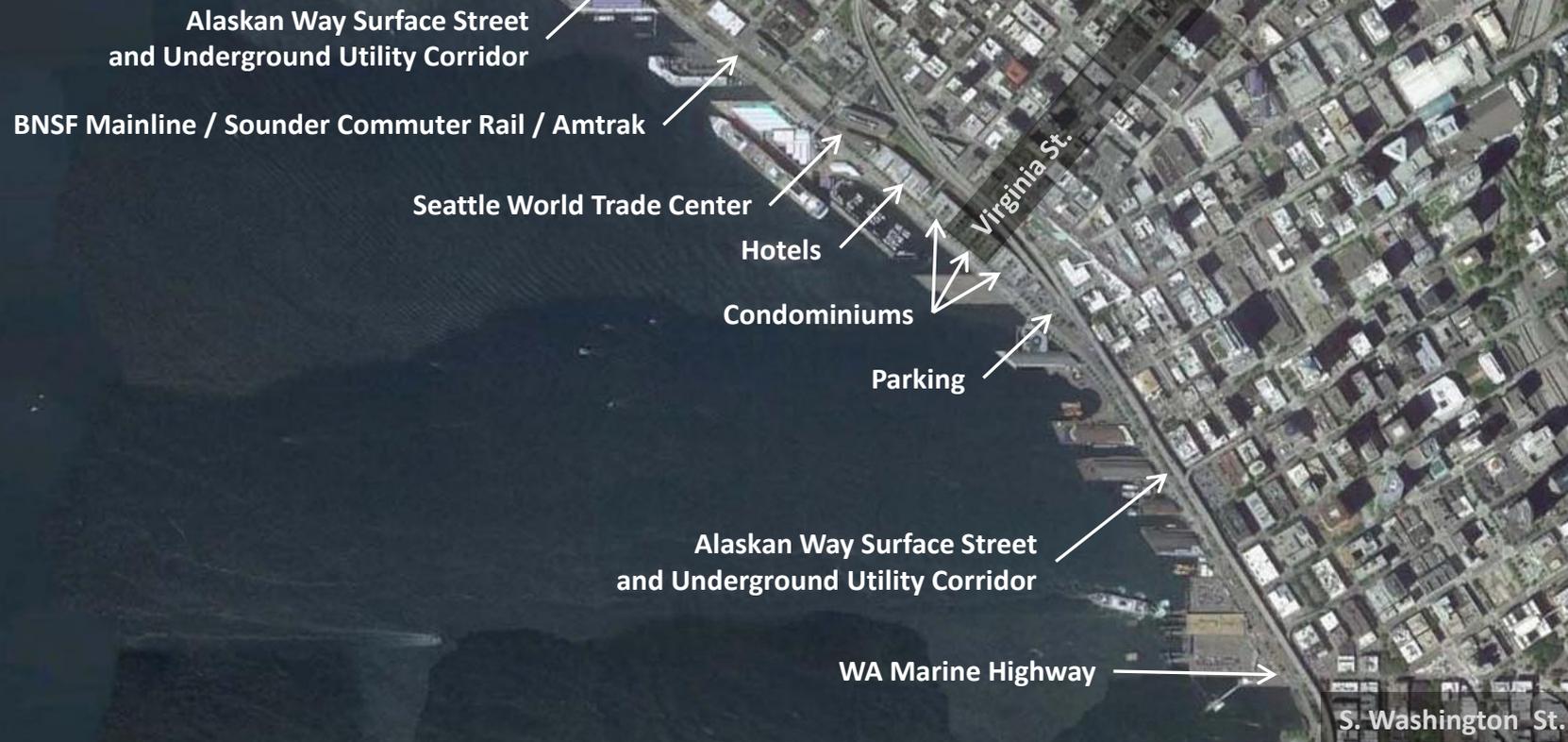
Costs in Year of Construction	Alt A	Alt B	Current CIP	35% Design
<b>Environmental and Design</b>	\$35 M	\$40 M		
<b>Construction</b>				
Soil Stabilization	\$185 M	\$223 M	\$330M	\$178 M
Ecosystem Restoration	\$8 M	\$23 M		\$11 M
Roadway and Access	\$19 M	\$23 M		\$23 M
Contingency	\$63 M	\$81 M		\$48 M
<b>Subtotal</b>	<b>\$310 M</b>	<b>\$390 M</b>		<b>\$300M</b>
<b>Public Utilities Infrastructure</b>				
SPU Facilities (full cost)	\$6 M	\$7 M		\$6 M
SCL Facilities (full cost)	\$19 M	\$19 M		\$19 M
<b>Total</b>	<b>\$335 M</b>	<b>\$416 M</b>	<b>\$365M</b>	<b>\$325M</b>

# Breakdown of 35% Estimate



# Key Questions

- What are we protecting?
- What is the current structure?
- What are the current problems?
- Why would the seawall fail?
- What are the impacts if the wall does fail?
- What are we trying to do?
- How will we do it?



# LANDSIDE INFRASTRUCTURE



Pier 70 – Office / Restaurant →

Pier 66 – Port of Seattle / Victoria Clipper →

Hotels →

Bell Harbor Cruise Ship Terminal and Conference Center →

Port of Seattle Public Short Stay Marina →

Pier 62/63 Public Park  
Seattle Aquarium  
Waterfront Park

Piers 54-59 – Historic Piersheds / Retail and Business Core / Tour Boats

Seattle Fire Department – Station # 5

Washington State Ferries – Colman Dock Terminal

WSF Foot Ferry / King County Water Taxi

Historic Washington Street Boat Landing →

S. Washington St.

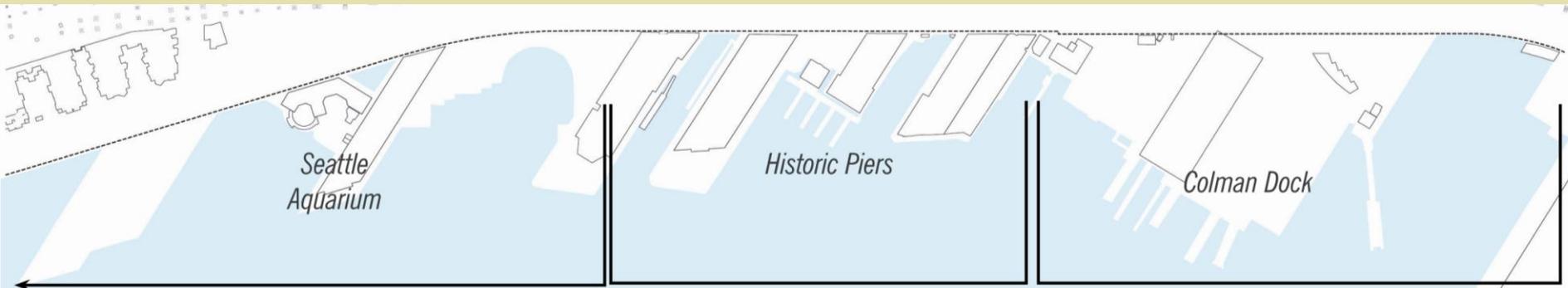
Broad St.

Alaskan Way

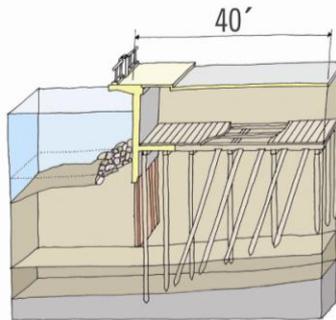
Virginia St.

Alaskan Way

# Existing Wall Types



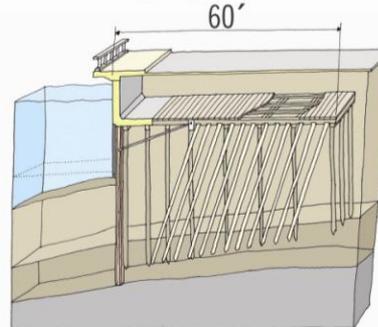
## Existing Type A Wall



Location: Aquarium and northward

- Built in 1934
- Timber structure with concrete face
- ~40 feet wide

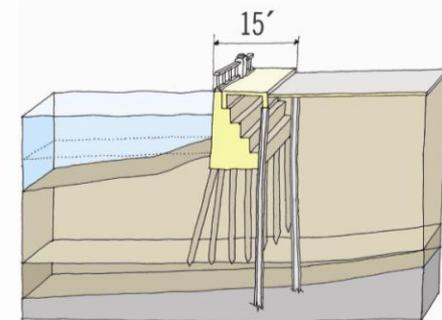
## Existing Type B Wall



Location: Central Pier Zone,  
Madison St to Union St

- Built in 1934
- Timber structure with steel master pile and concrete face
- ~60 feet wide

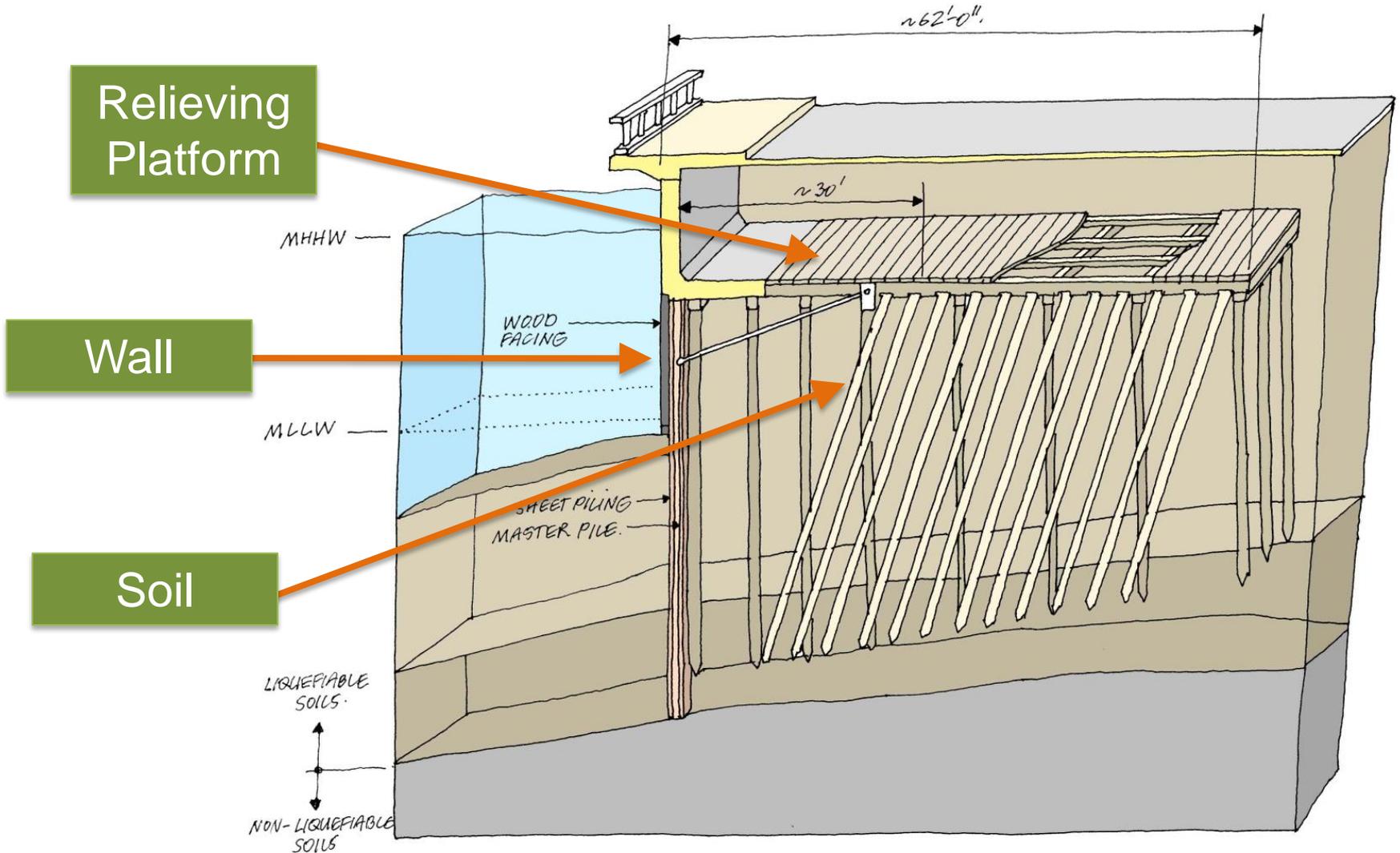
## Existing Gravity Wall



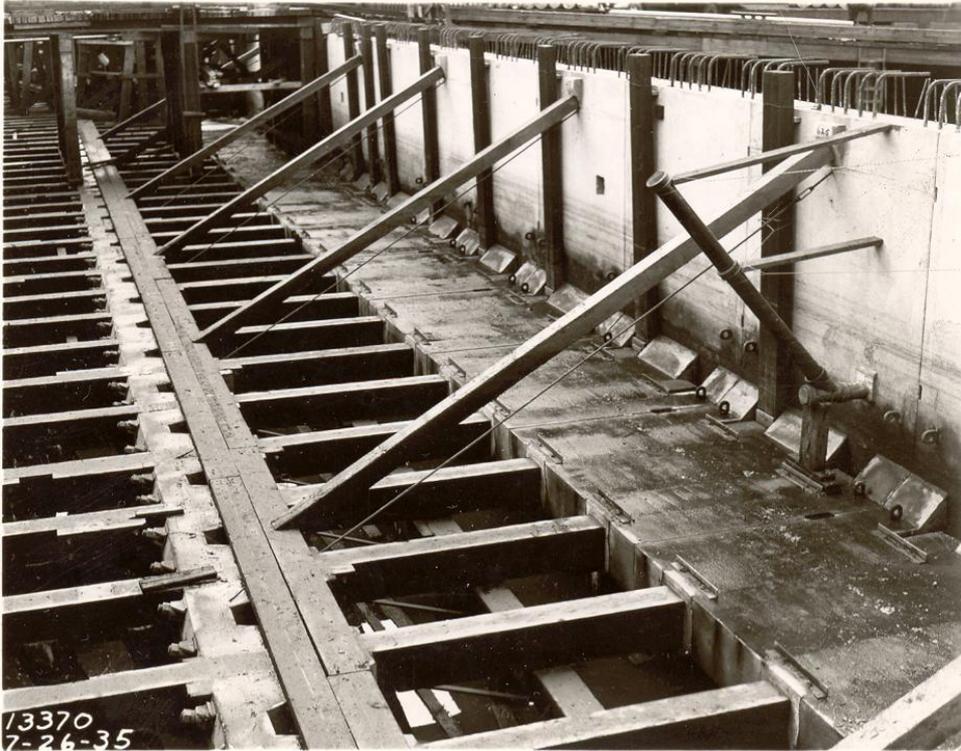
Location: Pioneer Square/Ferry Terminal,  
S. Washington St to Madison St

- Built in 1916
- Concrete structure supported by timber piles
- ~15 feet wide

# Structural Elements of the Wall



# Relieving Platform Condition



# Relieving Platform Condition



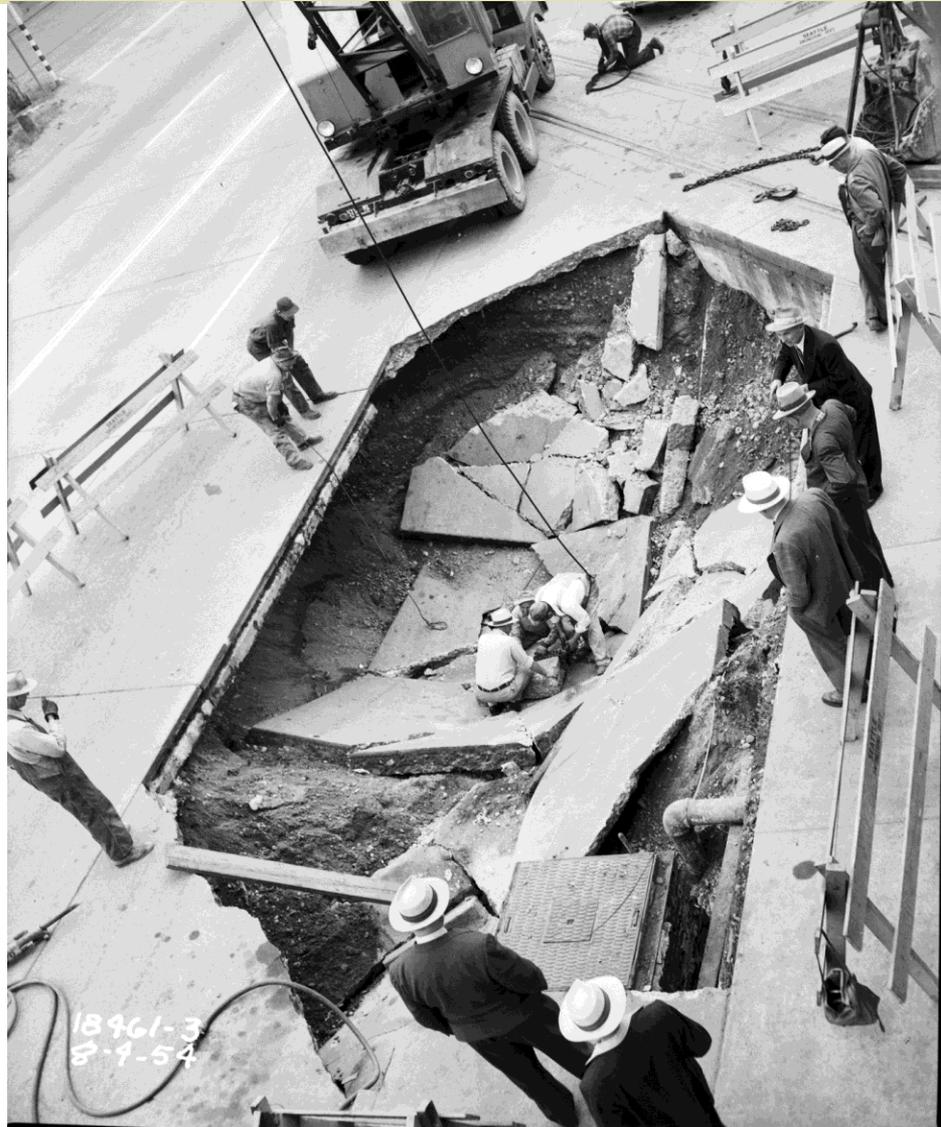
# Wall Condition



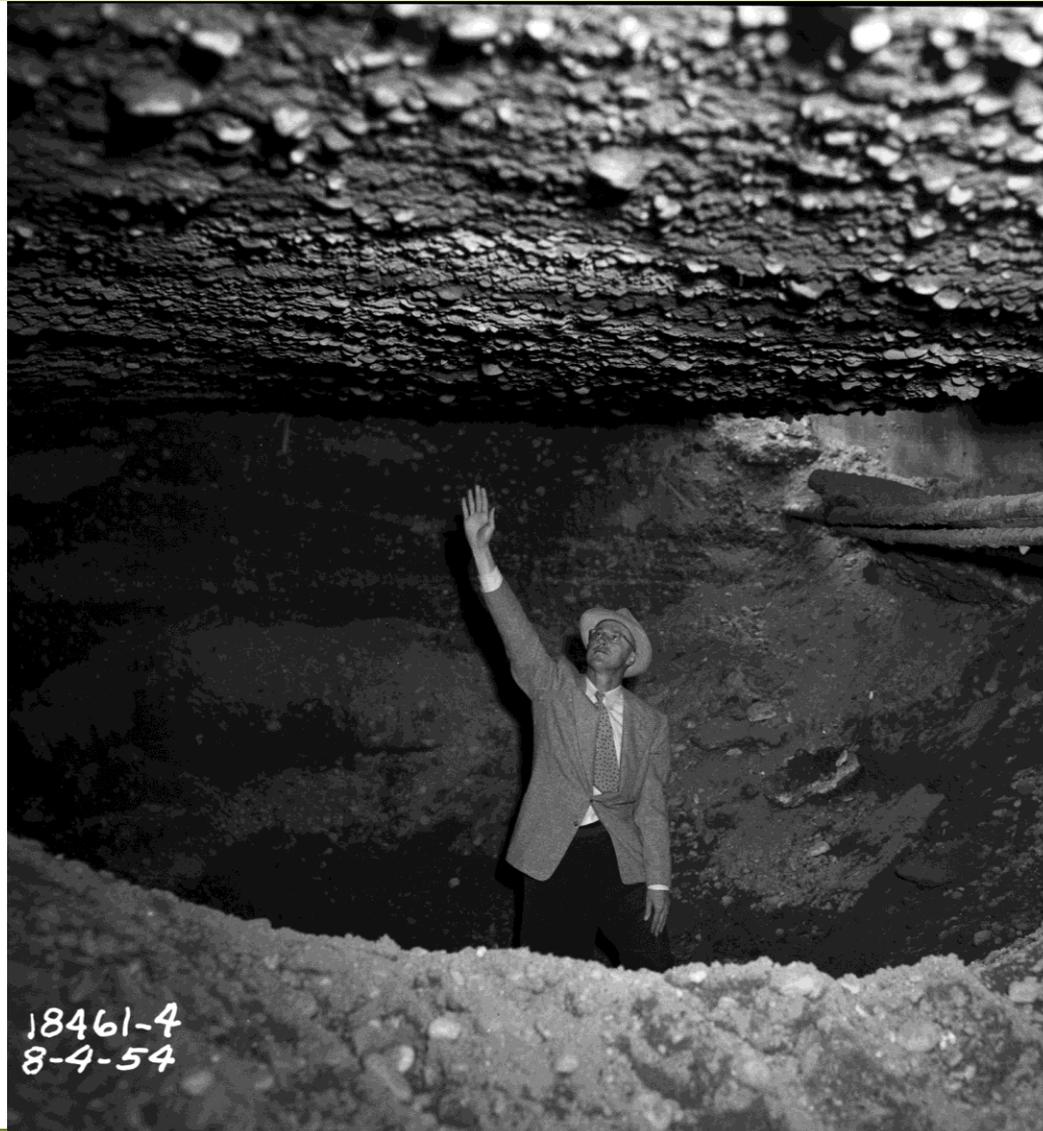
# Wall Condition at Washington Street: 1986



# Soil Condition at Clay Street: 1954

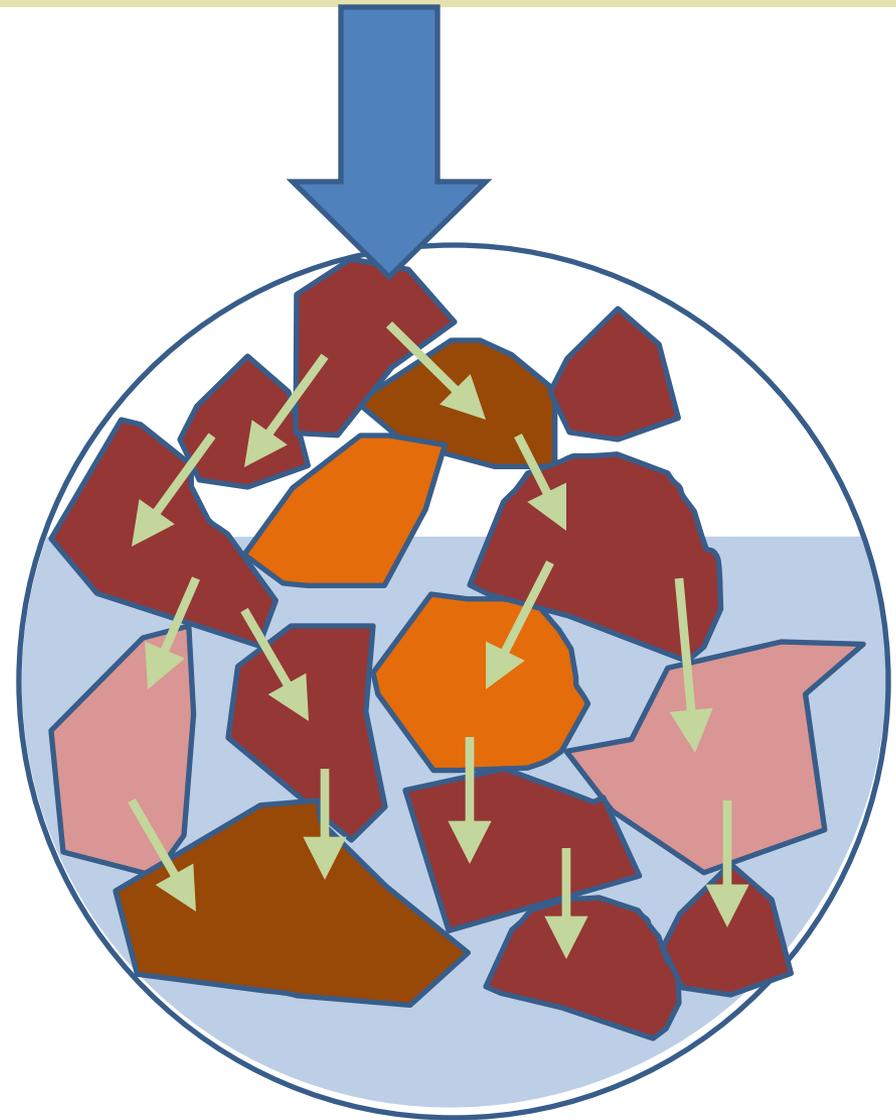


# Soil Condition at Clay Street: 1954



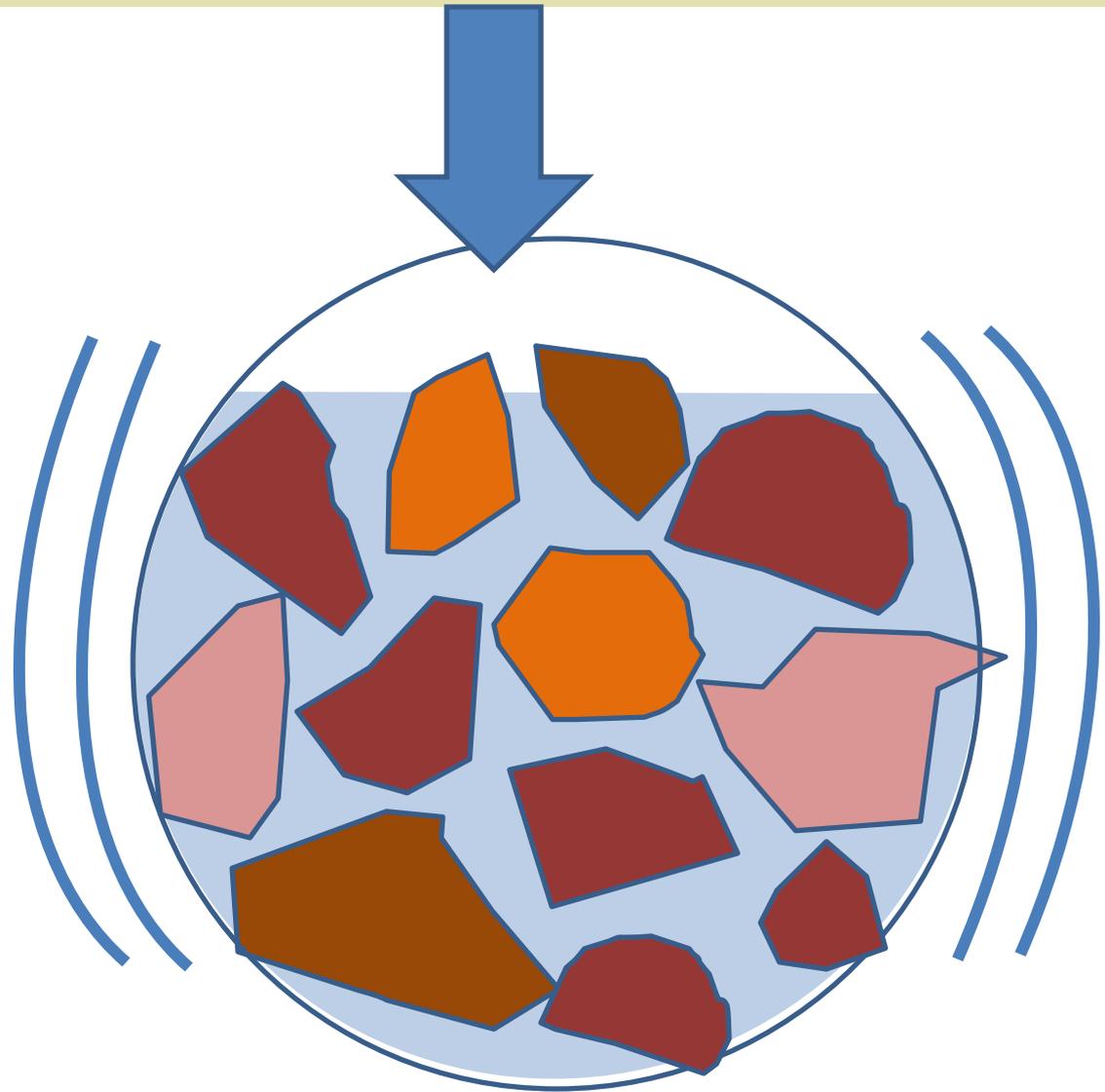
# Soil Structure

- Soil supports and distributes the load
- Direct contact and friction
- Water fills the space in between



# Liquefied Soil

- Soils that lack cohesion separate in a seismic event
- Once separated the soil particles are unable to distribute the load



# End Result: Kobe, Japan (1995)



# End Result: WSDOT Simulation (2010)



# Expected Economic Damages

- Preliminary estimate of total national damages: \$540-600M
- Initial estimate of local and regional damages: \$300M+

Categories of National Damages	Estimate
Transportation delay	\$300M
Utility and roadway infrastructure	\$150M
Structure inventory	\$75M
Major seawall repairs and maintenance	\$30M
Emergency infrastructure	\$24M
Erosion	\$21M

# Soil Stabilization: Jet Grouting

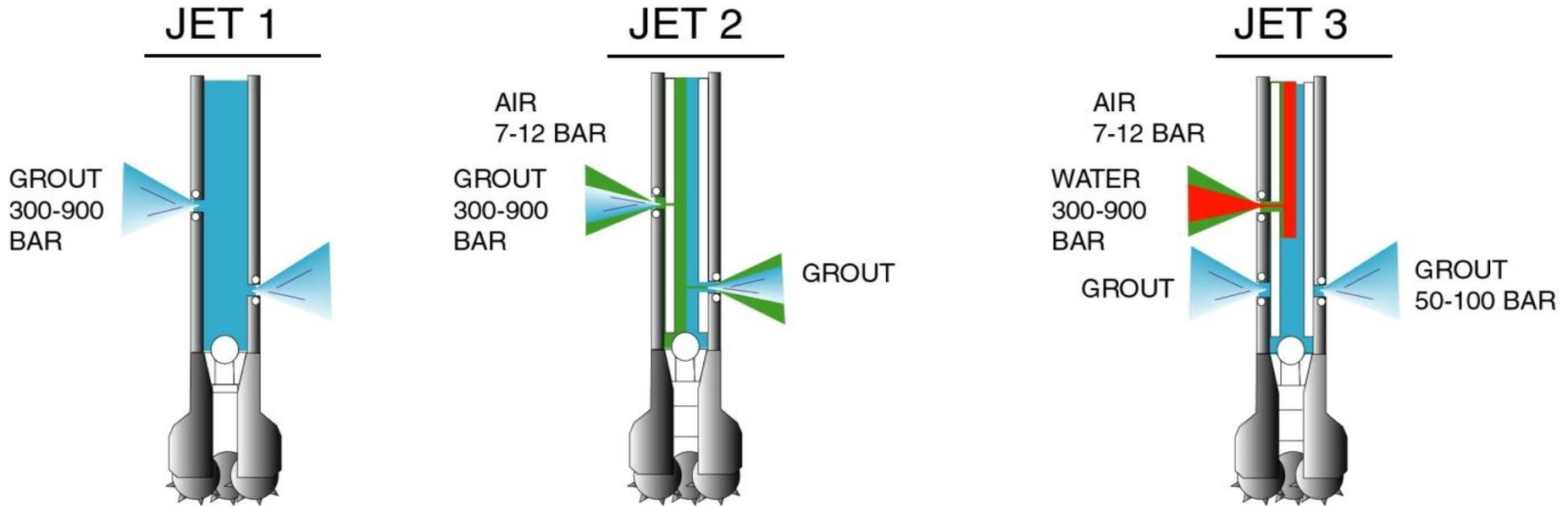
- Standards
  - 1,000 year seismic event
  - 75-year design life
- Structure
  - Directly addresses soil liquefaction problem
- Time
  - Potentially faster construction
- Cost
  - Lower than other options



# Soil Stabilization: Jet Grouting



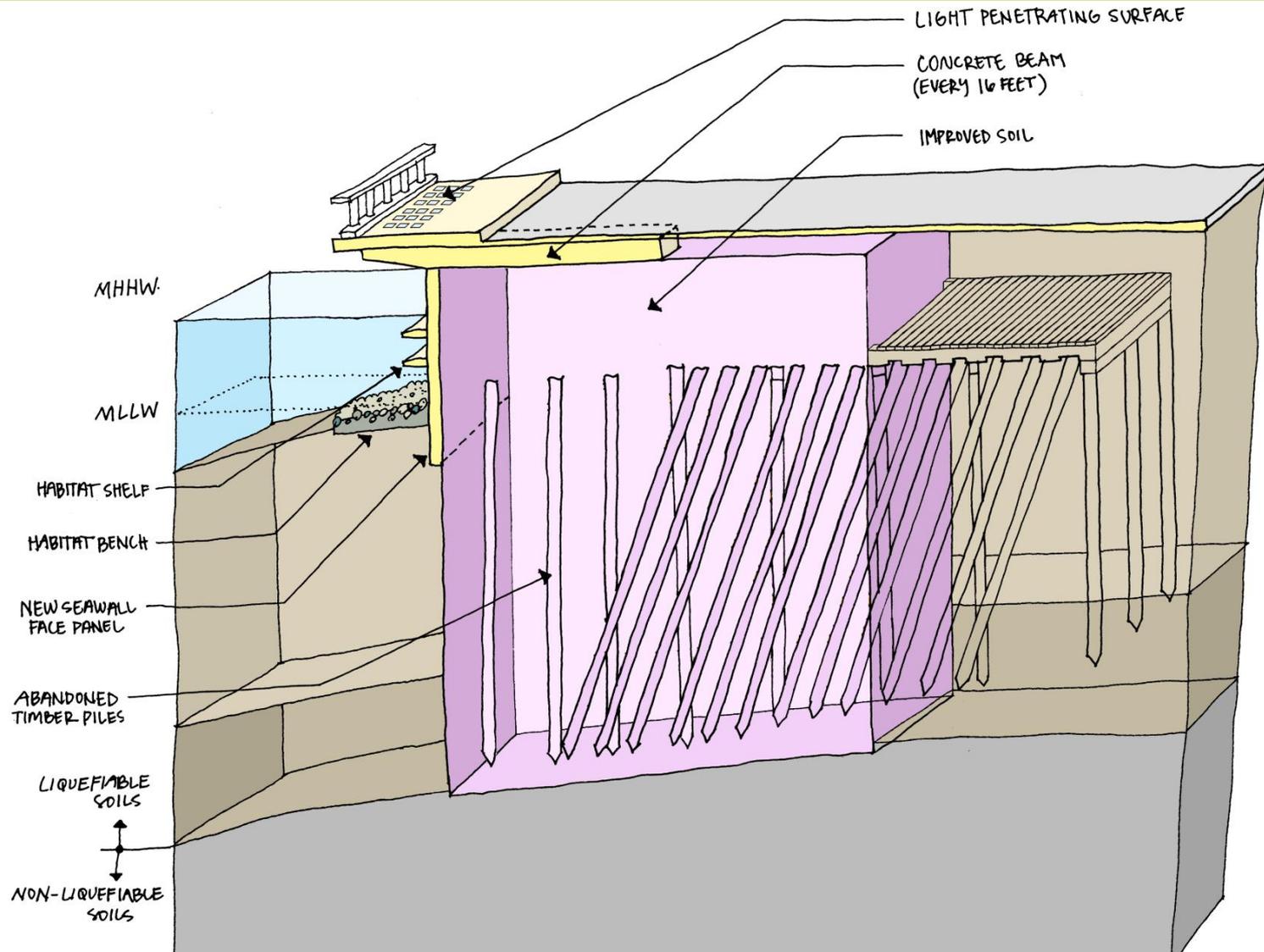
# Soil Stabilization: Typical Grout Methods



## LEGEND:

-  GROUT
-  AIR
-  WATER

# Soil Stabilization: Jet Grouting



# Flexibility: Small Spaces



# Flexibility: Urban Environments



# Flexibility: Addressing Utilities



# Learning from Peers

- Pelham Site Seawall (NY)
  - Jet grout and sheetpile wall along Hudson River
- New Corniche Road, Promenade, and Seawall (UAE)
  - Seawall and promenade rebuild
- Port of Los Angeles (CA)
  - Seawall and new wharf
- IHNC Hurricane Barrier (LA)
  - Jet grout barrier wall



# Upcoming Topics for Council Discussion

- Project schedule update
- Habitat research and ecosystem restoration design
- Opportunities for final design
- Approach to Waterfront coordination
- Report on construction contracting workshop

# Seattle City Council Special Committee Briefing

May 14, 2012



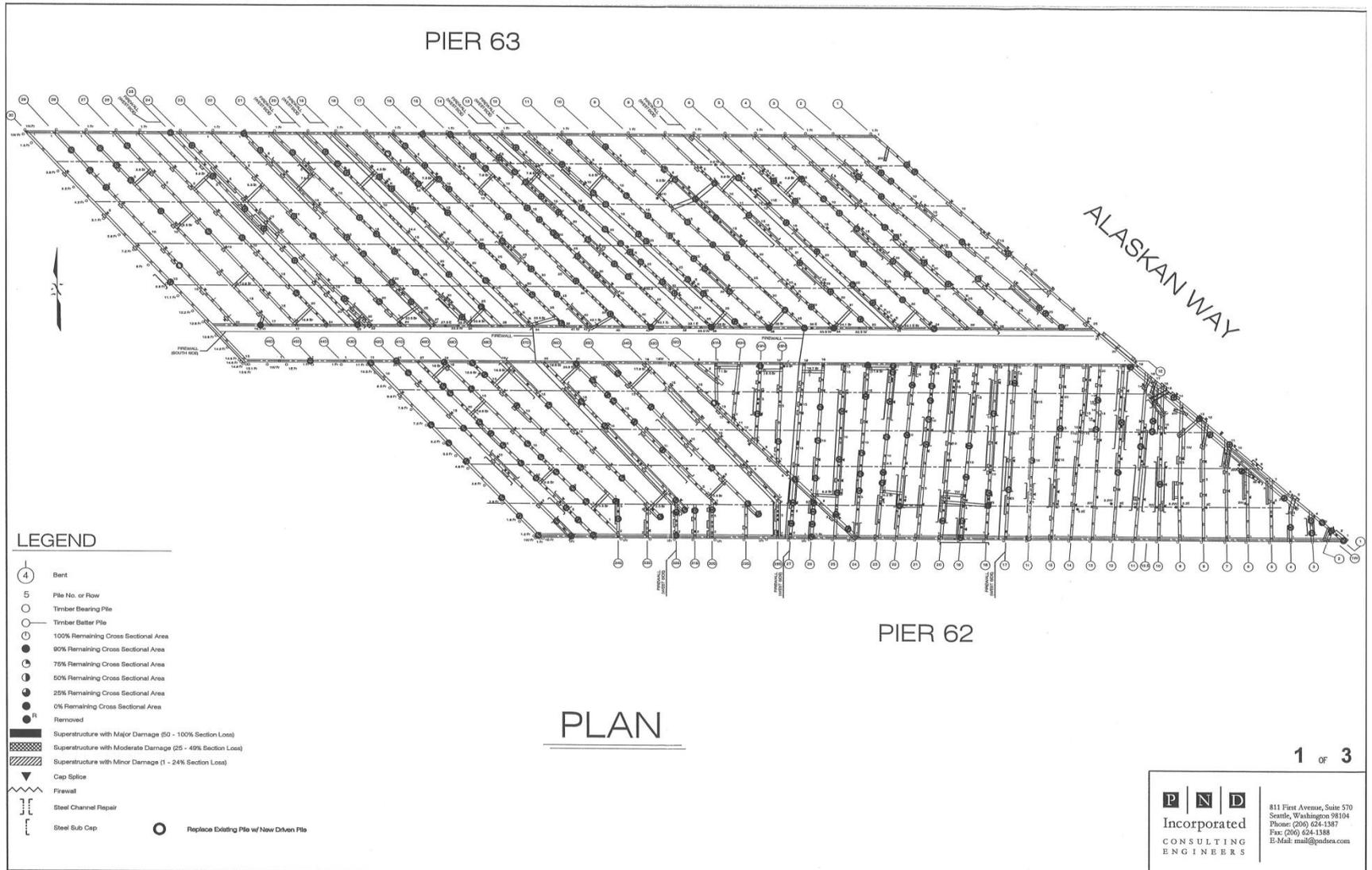
# Pier 62/63 – Summer Nights on the Pier



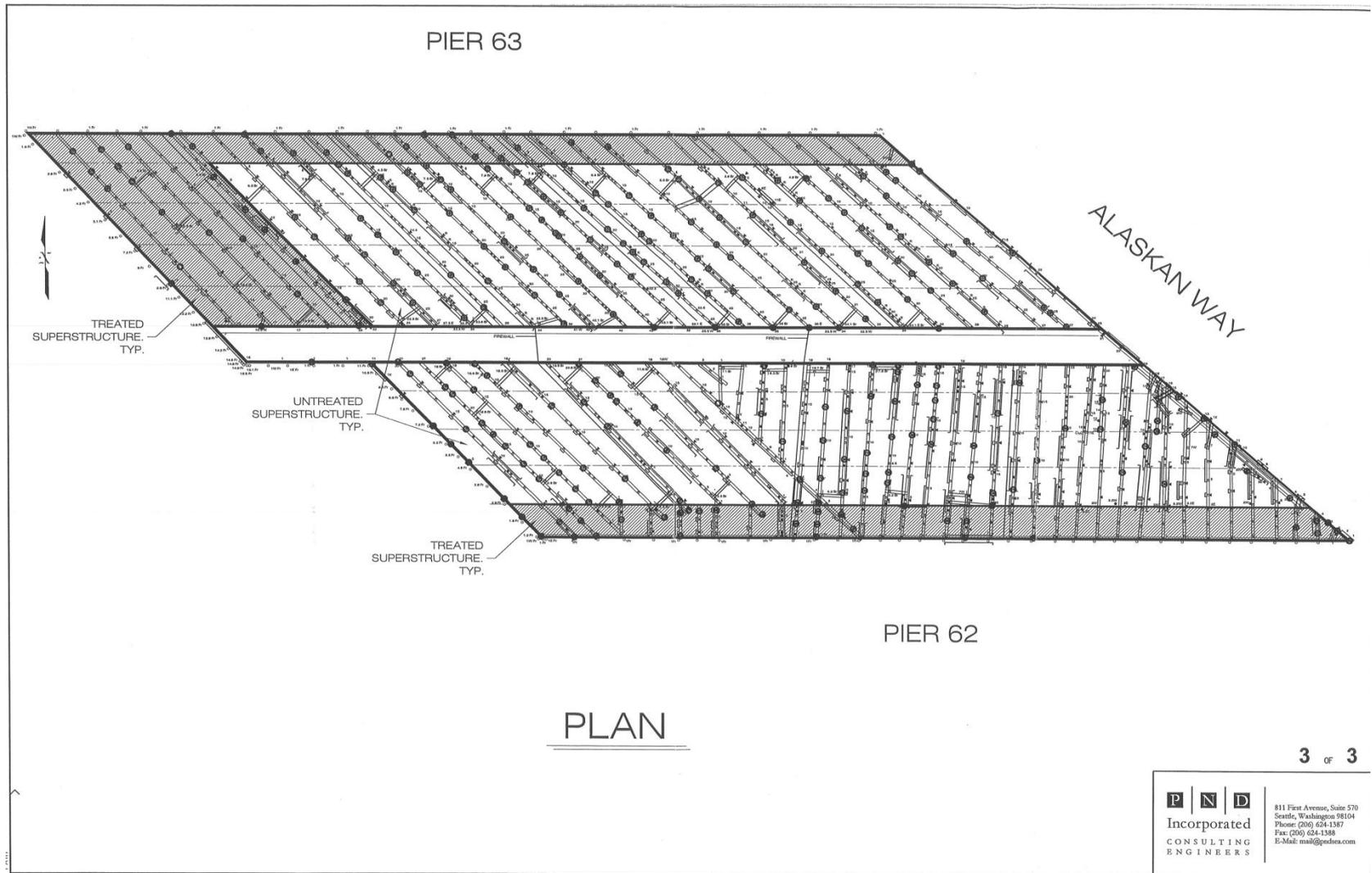
# Pier 62/63



# Condition Assessment (2004)



# Condition Assessment (2004) Cont.



# Condition Assessment (2008)



# Waterfront Park



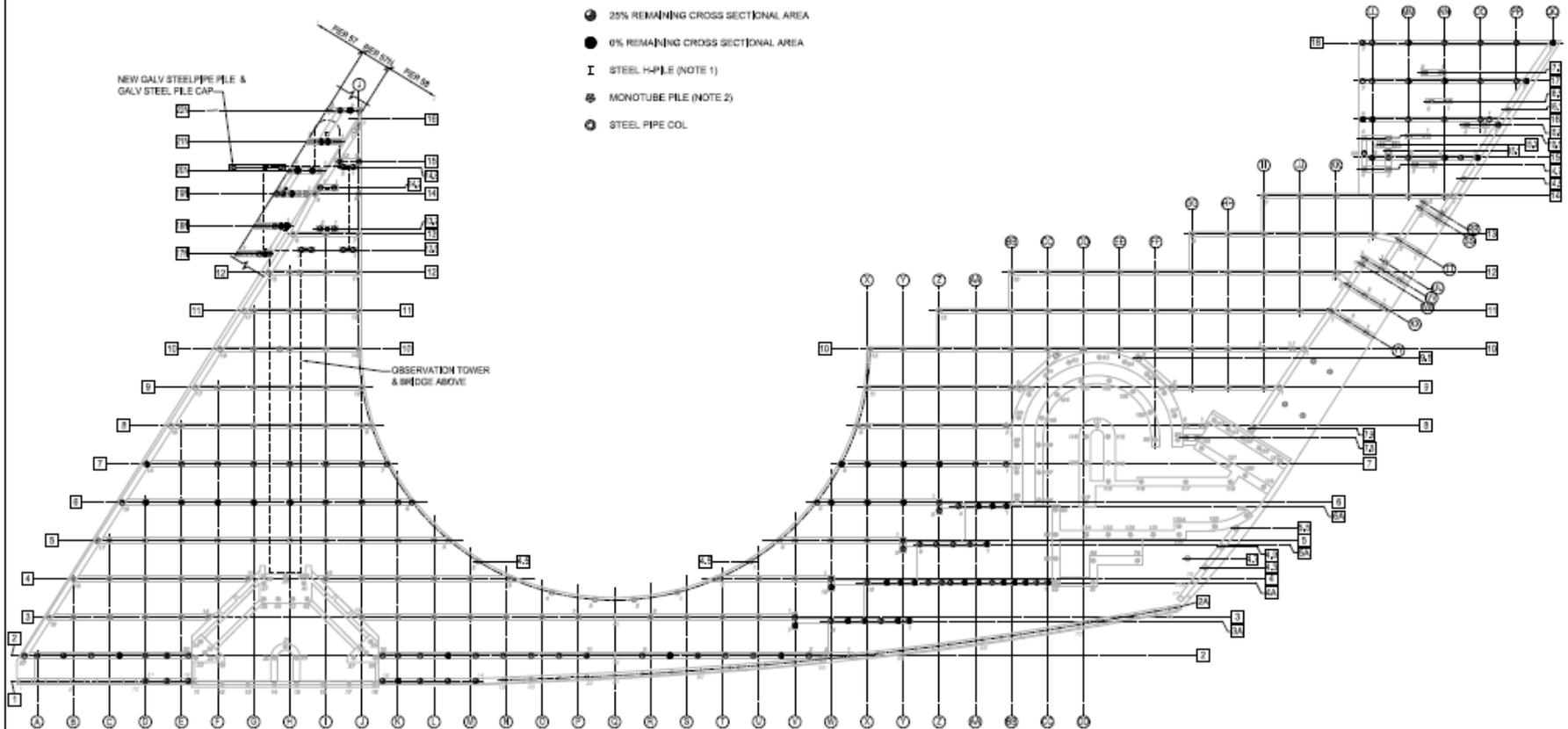
# Condition Assessment (2011)

## LEGEND

- TIMBER BEARING PILE (NO DATA)
- ⑩ 100% REMAINING CROSS SECTIONAL AREA
- ⑨ 95% REMAINING CROSS SECTIONAL AREA
- ⑧ 75% REMAINING CROSS SECTIONAL AREA
- ⑦ 50% REMAINING CROSS SECTIONAL AREA
- ⑥ 25% REMAINING CROSS SECTIONAL AREA
- 0% REMAINING CROSS SECTIONAL AREA
- I STEEL H-PILE (NOTE 1)
- ⊗ MONOTUBE PILE (NOTE 2)
- ⊙ STEEL PIPE COL.

## NOTES

1. H PILES #1 THRU #65 ARE HP10x42, #66 THRU #78 ARE HP10x157  
SOURCE: 1973 RECORD DWGS
2. MONOTUBE PILES ARE 12" DIA x 75A (S-175")  
SOURCE: 1973 RECORD DWGS



# Waterfront Park Understructure



## Next Steps

- Continue to monitor the conditions of both Piers 62/63 and Waterfront Park
- Begin design work and permitting for Pier 62/63 and Waterfront Park as soon funds become available