THE PORT OF LOS ANGELES

AAPA American Association of Port Authorities

Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

Automated Container Terminal Design at the Port of Los Angeles

Facilities Engineering Seminar
Vancouver, BC

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AUTOMATED CARGO TERMINALS

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The San Pedro Bay Port Complex

Port of Los Angeles at a Glance

- Founded in 1907
- Non-taxpayer supported
- Landlord business model
- 7,500 acres land and water
- 43 miles of waterfront
- 270 berths and 27 cargo terminals

Harbor Department Administration Bldg.

Downtown Los Angeles City Hall

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Diversity at the Port

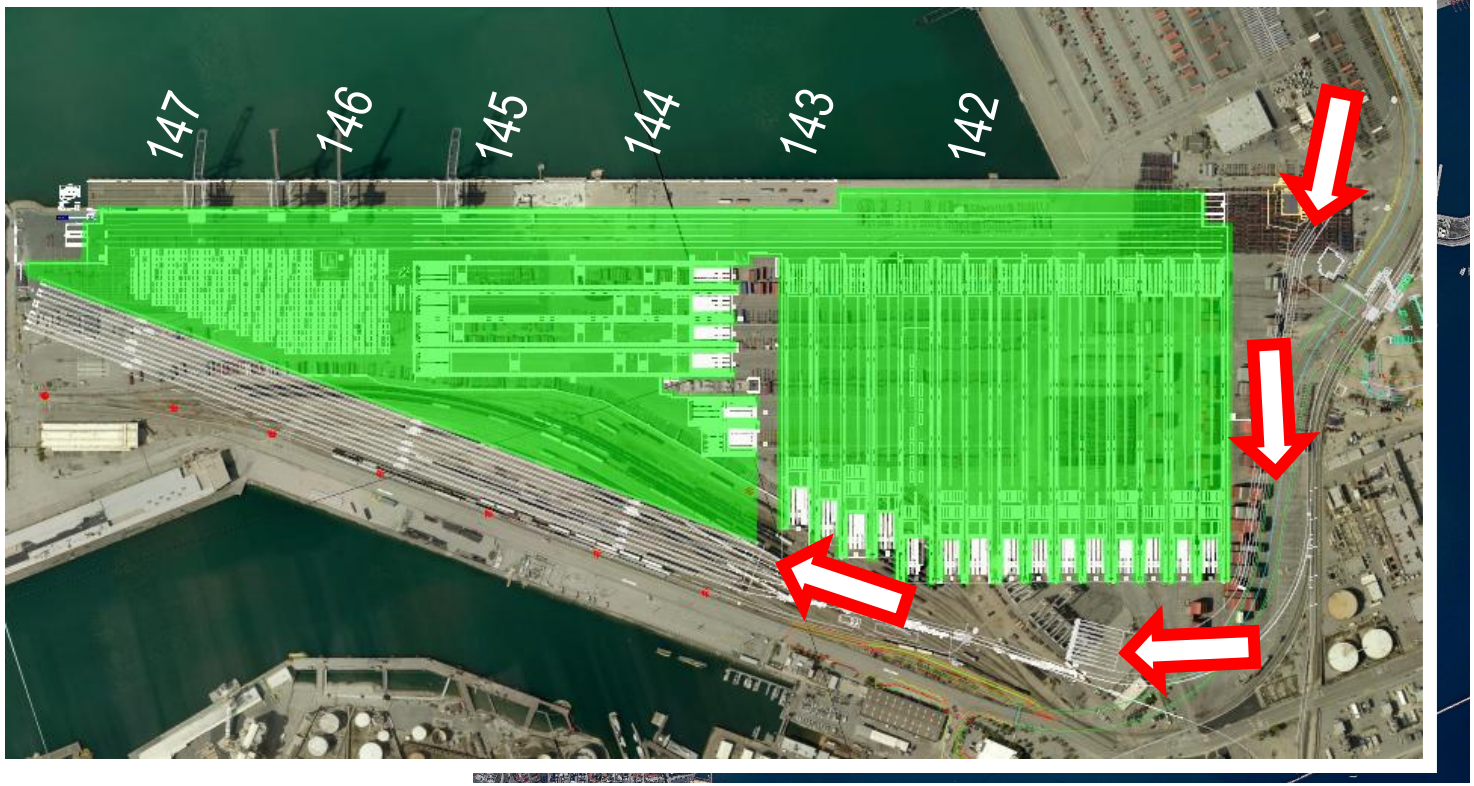
- Cruise
- Fishing
- Marinas
- Containerized cargo
- Non-containerized cargo
- Commercial/Retail

TOP TRADING PARTNERS

- 1. China ($92.5 billion)
- 2. Japan ($22.3 billion)
- 3. Taiwan ($7.4 billion)
- 4. South Korea ($5.7 billion)
- 5. Thailand ($5.2 billion)


2013 Port of Los Angeles
Container Terminals
Current Container
Terminal Area =
approx. 1700 acres

TraPac Container Terminal



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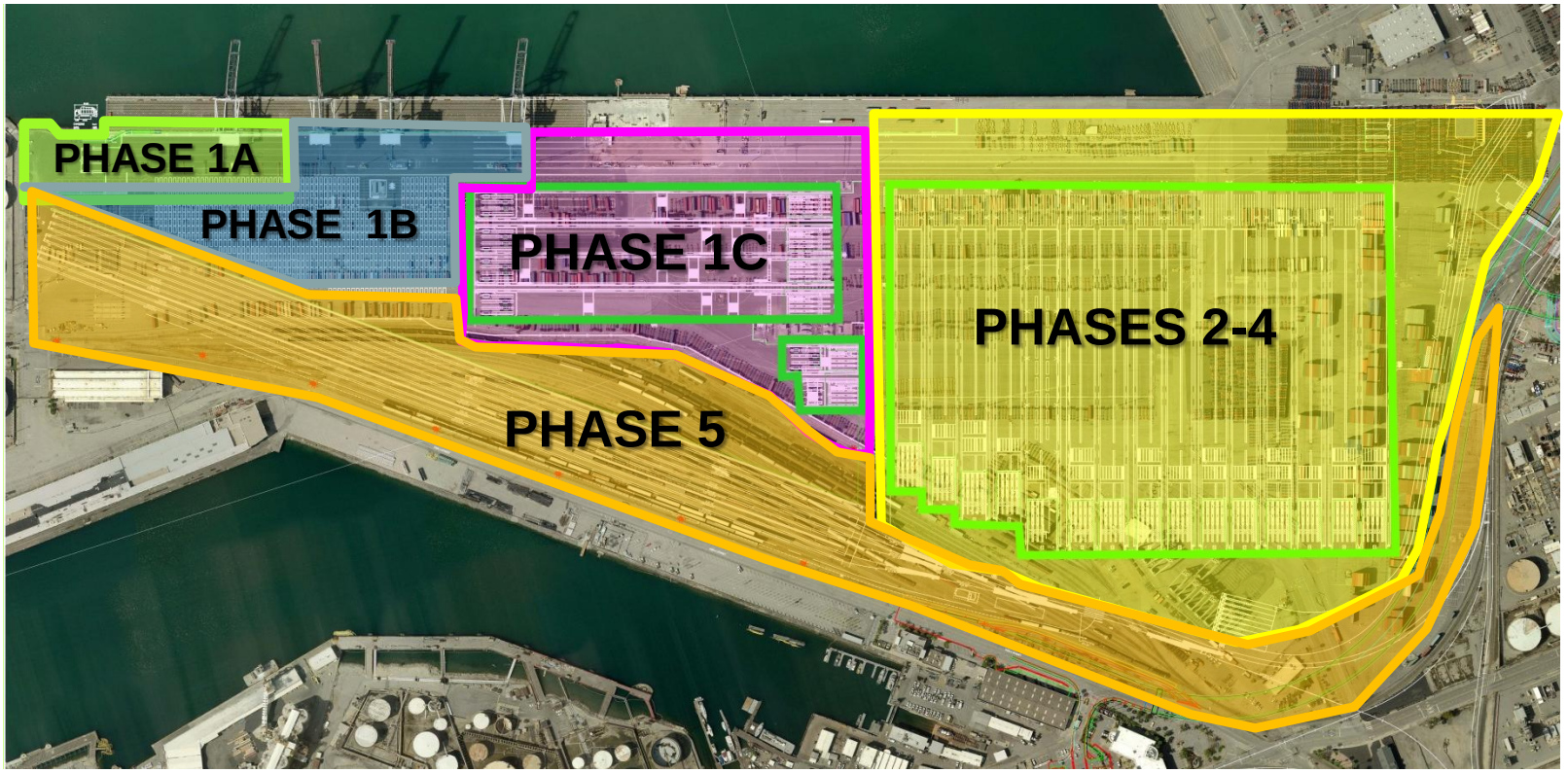
Why Automate?

- **Efficient (High Productivity)**
- **Maximizes the Utilization of Yard Capacity**
- **Cost Effective**
- **Environmental Friendly**
- **Helps the West Coast Stay Competitive**

TraPac



SCOPE:

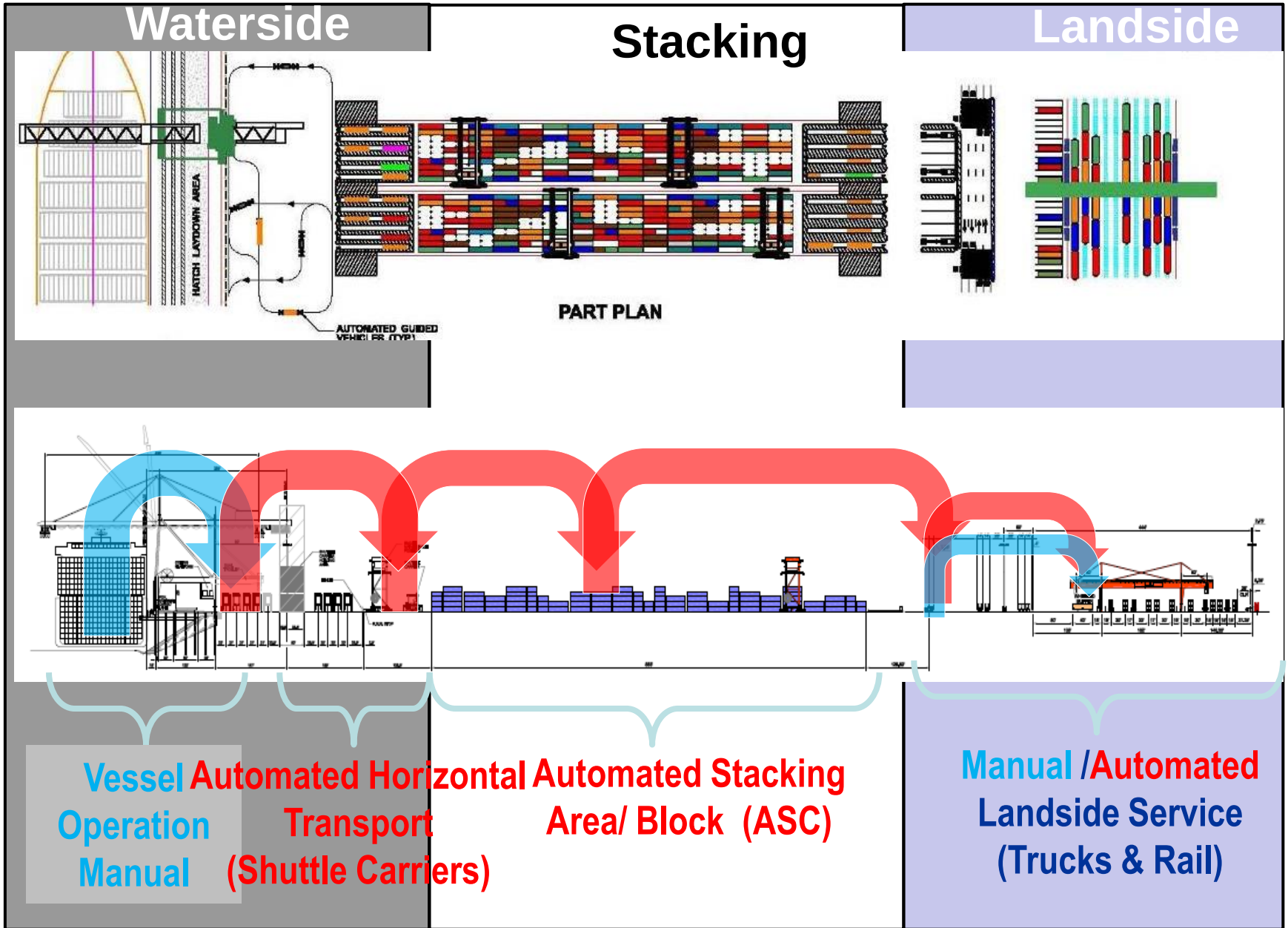
- 134 Acres
- Project Cost = $303 M
- 21 Automated Stacking Rows
- On-Dock Rail Yard
- 5 Construction Phases
- Phase 1C Complete 2014

- Total Equipment:
  - 39 – 8 Wide Automated Stacking Cranes (ASCs)
  - 1 – 10 Wide ASC
  - 17 – Automated Shuttle Carriers
  - 2 Rail Mounted Gantry Cranes
- Throughput 1.6 M TEU

Site Constraints

- Operating Terminal
- Irregular Shape
- Existing Utilities
- Chemically Impacted Soil
- Precise Manufacturer Parameters
- Phasing (7 Adjacent Construction Projects)

Automated Operations



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Automated Operations

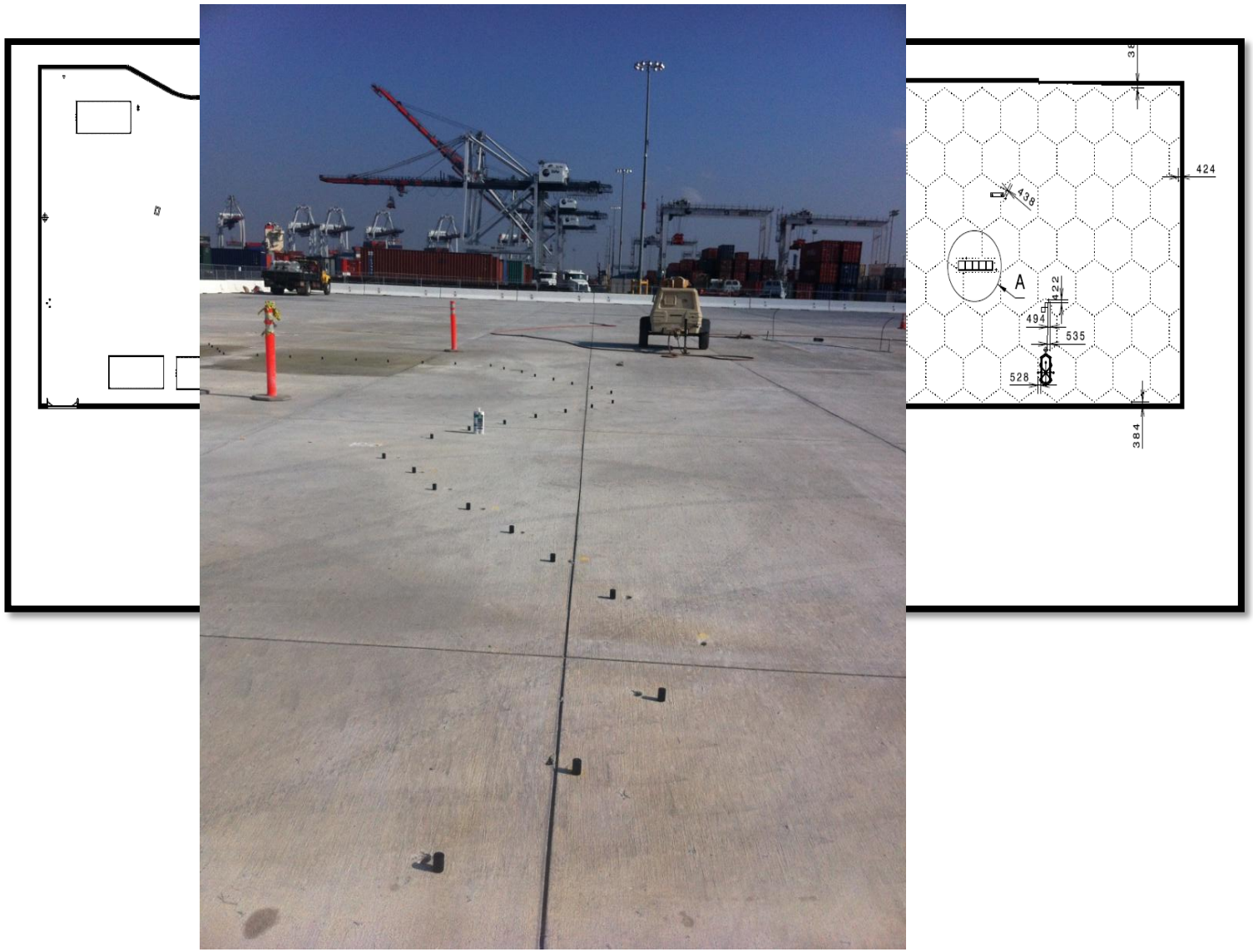
Horizontal Transport

Automated Shuttle Carrier

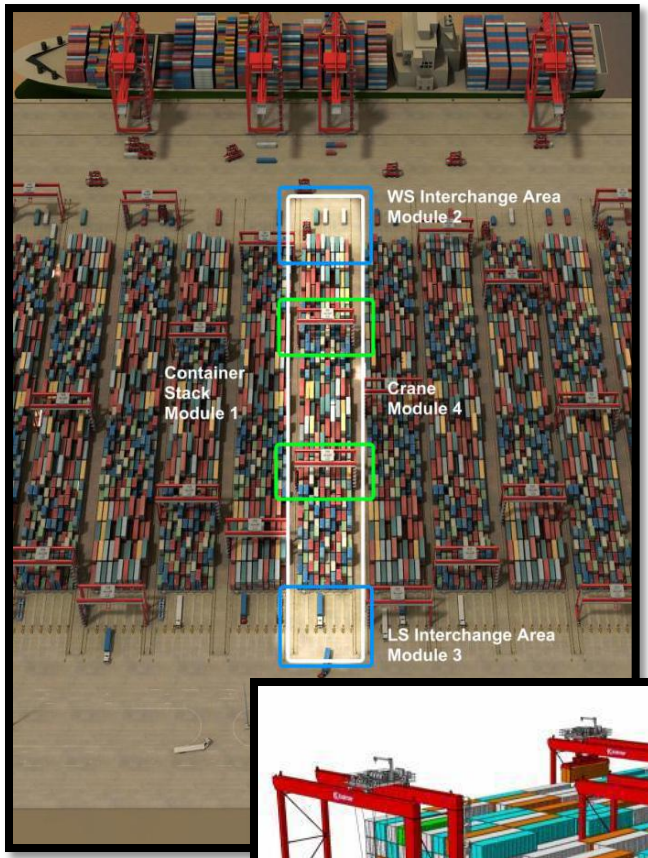
Stacking Ability:
1 over 2 High
Speed: 18 MPH
Cost: $1.7 M

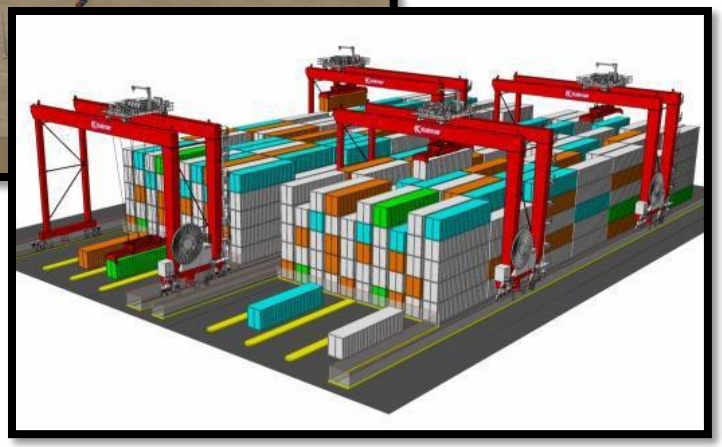
TraPac: 16 Shuttle Carriers Arrived 11/12

Horizontal Transport



Automated Stacking Cranes (ASC)





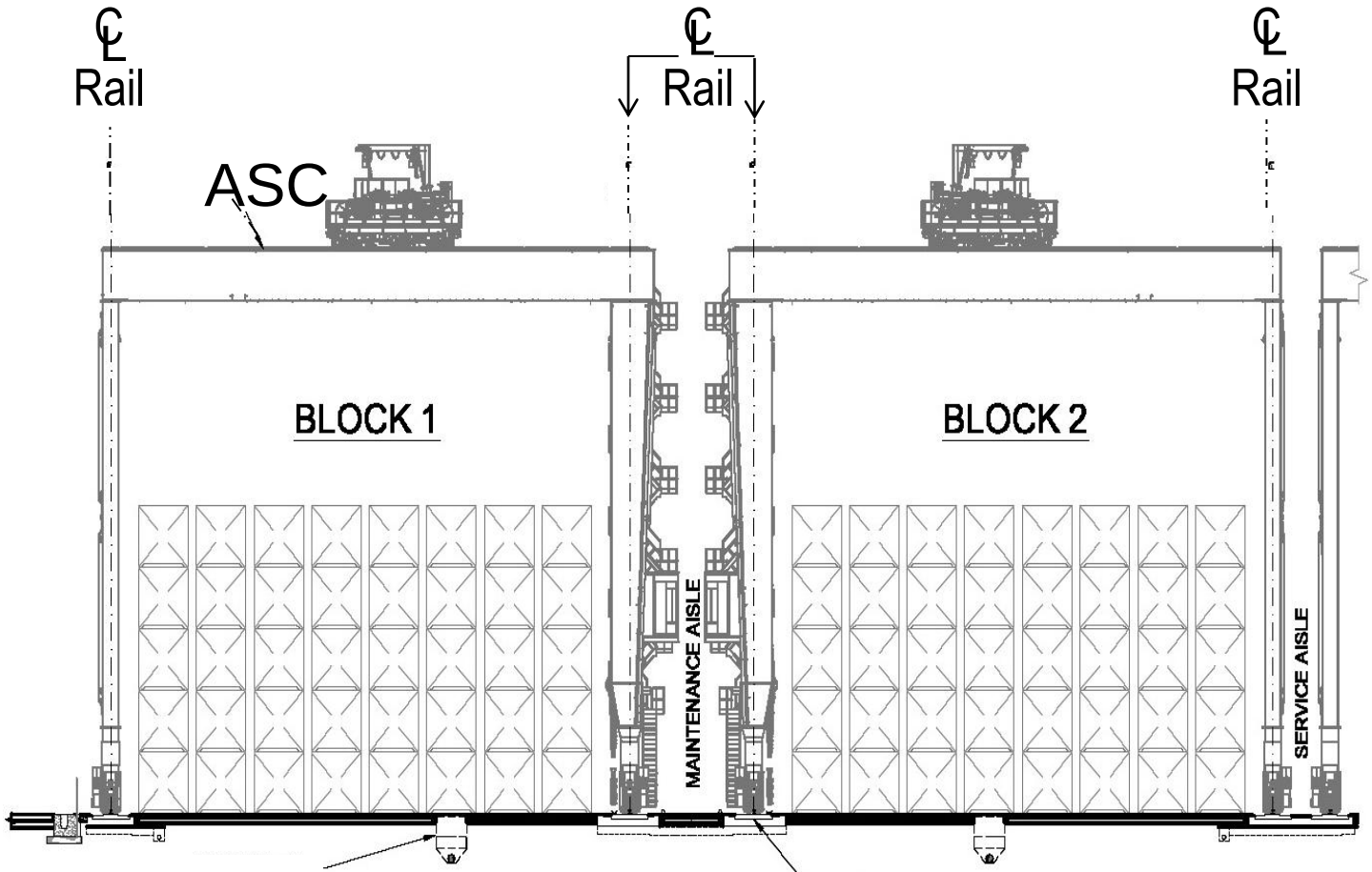
Core of Stacking Operation:

Stacking Ability:
1 over 5 containers
(Stack 6 High)

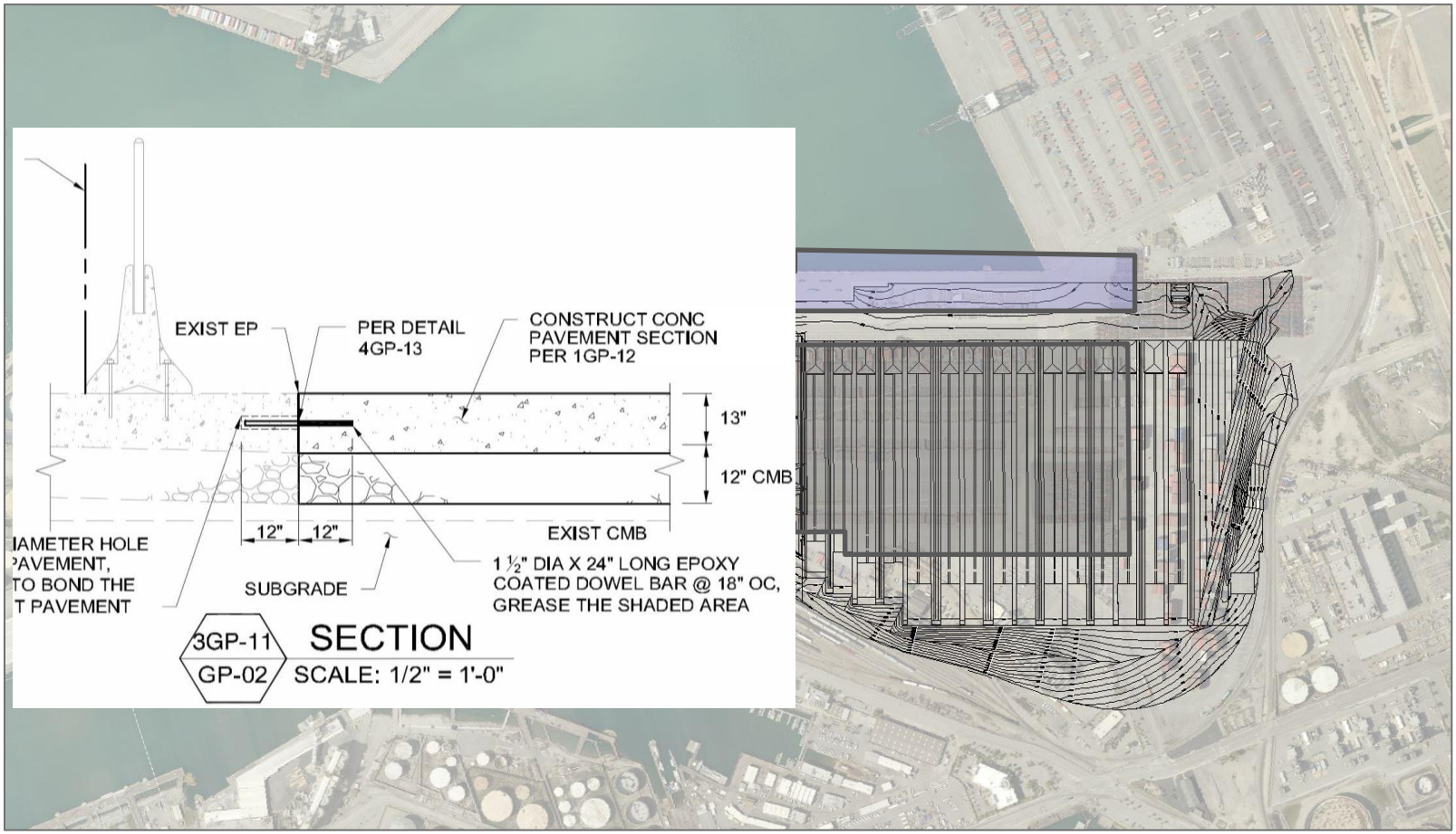
Specifications:
Dimensions – 78’ H X 84’ W
Weight – 230 Tons
Cost – $3 M

Operated by:
TOS/TLS

Design Elements



Grading & Paving Design



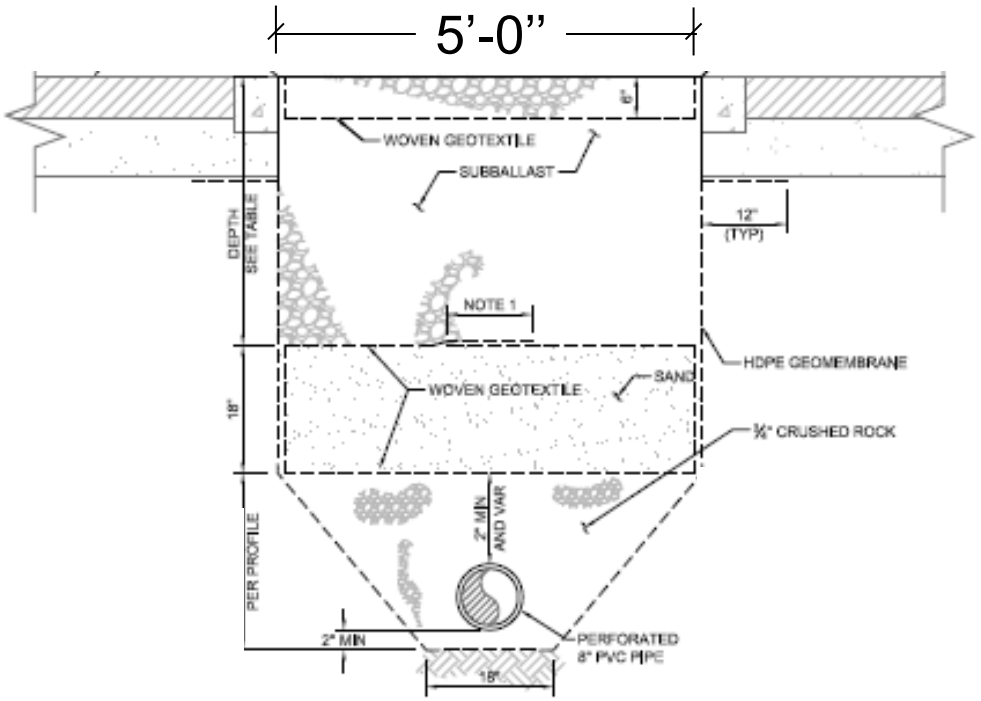
Shuttle Carrier Travel Way: 2% max. slope (1% preferred)

Stacking Blocks: 0.25% max. slope

Drainage Design

Objective:

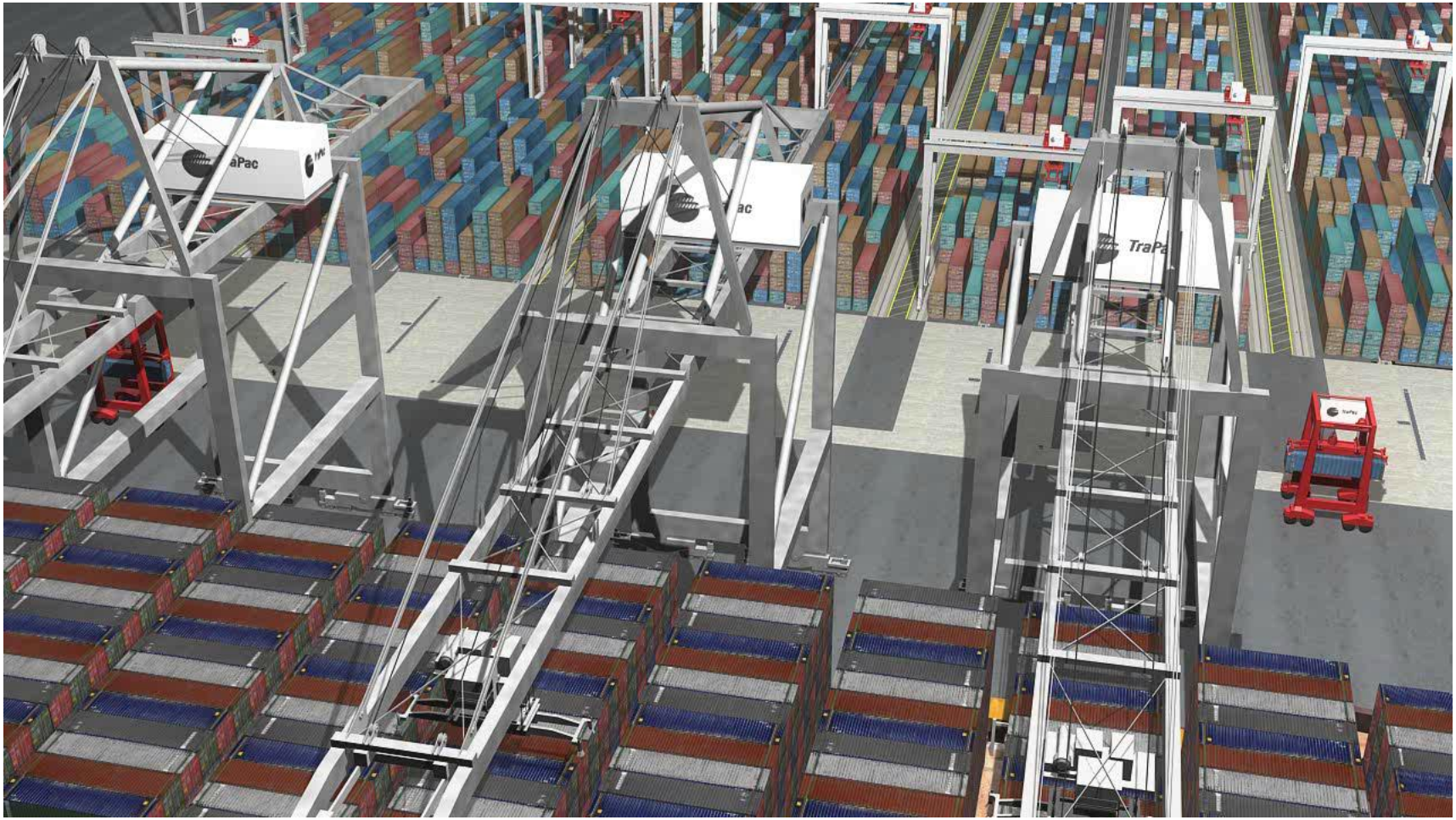
1) Compliance with City of Los Angeles Standard Urban Stormwater Mitigation Plan (SUSMP)
2) Drain site without affecting precision of ASC equipment
3) No infiltration due to chemically impacted soil



Implementation:

- SAND FILTERS (81,820 SF)
- Subdrains (~50,000 LF)
- Trench Drains (5200 LF)
- Overflow Trenches
- Filtration Vaults (5)

Drainage Design



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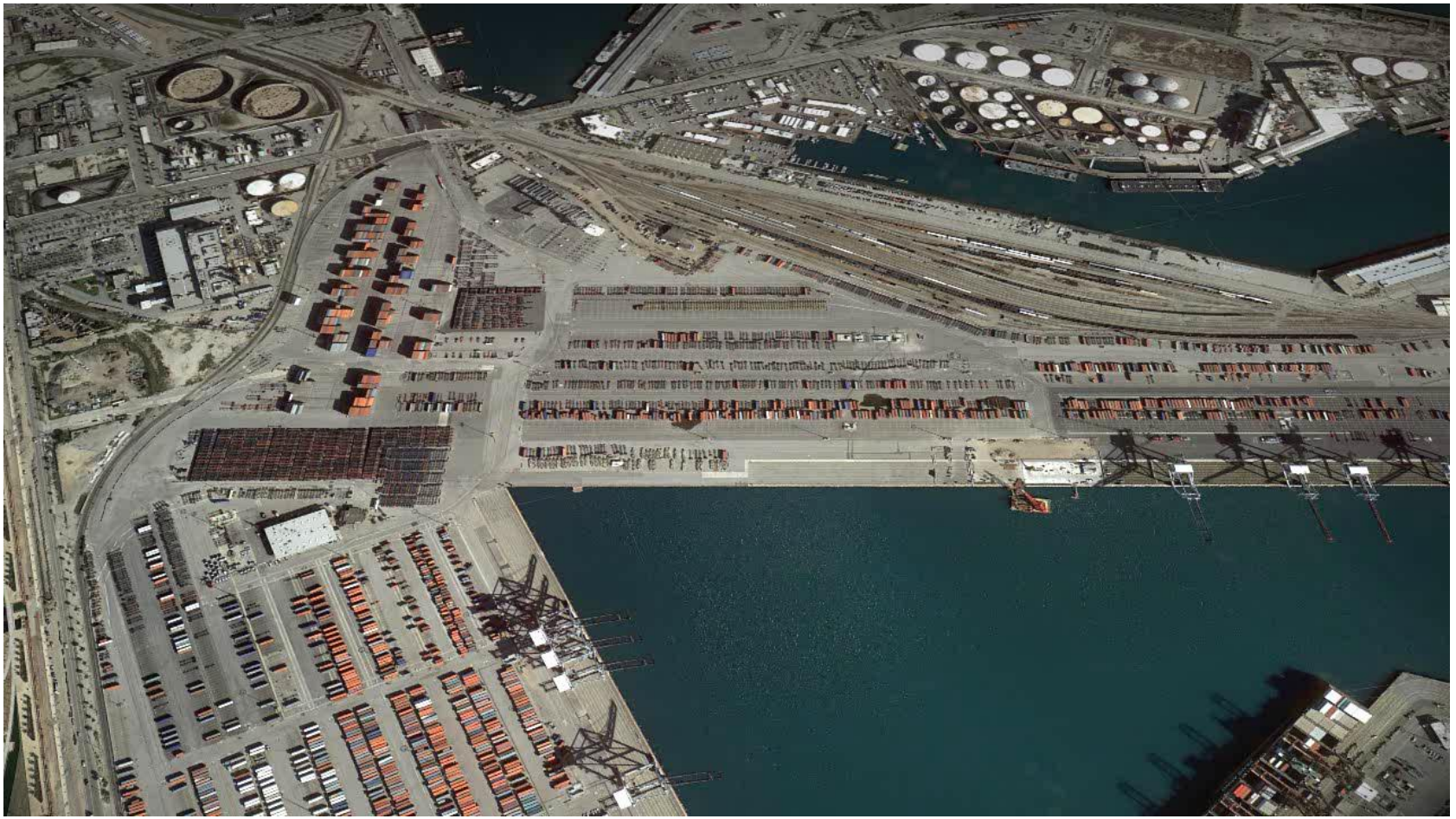
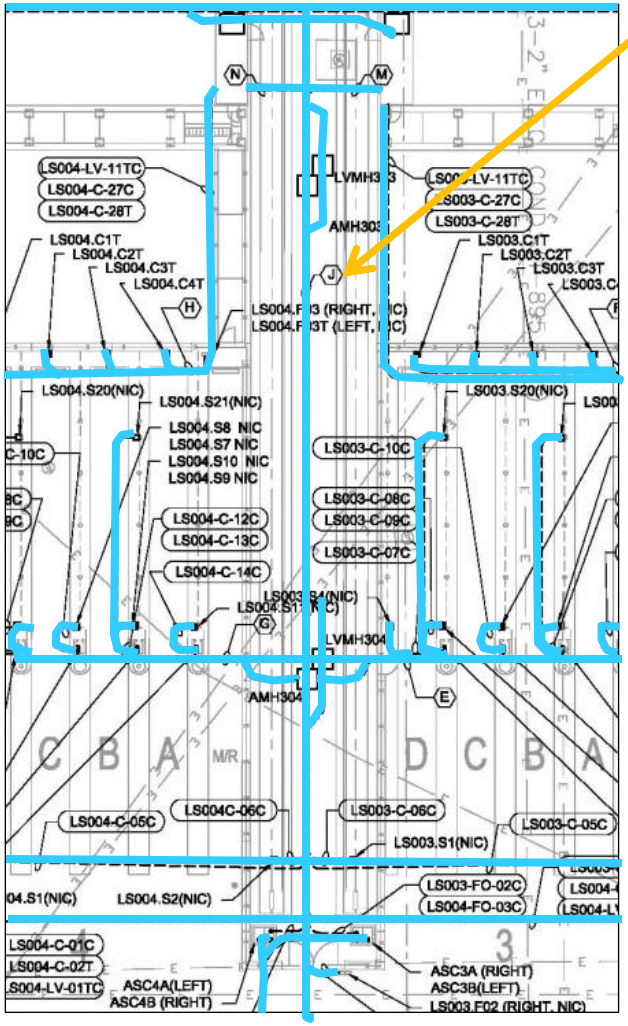
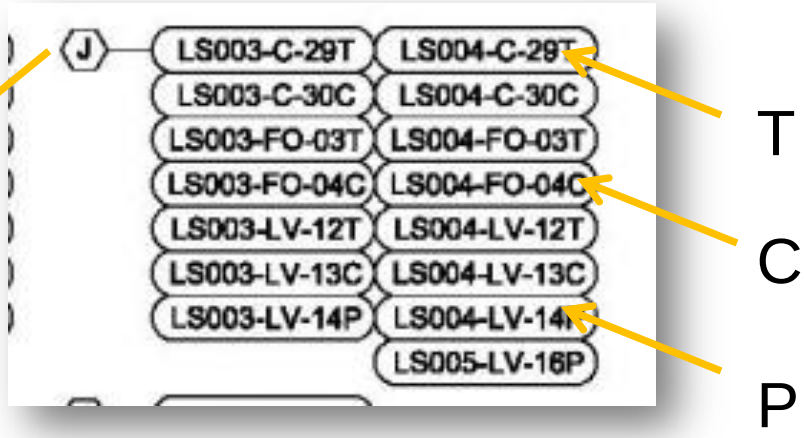
Electrical Design



Communication Designation

NAMING CONVENTION



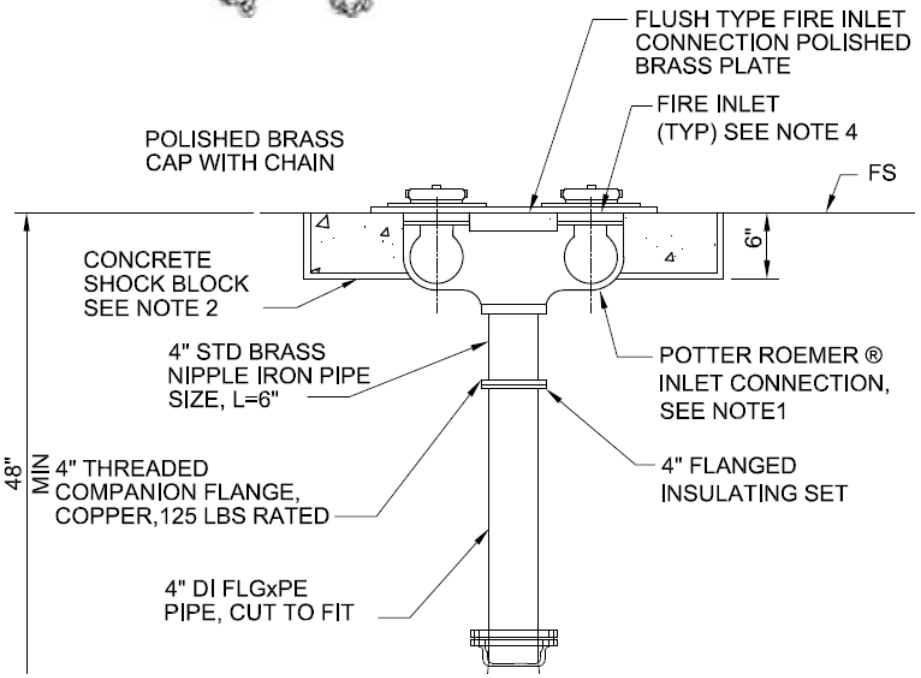


Designation of conduits between Owner (P), Operator (T), and Crane Manufacturer (C) is imperative.

Snapshot represents connection between reefer plugs, landside truck booths, and ASC vaults.

Water Design

- Service Lanes (4’)
- Maintenance Lanes (9’-6”) Access for mechanics and emergency vehicles only
- Standpipes with valves along service and maintenance lanes every 150’
- Heat sensor cameras placed at each 100’ HMP along perimeter



Lessons Learned

- Paradigm Shift in Container Terminal Design
- Early Expectations from ALL Stakeholders
- Crane Equipment, Operations & Civil Design are Integrated
- Development of New Standards
- Communication is Key!

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Thank you !!