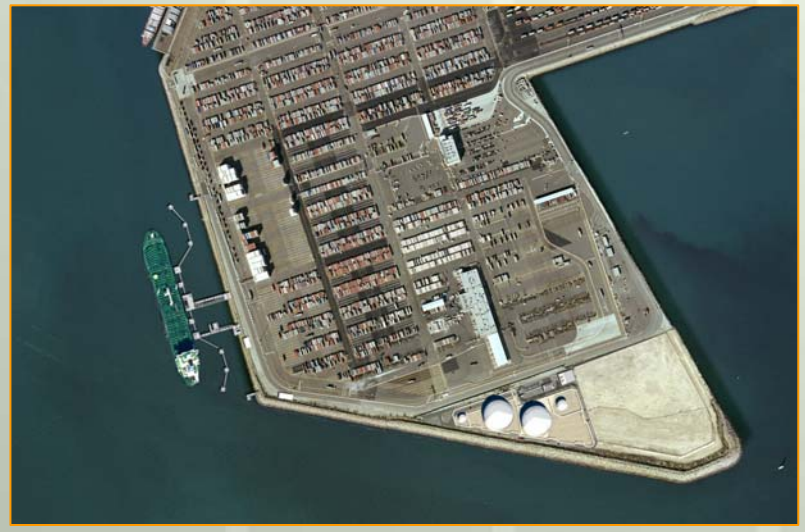
"Overview of the Terminal Design"

Prevention First 2006

September, 2006

Long Beach, CA

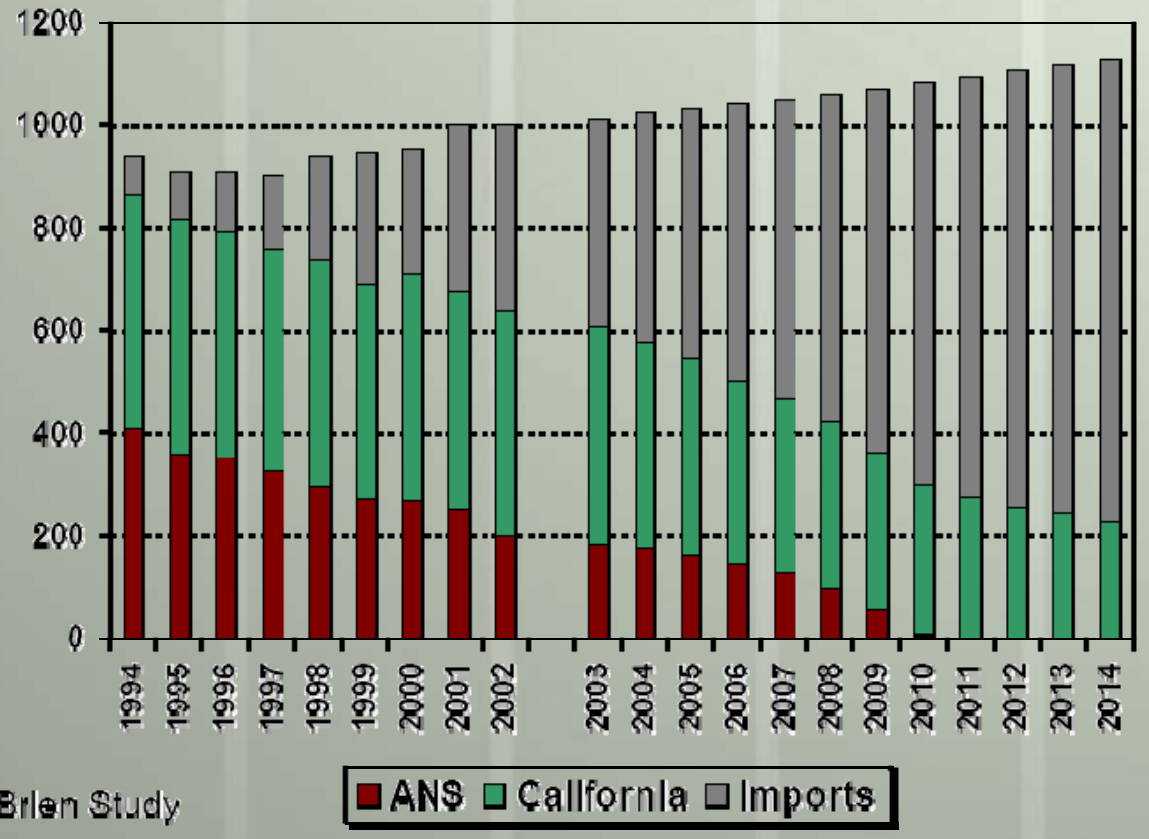
Topics to be Covered



- *The Need for the Terminal*
- *Full Project Flyover*
- *Design Criteria*
- *State-of-the-Art Systems and Features*
- *State-of-the-Art Analyses Performed*
- *Challenges and Hurdles to Overcome*

The Need for the Terminal

Los Angeles Regional Demand

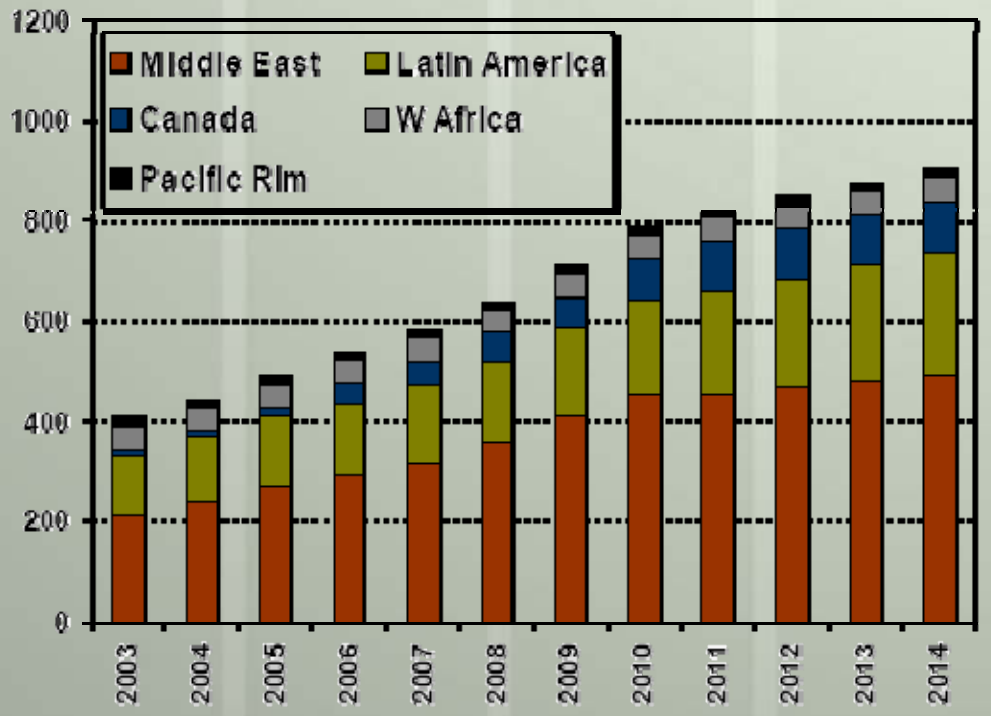


From Baker & O'Brien Study

The Need for the Terminal

Foreign Imports Drive Demand

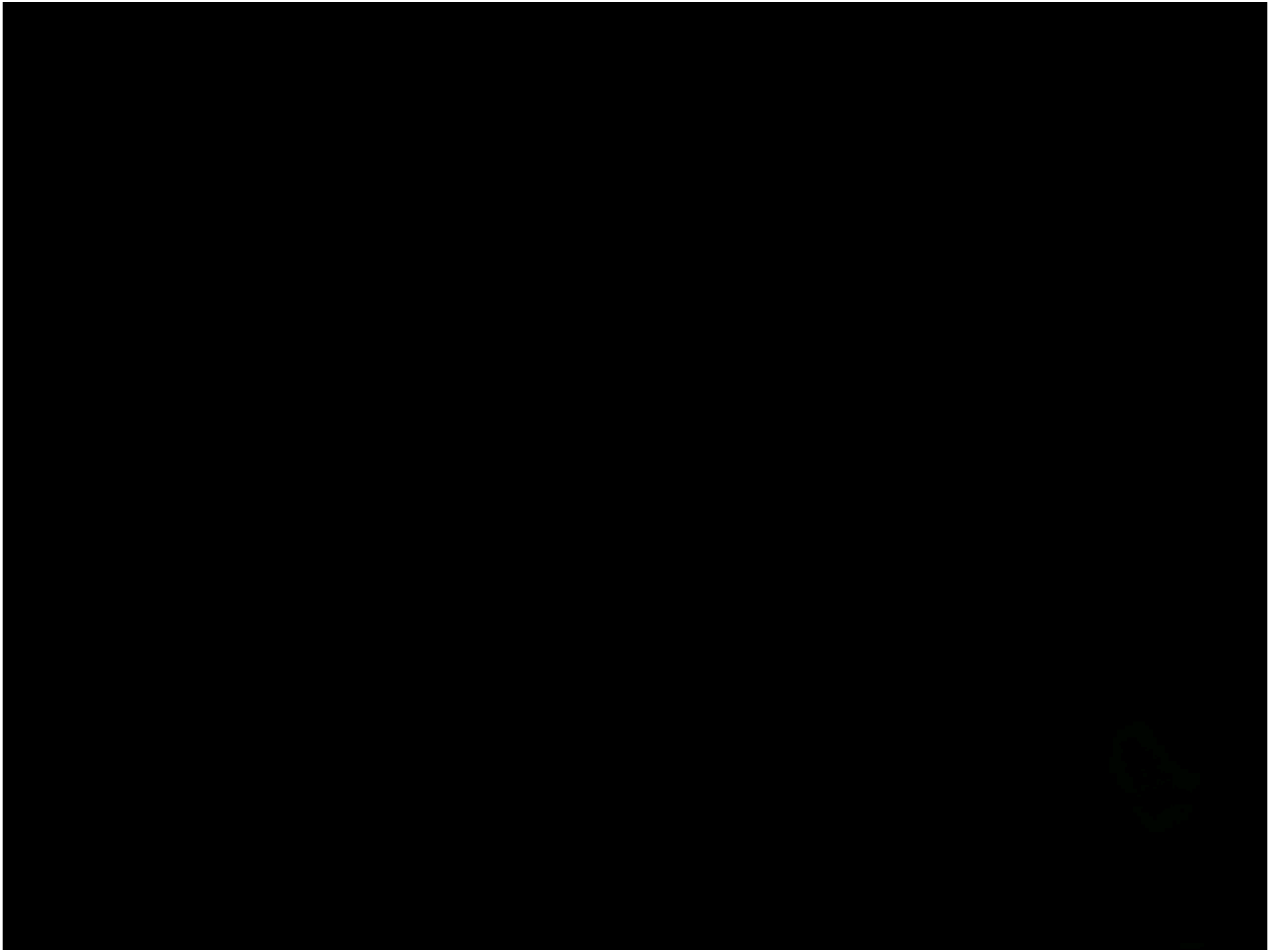
- Significant increase in marine imports over next ten years– 460,000 bbls/day or 100% increase
- Crude oil demand and decline of California crude oil productions drives the need for Pier 400 project
- Addresses petroleum import needs for the Los Angeles area
- Imports will be important to the continued economic development of the Los Angeles area economy



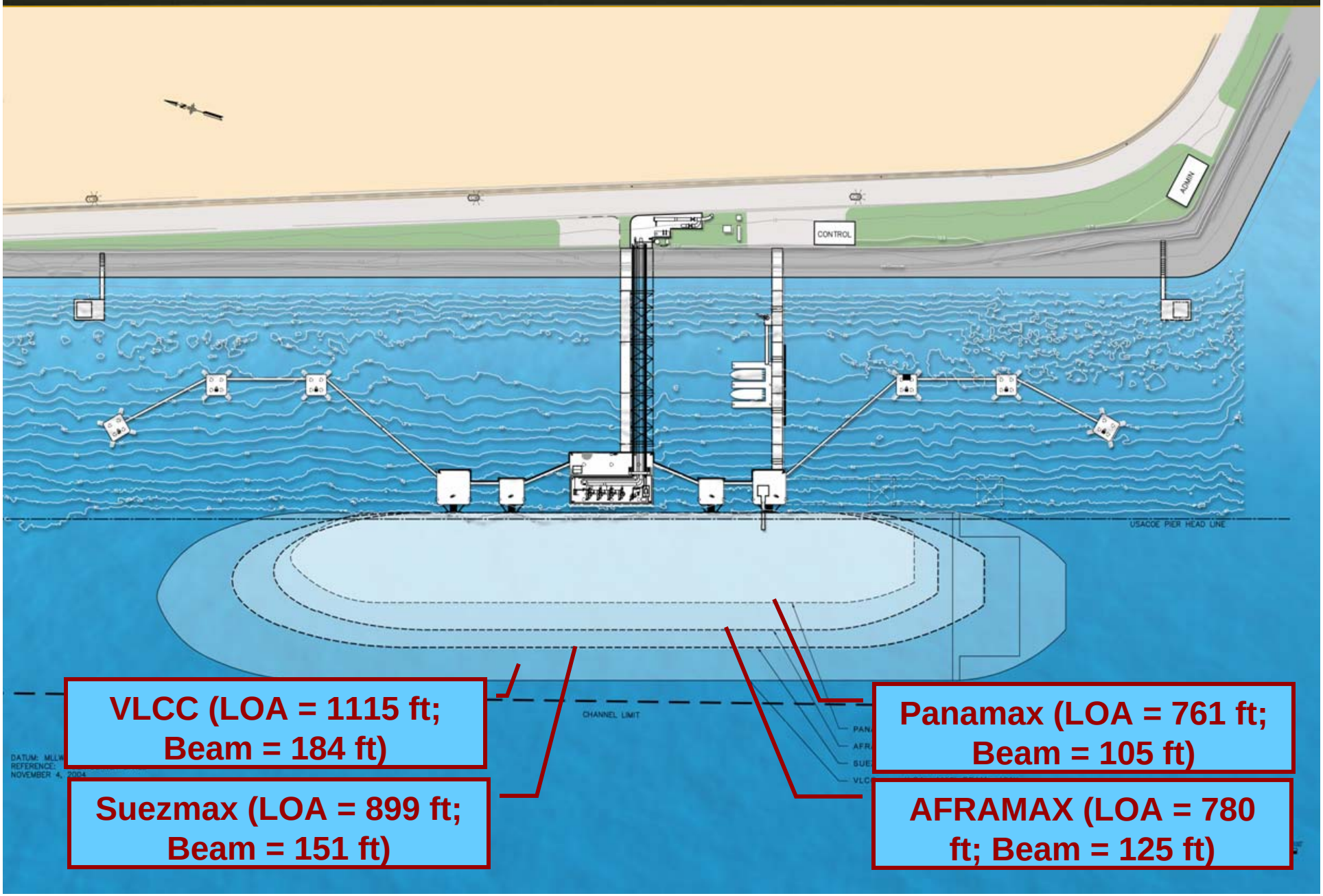
From Baker & O'Brien Study

Design Criteria – Big Picture

- *Import Capacity = 250,000 bbl/day*
- *Pier 400, Berth 408 Site Chosen*
  - *Deep Draft (-81 ft) Requires No Additional Dredging*
  - *Original Driver Behind Pier 400 Landfill*
  - *Relatively Isolated From San Pedro Community*
- *Accommodate Panamax up to VLCC*
- *Four 16-inch Unloading Arms*
- *One 8-inch Fueling Arm for Distillate Loading/Unloading*
- *State-of-the-Art Safety Features*

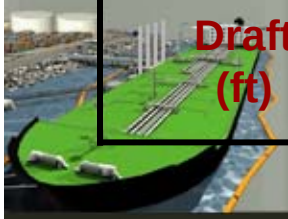


Design Criteria – Terminal Layout

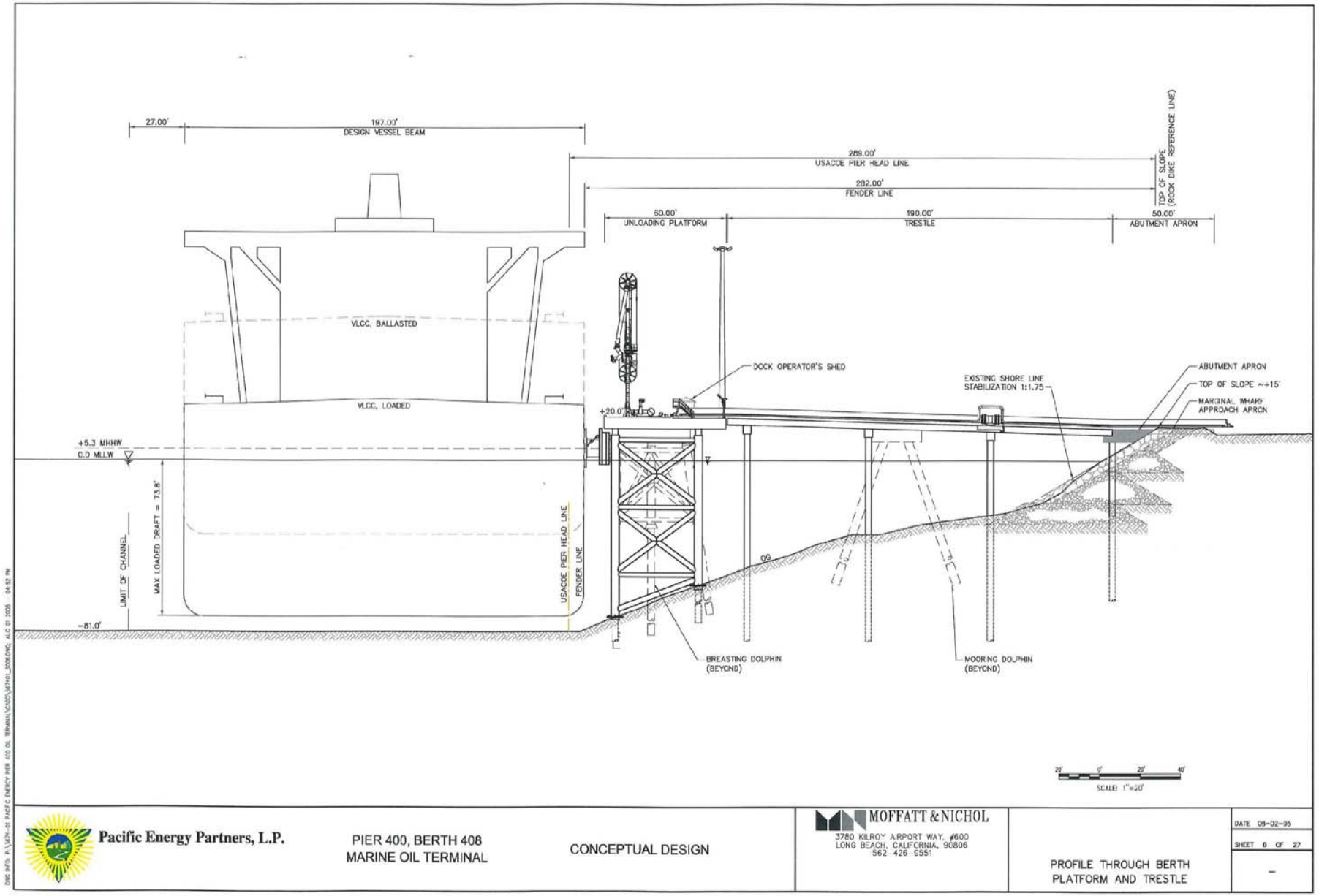


Design Criteria – Design Vessel Parameters

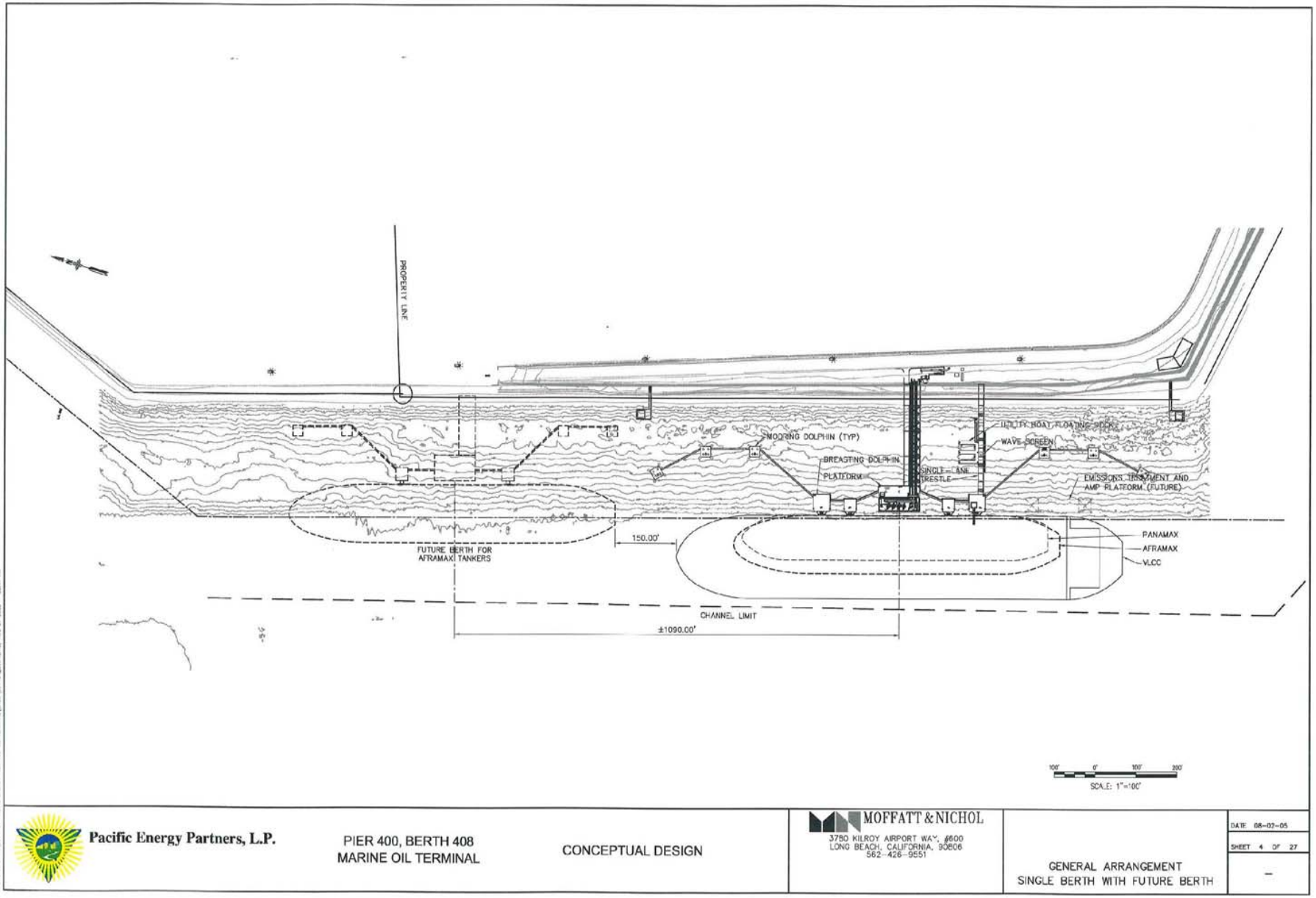
PARAMETER	VLCC	SUEZMAX	AFRAMAX	PANAMAX	FUEL BARGE
DWT (tonnes)	325,000	149,000	105,000	70,000	1,400
Displace-ment (tonnes)	370,000	172,400	125,000	85,000	~1,800
LOA / Beam (ft)	1,115 / 184	899 / 151	780 / 125	761 / 105	170 / 44
Loaded Draft (ft)	74	56	48.5	44.6	~7



Design Criteria – Cross Section



Design Criteria – Allowing for the Future



Design Criteria – Fueling System

Design Criteria

- ***MOTEMS Structural Criteria***
  - ***Seismic Criteria***
  - ***Mooring Loads***
  - ***Berthing Loads***
  - ***Wave Loads***
  - ***Passing Vessel Loads***
  - ***Seiche***
  - ***Tsunamis***
  - ***Wind Loads***
  - ***Current Loads***
  - ***Load Combinations***
  - ***Safety Factors***

Design Criteria

- ***MOTEMS Fire Prevention, Detection and Suppression Criteria***
- ***MOTEMS Piping, Mechanical and Electrical Systems Criteria***
- ***Seismic Sensors***
- ***Environmental Monitoring***
- ***Security***

State-of-the-Art Systems and Features

- ***Laser-Assisted Docking Aid System***

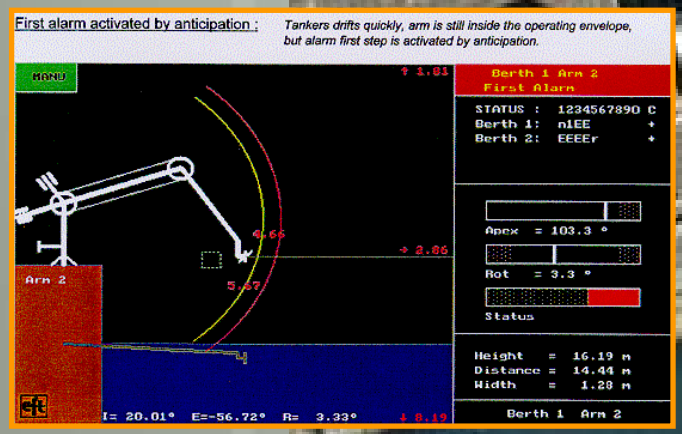
State-of-the-Art Systems and Features

- ***Quick Release Mooring Hooks with Integral load Monitoring and Staged Alarm***

Load Cell in Hook

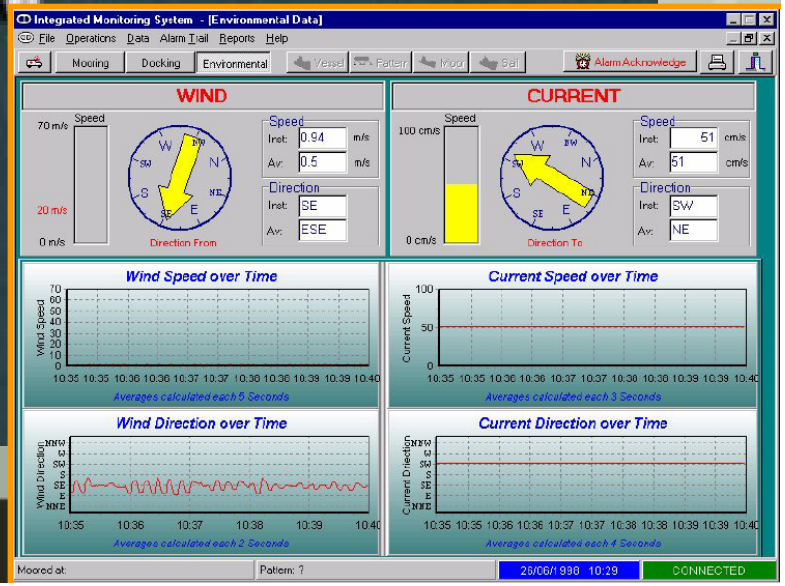
State-of-the-Art Systems and Features

- ***Unloading Arms with Quick Connect/Disconnect Couplers***



State-of-the-Art Systems and Features

- ***Real-time Environmental and Seismic Sensor Monitoring***



State-of-the-Art Systems and Features

- ***Gangway Tower with Integral Position Monitoring and Staged Alarm***

State-of-the-Art Systems and Features

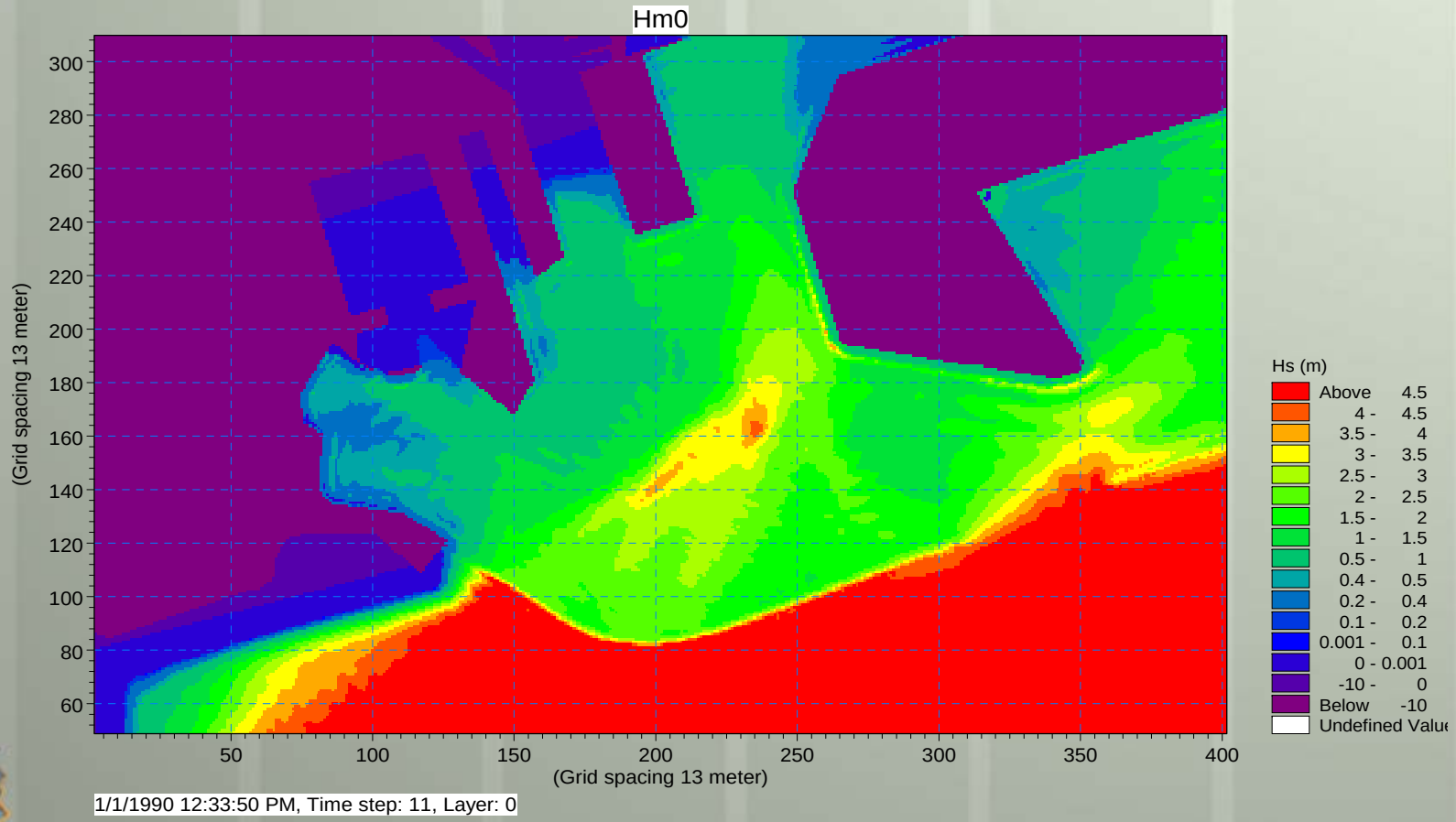
- ***Fire Protection System with Redundancies – Based on Hazard Analysis and Fire Plan***

State-of-the-Art Systems and Features

- ***Integrated Control System for Effective Operator Control***

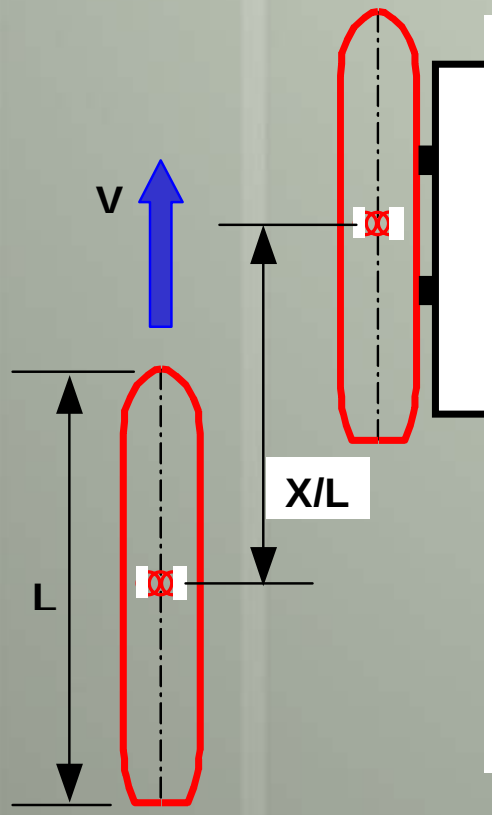
State-of-the-Art Analyses Performed

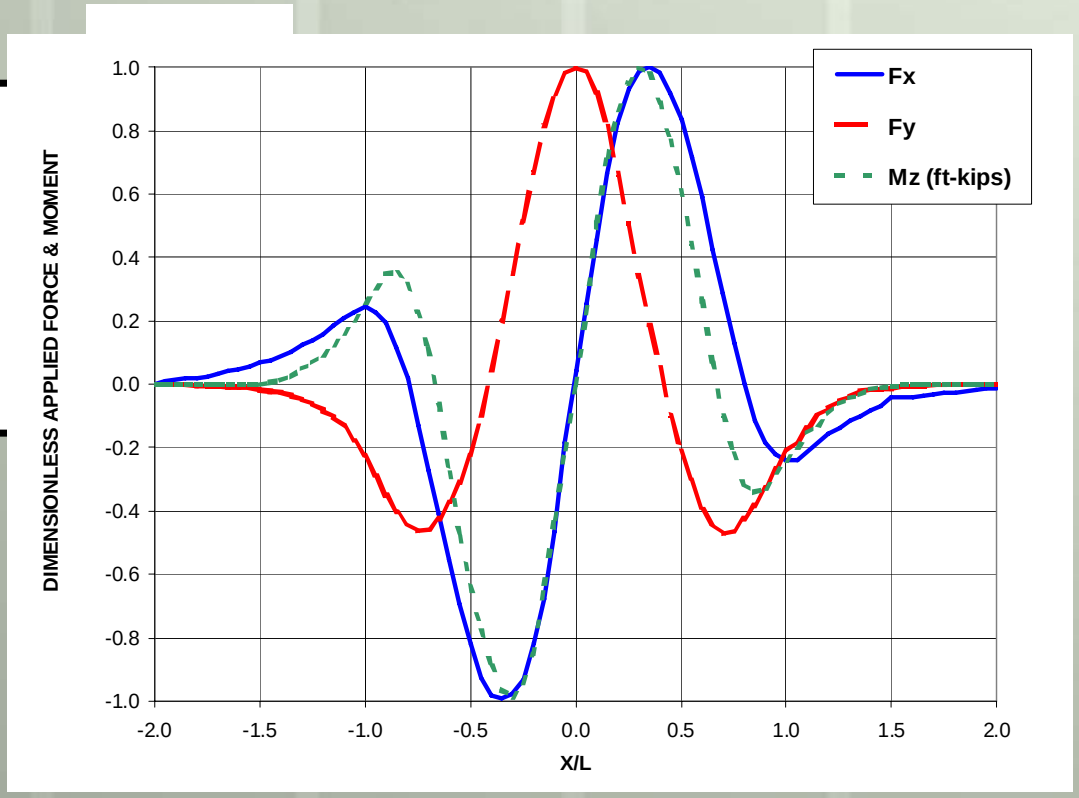
- ***Berth Operational Downtime Analysis***



State-of-the-Art Analyses Performed

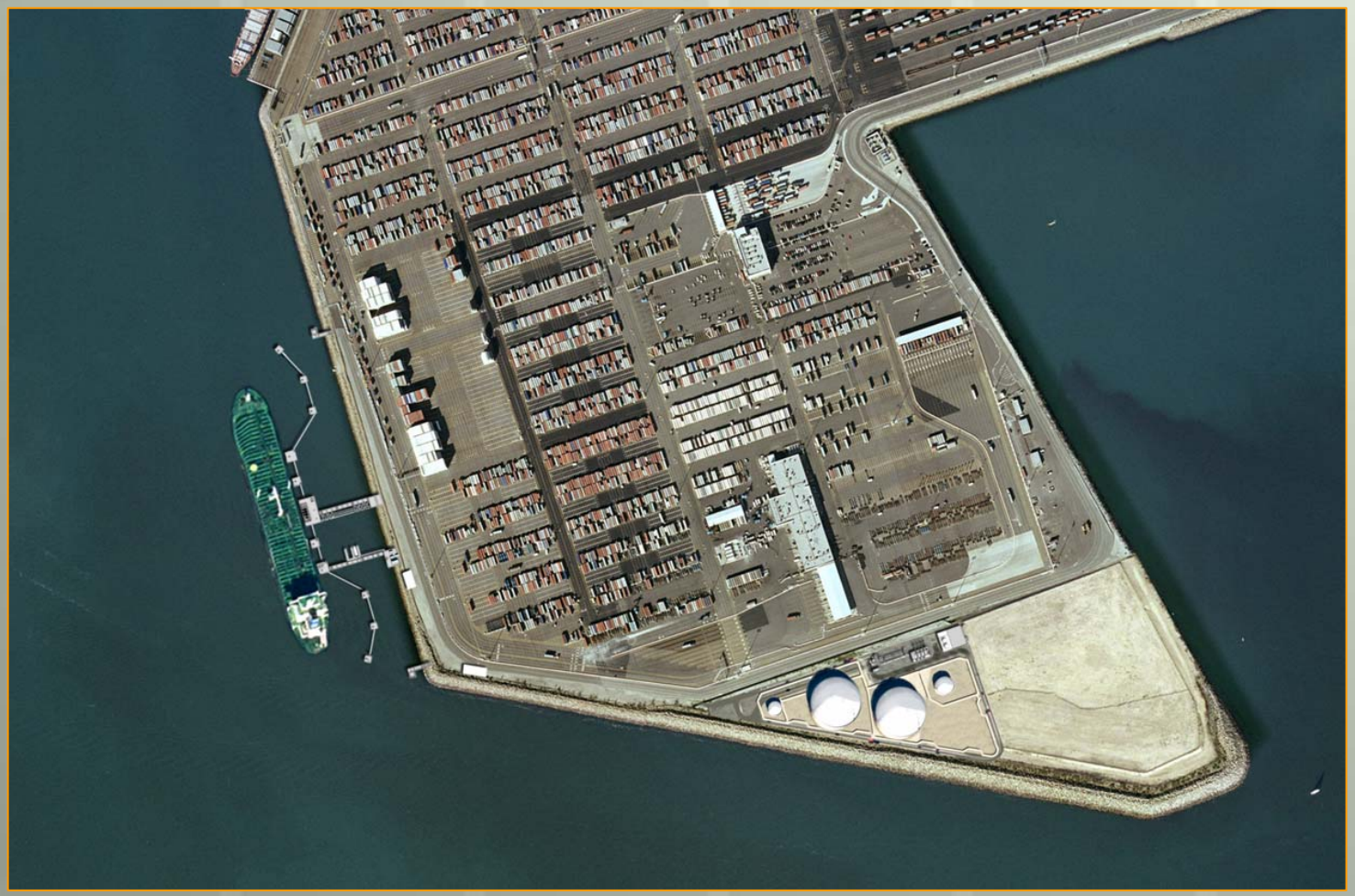
- ***Passing Vessel Motion Analysis***





State-of-the-Art Analyses Performed

- ***Tsunami Hazard Analysis***

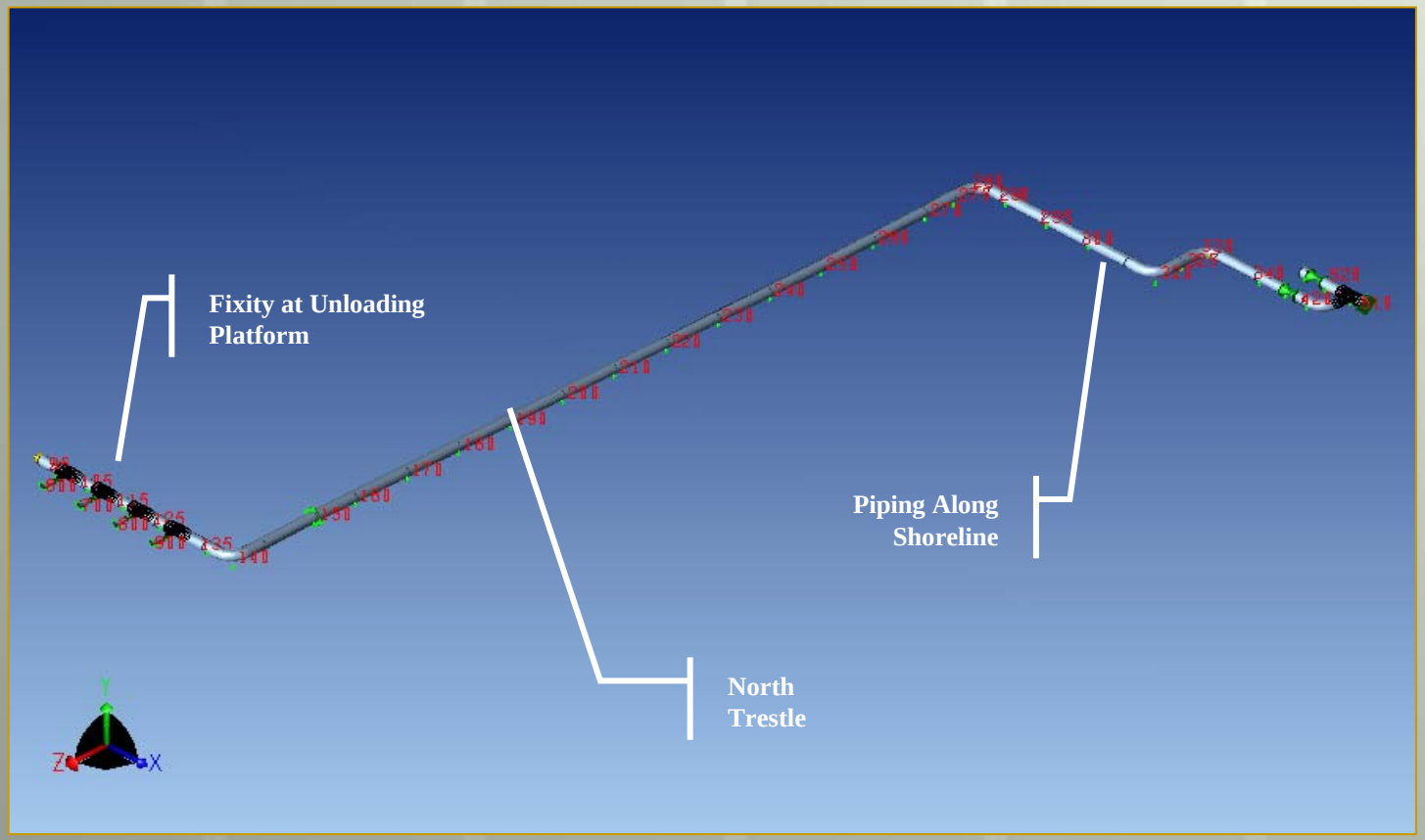


State-of-the-Art Analyses Performed

- ***Seismic Structural Analysis Per MOTEMS***
  - ***Level 1 Seismic Performance***
    - *Minor or no structural damage*
    - *Temporary or no interruption in operations*
  - ***Level 2 Seismic Performance***
    - *Controlled inelastic structural behavior with repairable damage*
    - *Prevention of collapse*
    - *Temporary loss of operations, restorable within months*
    - *Prevention of major spill (≥1200 bbls)*

State-of-the-Art Analyses Performed

- ***Structural and Piping Stress Analysis***



Challenges and Hurdles Overcome

- ***Regulatory and Permitting Hurdles***
  - ***Over 25 agency approvals***
  - ***Over 80 individual permits required***
- ***Political Challenges***
  - ***Effective Outreach***
  - ***Citizens and Community Organizations***
  - ***Interest Groups***
  - ***Neighborhood Groups***
  - ***Politicians***
- ***Alternative Marine Power Requirement***
  - ***Shore side infrastructure Challenges***
  - ***Ship Conversion Challenges***

Conclusions

- *Next Generation Marine Oil Terminal*
- *First New CA MOT in 25+ Years*
- *First CA MOT to be Designed to New MOTEMS Requirements*
- *Precedent-Setting Solutions to Technical, Environmental and Political Challenges*

"Overview of the Terminal Design"

Thank You!

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