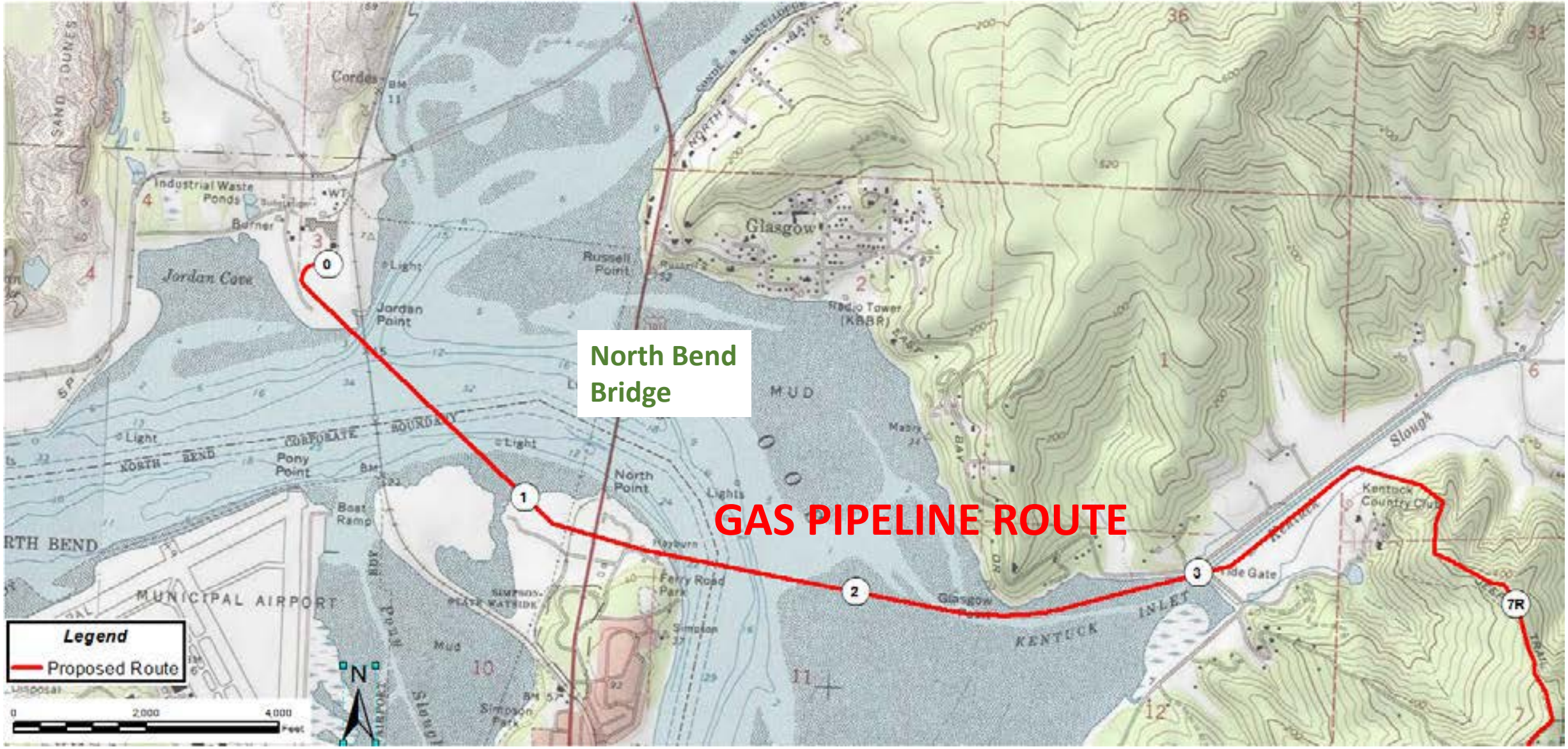
THE JORDAN COVE LIQUIFIED NATURAL GAS PROJECT

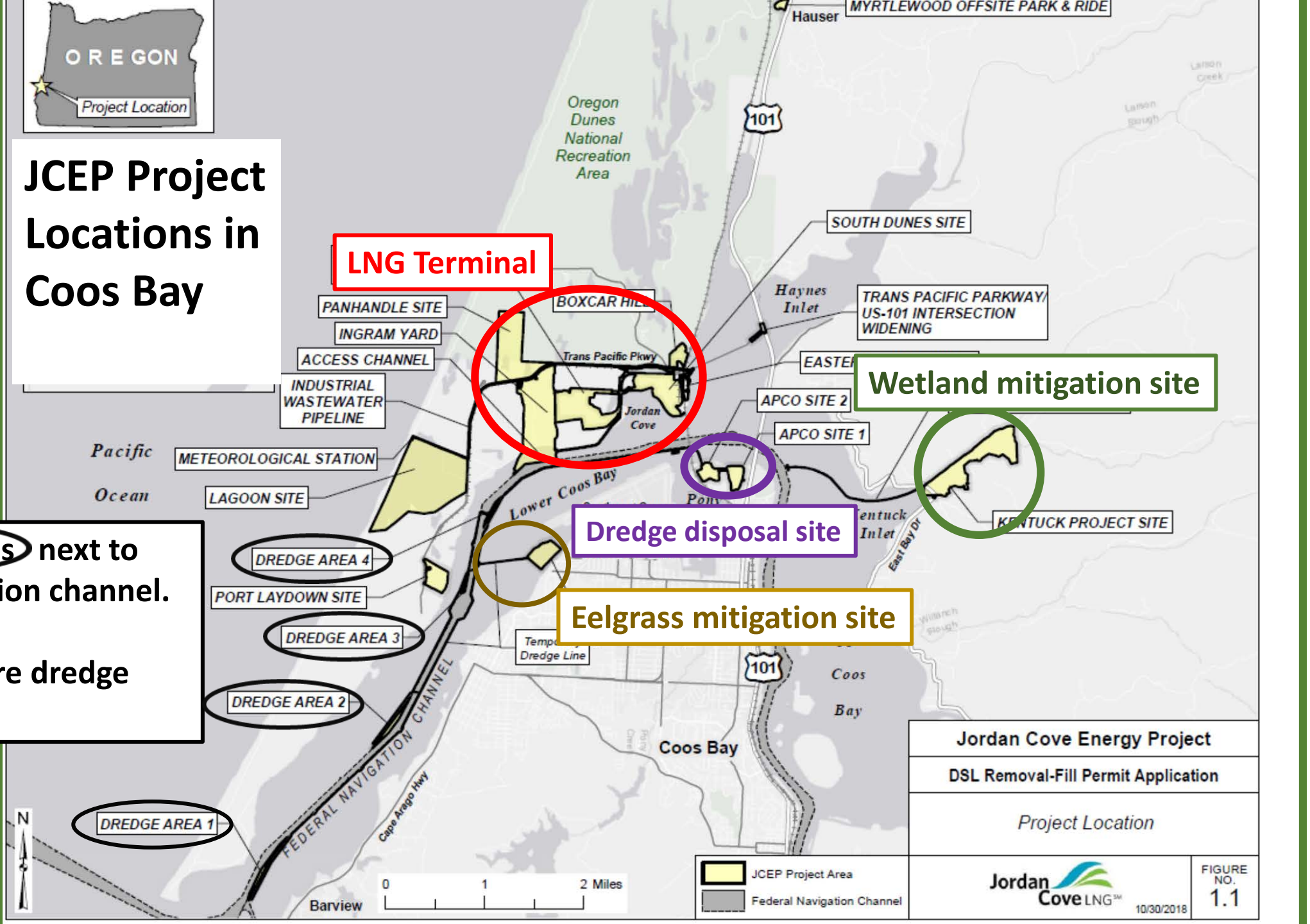
36 inch diameter
Natural gas = methane
Pressure = 1900 psi

- **GAS PIPELINE**
- **TERMINAL TO LIQUIFY THE GAS**
- **SHIPS TO TAKE IT TO ASIA**

229-mile Pacific Connector fracked gas pipeline and the Jordan Cove LNG export terminal

36 inch pipe - horizontal directional drilling under the bay
Max depth 190ft



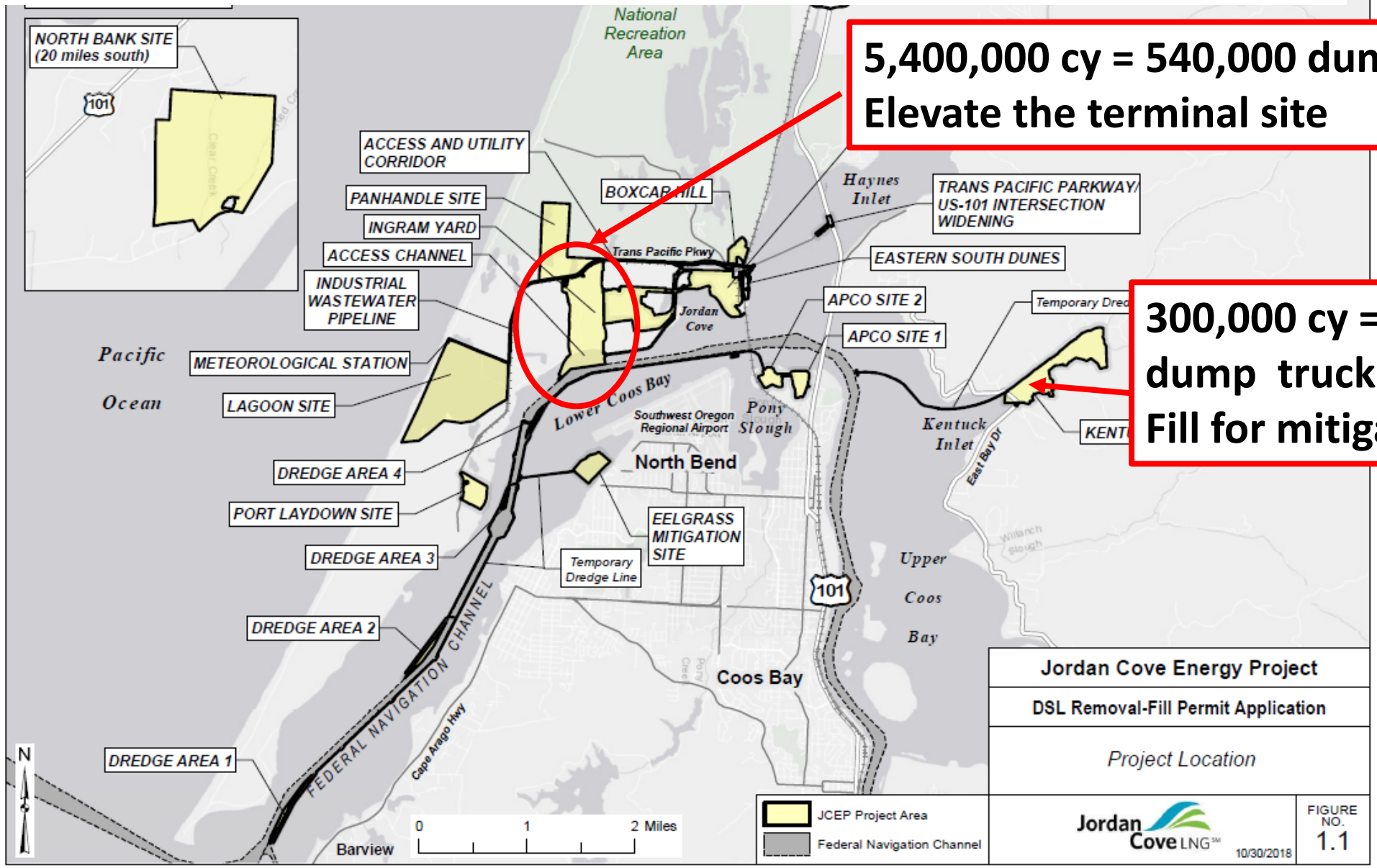

OREGON
Project Location
JCEP Project Locations in Coos Bay
LNG Terminal
Wetland mitigation site
Dredge disposal site
Eelgrass mitigation site
Four dredged areas next to the current navigation channel.
Black lines in Bay are dredge pipes
Oregon Dunes National Recreation Area
Hauser
MYRTLEWOOD OFFSITE PARK & RIDE
101
SOUTH DUNES SITE
Haynes Inlet
TRANS PACIFIC PARKWAY/ US-101 INTERSECTION WIDENING
PANHANDLE SITE
INGRAM YARD
ACCESS CHANNEL
INDUSTRIAL WASTEWATER PIPELINE
BOXCAR HILL
Trans Pacific Pkwy
Jordan Cove
APCO SITE 2
APCO SITE 1
Pacific Ocean
METEOROLOGICAL STATION
LAGOON SITE
Lower Coos Bay
KENTUCK PROJECT SITE
East Bay Dr
DREDGE AREA 4
PORT LAYDOWN SITE
DREDGE AREA 3
DREDGE AREA 2
DREDGE AREA 1
Dredge Line
FEDERAL NAVIGATION CHANNEL
Cape Arago Hwy
Coos Bay
Barview
0 1 2 Miles
N
JCEP Project Area
Federal Navigation Channel
Jordan Cove Energy Project
DSL Removal-Fill Permit Application
Project Location
Jordan Cove LNG
10/30/2018
FIGURE NO. 1.1

TERMINAL TO LIQUIFY THE GAS AND LOAD IT INTO SHIPS

https://www.jordancovelng.com/project

Dredge a 45 foot deep channel for the LNG ship to access the plant

Fate of dredge spoils from the slip and access channel

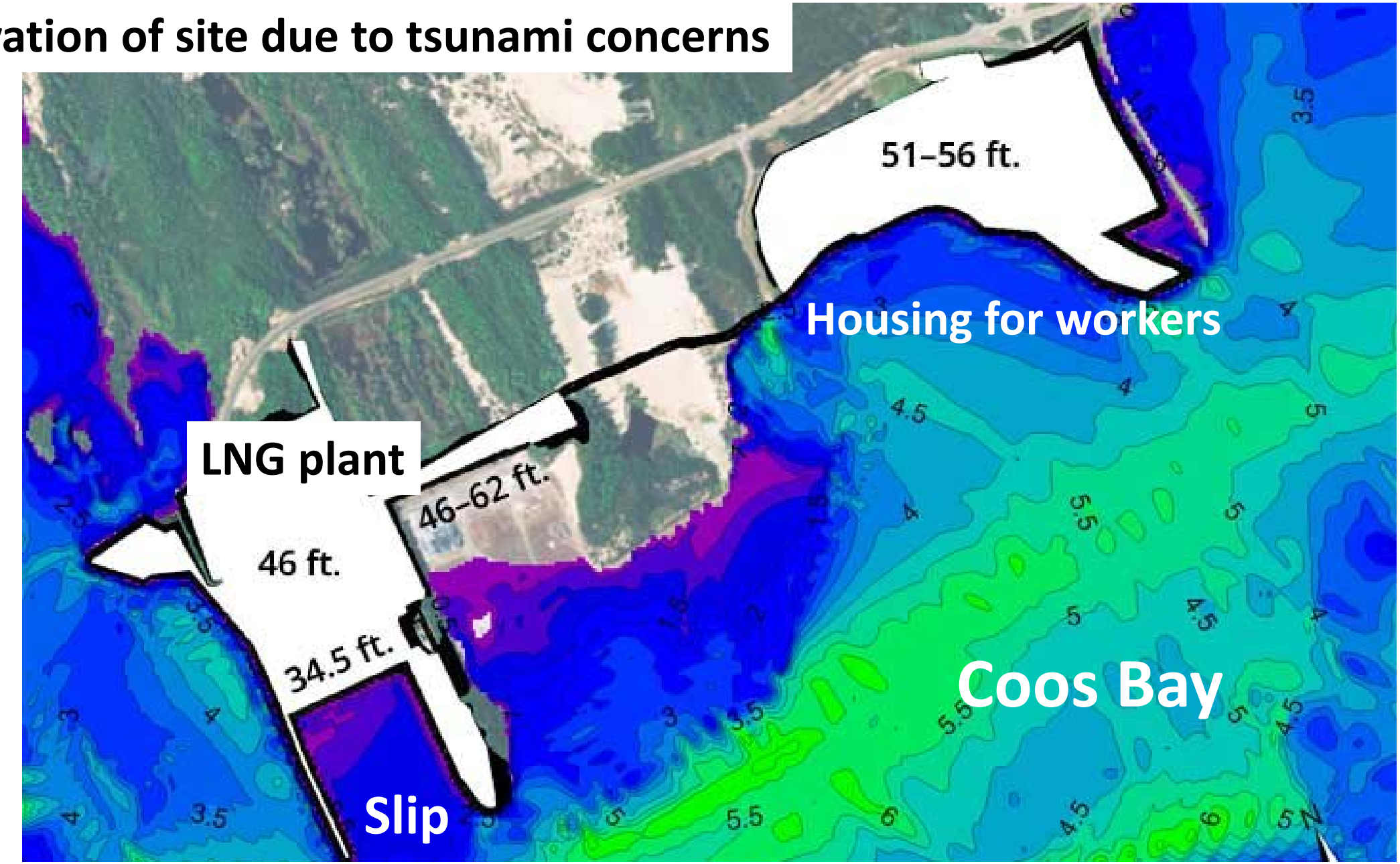


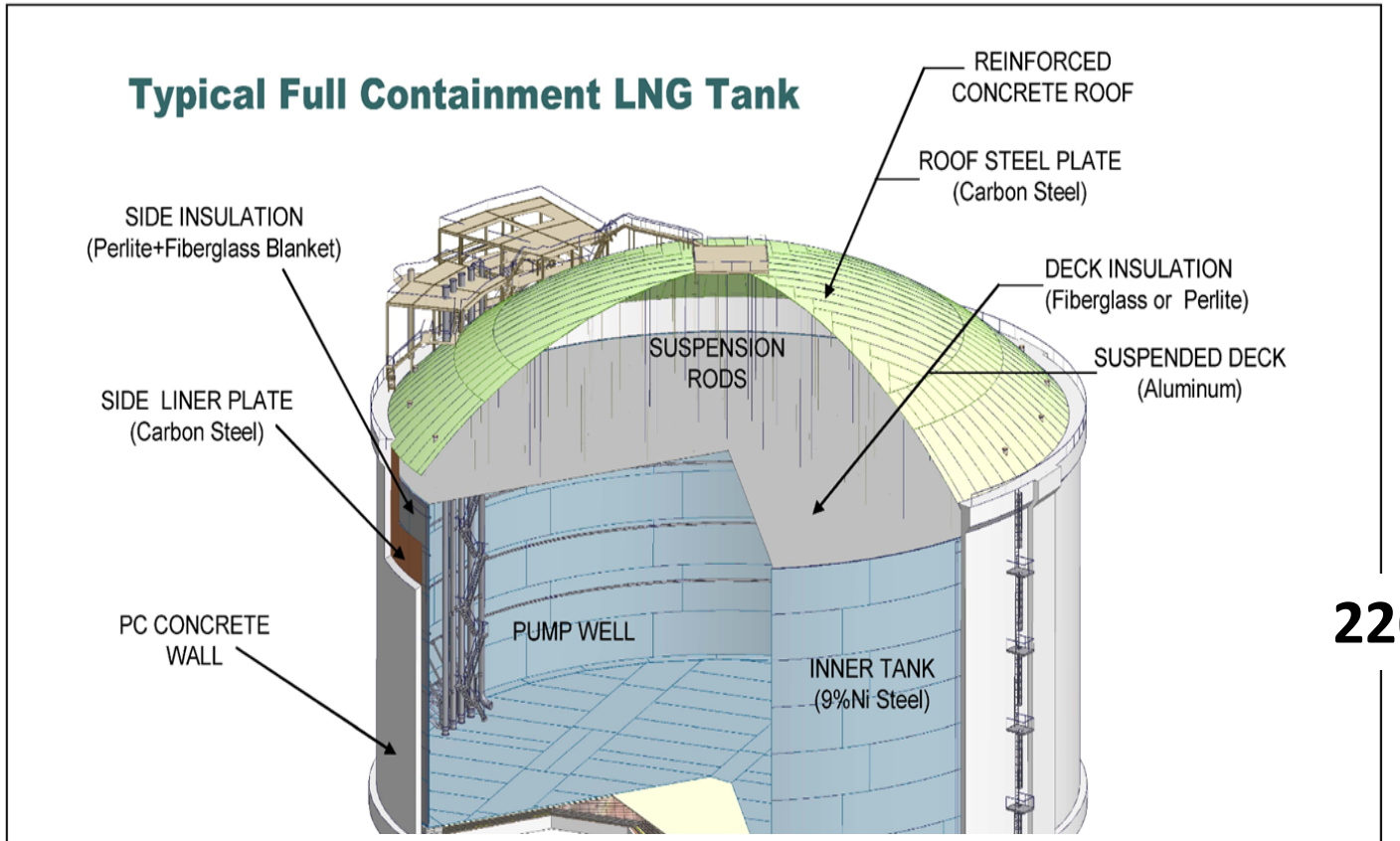
5,400,000 cy = 540,000 dump trucks
Elevate the terminal site

300,000 cy = 30,000 dump trucks
Fill for mitigation site

J1-000-RGL-PMT-DEA-00003-00 Rev. F

Elevation of site due to tsunami concerns

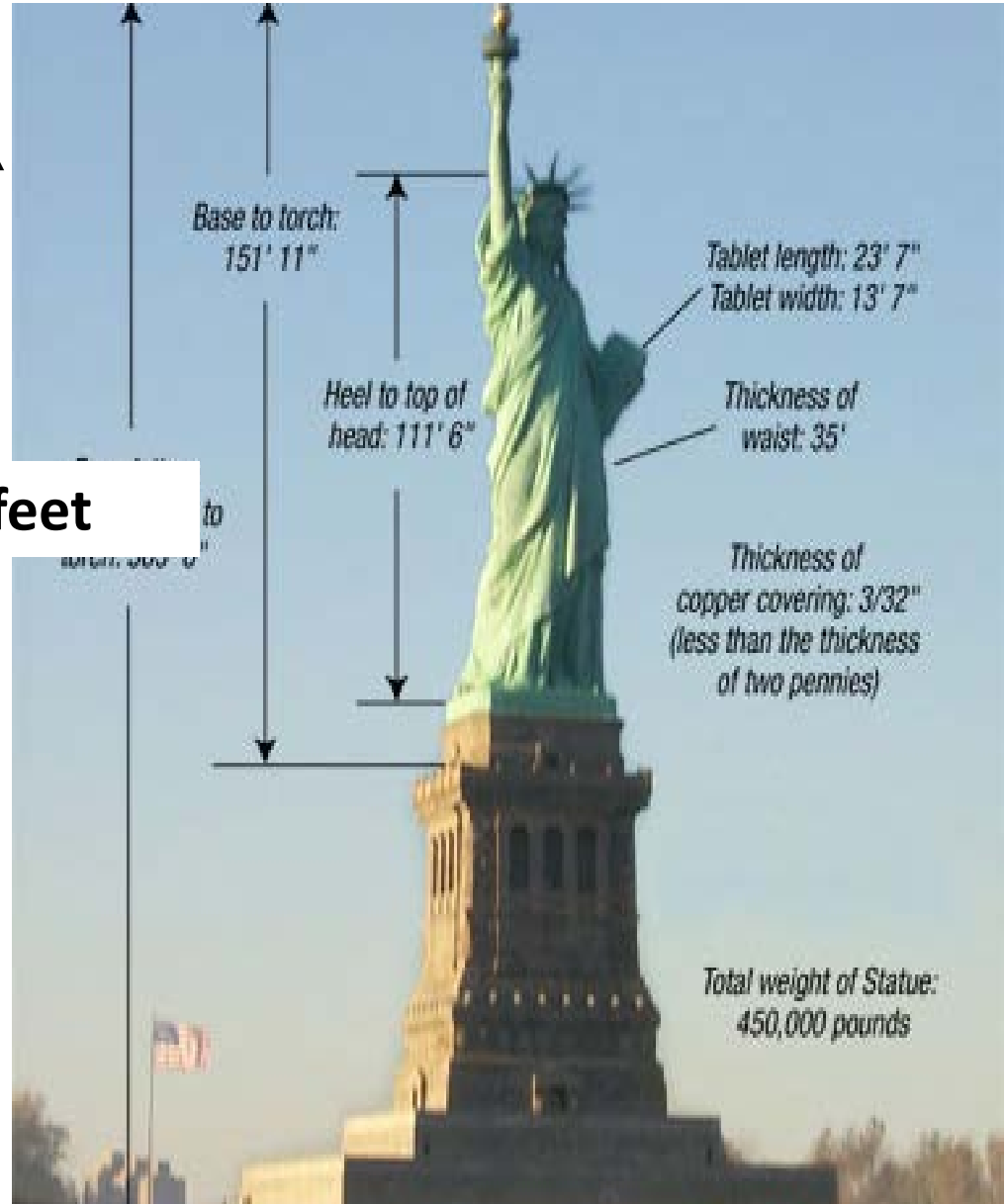




180 ft high LNG tank -

46 feet of dredge spoils

226 feet



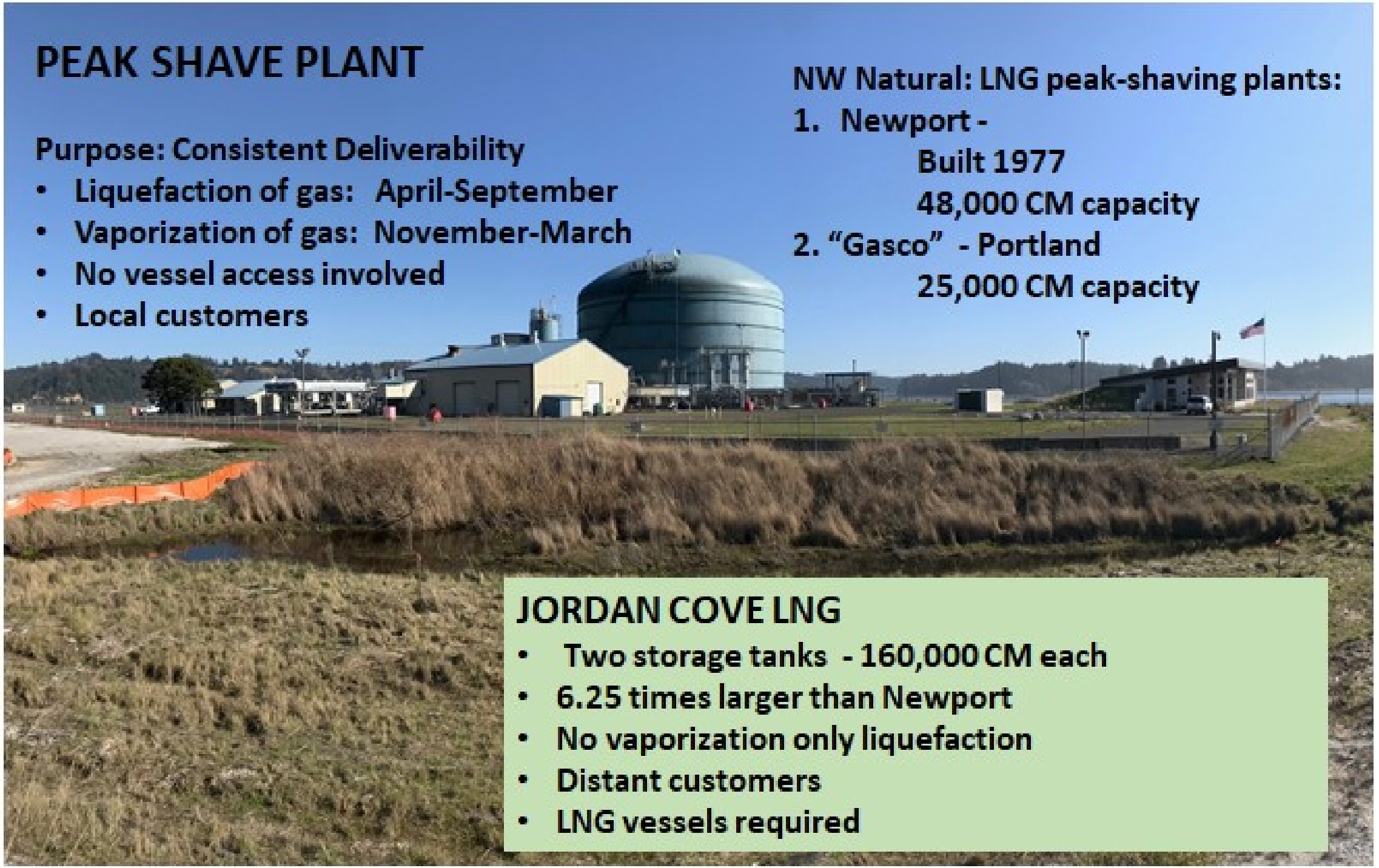
PEAK SHAVE PLANT

Purpose: Consistent Deliverability

- Liquefaction of gas: April-September
- Vaporization of gas: November-March
- No vessel access involved
- Local customers

NW Natural: LNG peak-shaving plants:

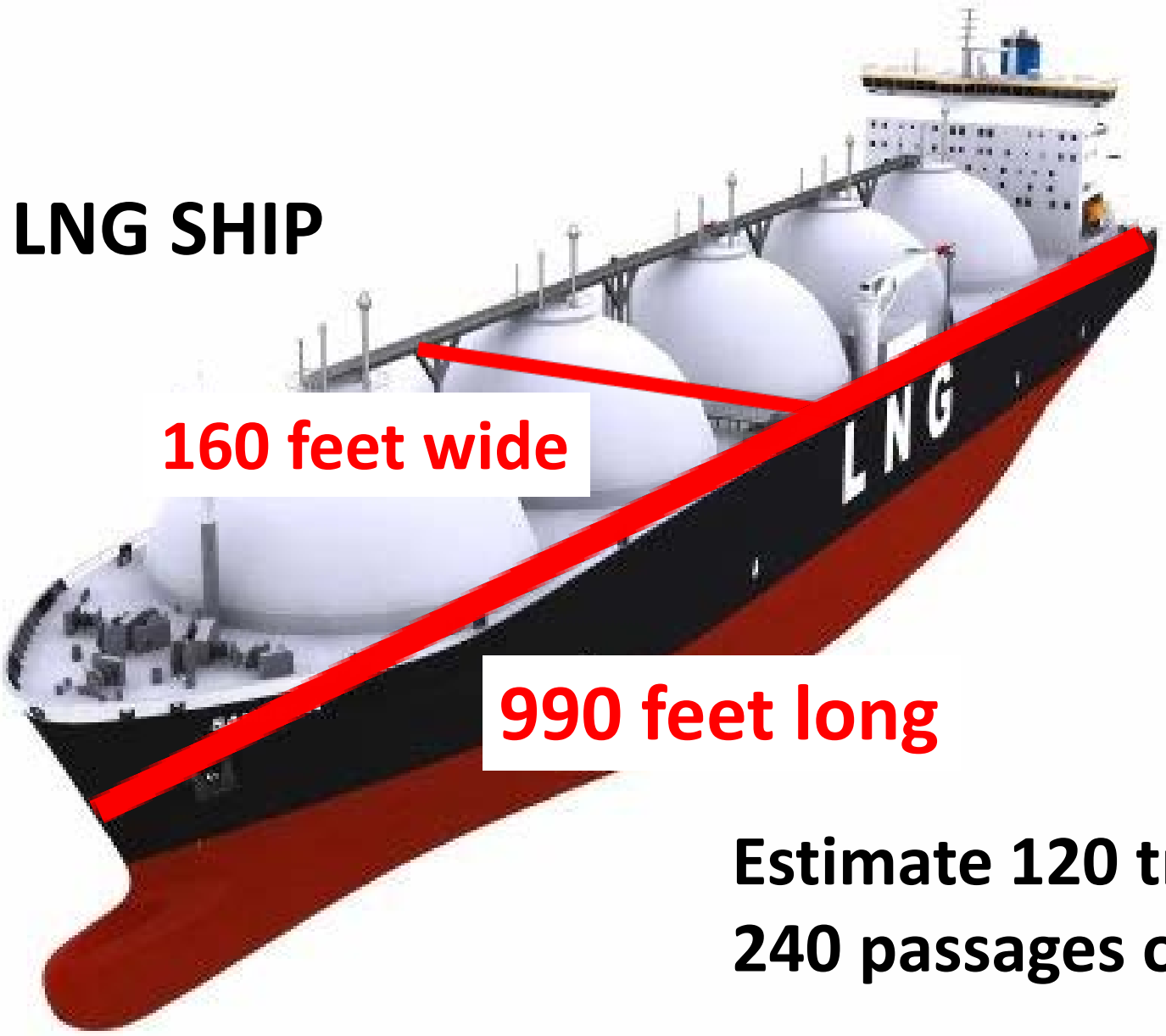
1. Newport -
   Built 1977
   48,000 CM capacity
2. "Gasco" - Portland
   25,000 CM capacity



JORDAN COVE LNG

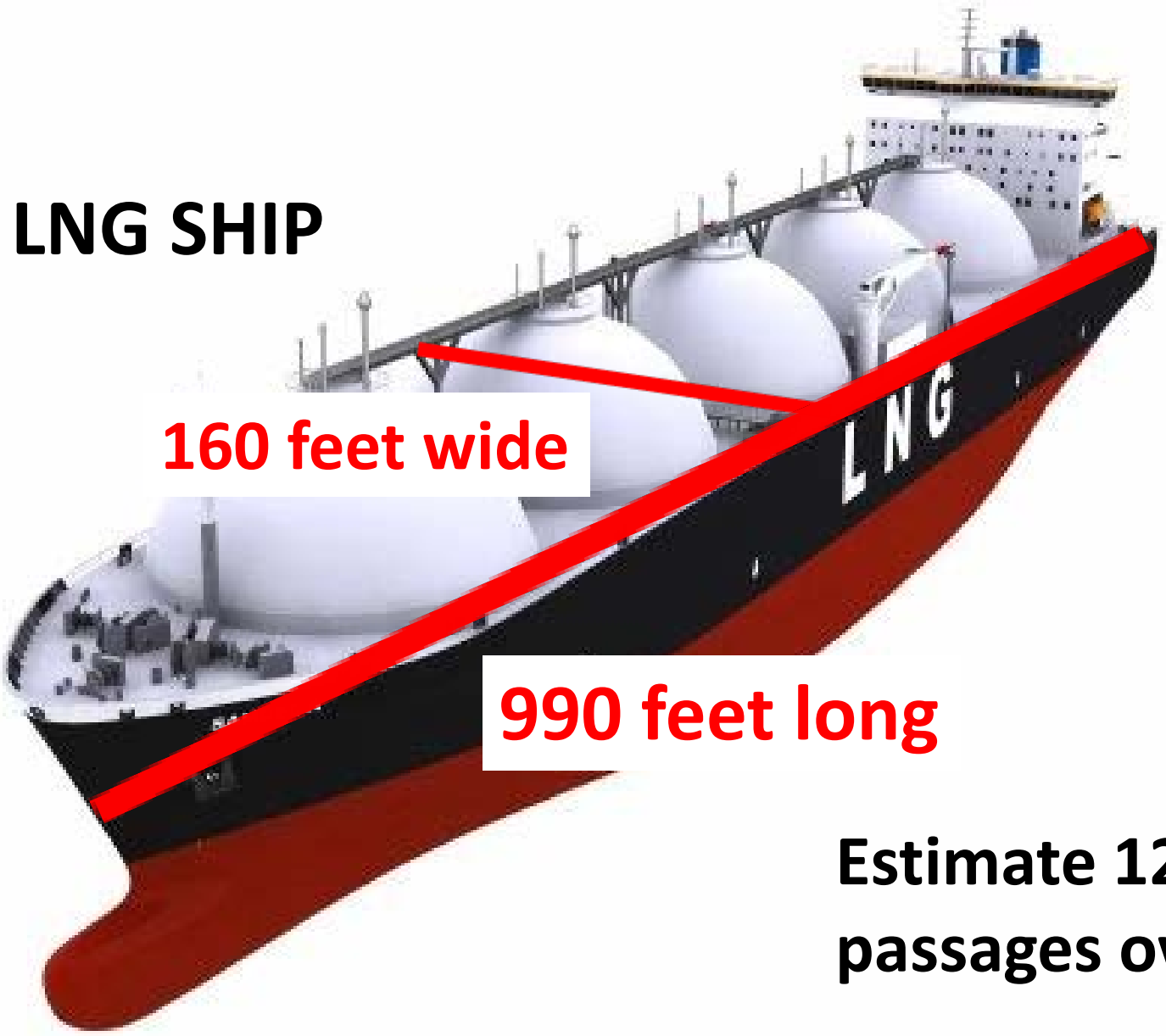
- Two storage tanks - 160,000 CM each
- 6.25 times larger than Newport
- No vaporization only liquefaction
- Distant customers
- LNG vessels required

LNG SHIP



Estimate 120 transits/year =
240 passages over the bar at high tide

LNG SHIP



160 feet wide

990 feet long

COOS BAY CHIP SHIP

100 feet wide

650 feet long

Estimate 120 transits/year = 240 passages over the bar at high tide

LNG SHIP

USCG Cutter Orcas
is 110ft long

160 feet wide

990 feet long

COOS BAY CHIP SHIP

100 feet wide

650 feet long

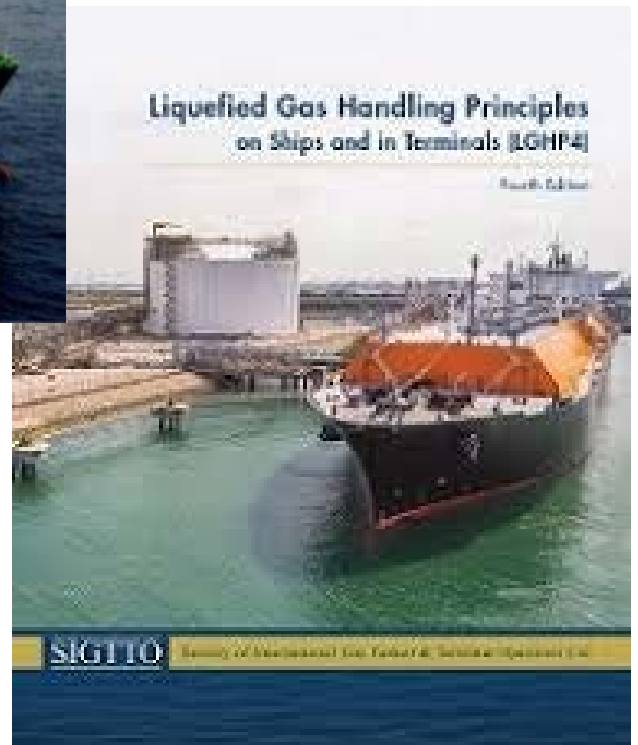
Estimate 120 transits/year = 240 passages over the bar at high tide

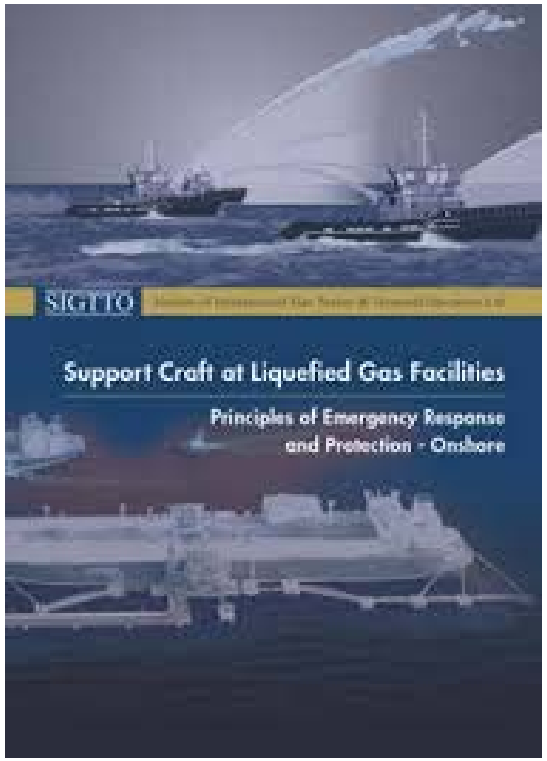
SOCIETY OF INTERNATIONAL GAS TANKER AND TERMINAL OPERATORS LTD (SIGTTO)

Purpose of SIGTTO

- To exchange of technical information among its members.
- To share experience.
- To enhance the safety.
- To Achieve Operational Reliability of gas tankers and terminals.

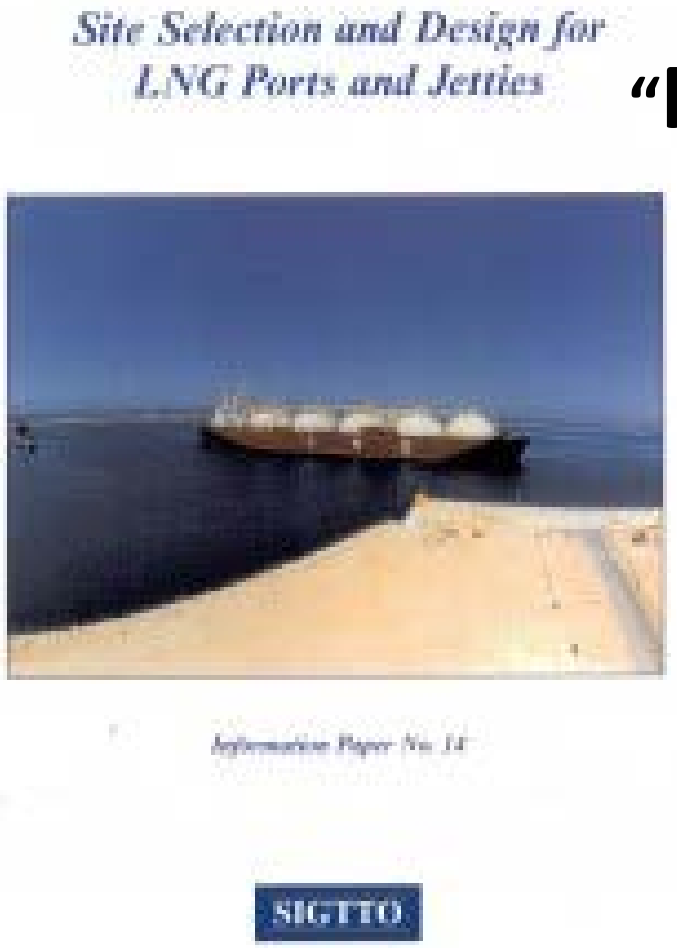
Jordan Cove Energy Project L.P. is a member of SIGTTO





SOCIETY OF INTERNATIONAL GAS TANKER AND TERMINAL OPERATORS LTD (SIGTTO)

Site Selection and Design for LNG Ports and Jetties (Info. Paper no. 14)



"REMOVE AS MANY RISKS AS POSSIBLE"

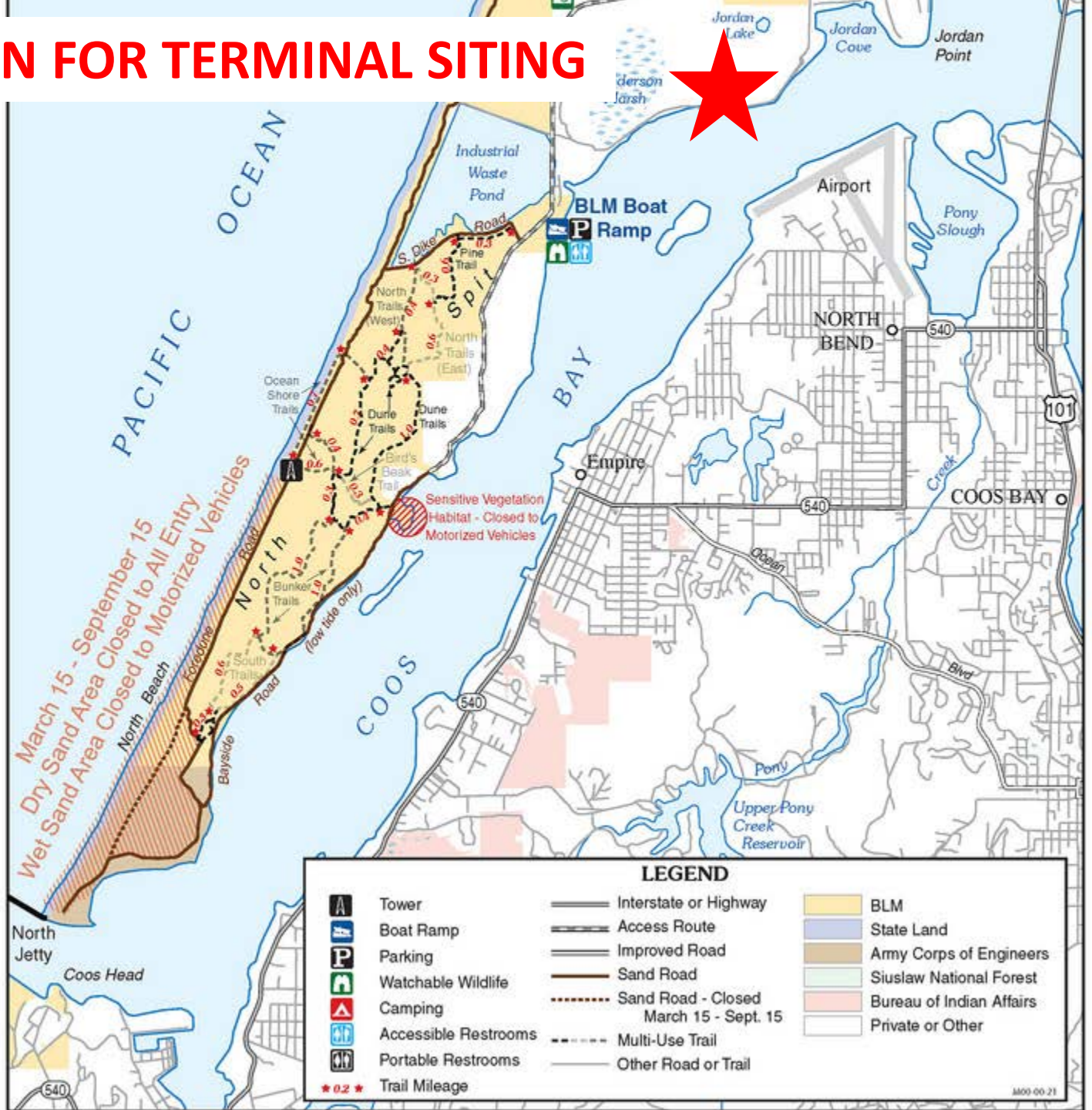
Jordan Cove Energy Project L.P. is a member of SIGTTO

SIGTTO RECOMMENDATION FOR TERMINAL SITING

LNG terminals should not be sited in areas close to population centers

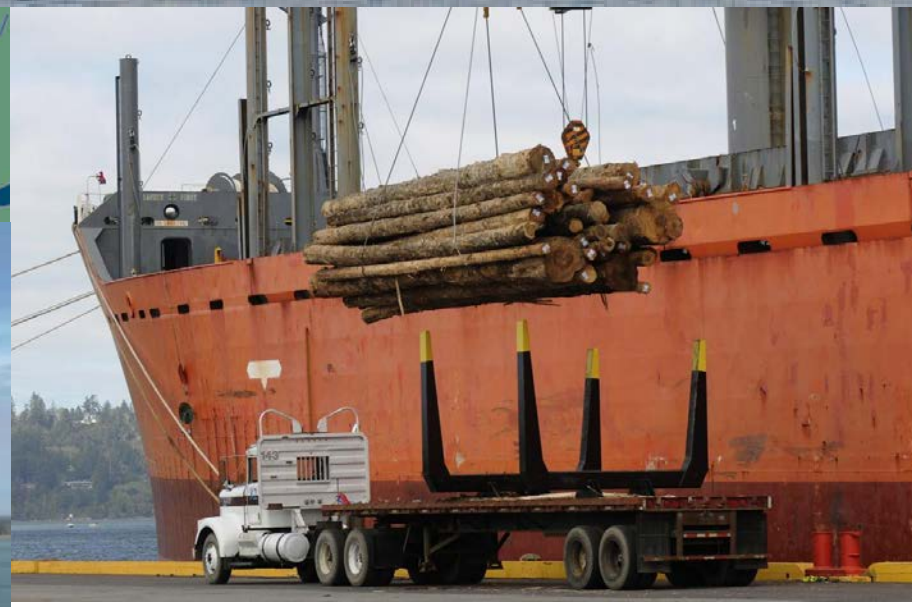
Coos Bay: 16,295
North Bend: 9,702
Barview: 1,844
Charleston: 795

Total population: 28,636



SIGTTO RECOMMENDATION FOR TERMINAL SITING

Place LNG terminals in sheltered locations remote from other port users

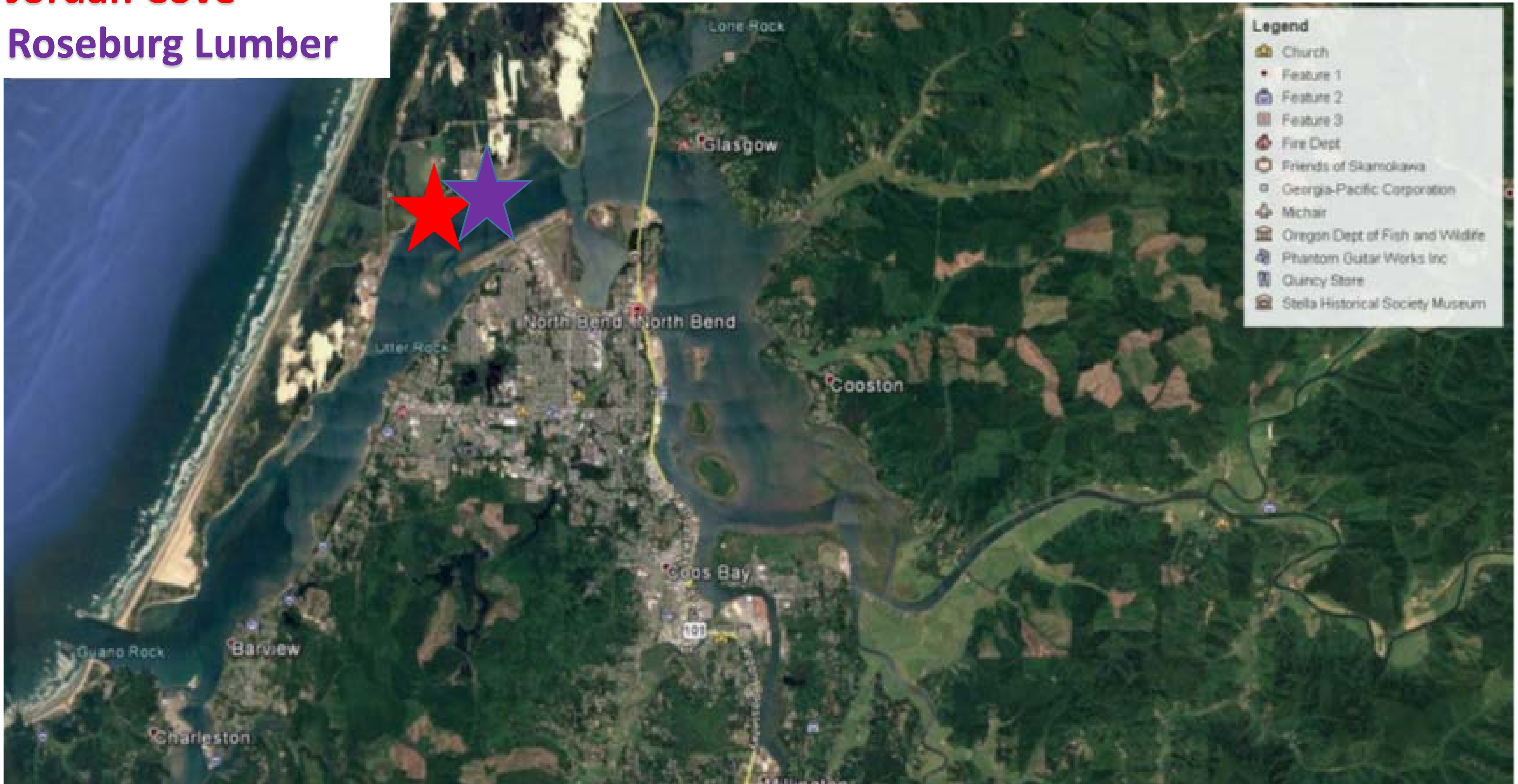


SIGTTO RECOMMENDATION FOR TERMINAL SITING

Simultaneous LNG operations and ship movements in adjacent berths should be avoided

Jordan Cove

Roseburg Lumber



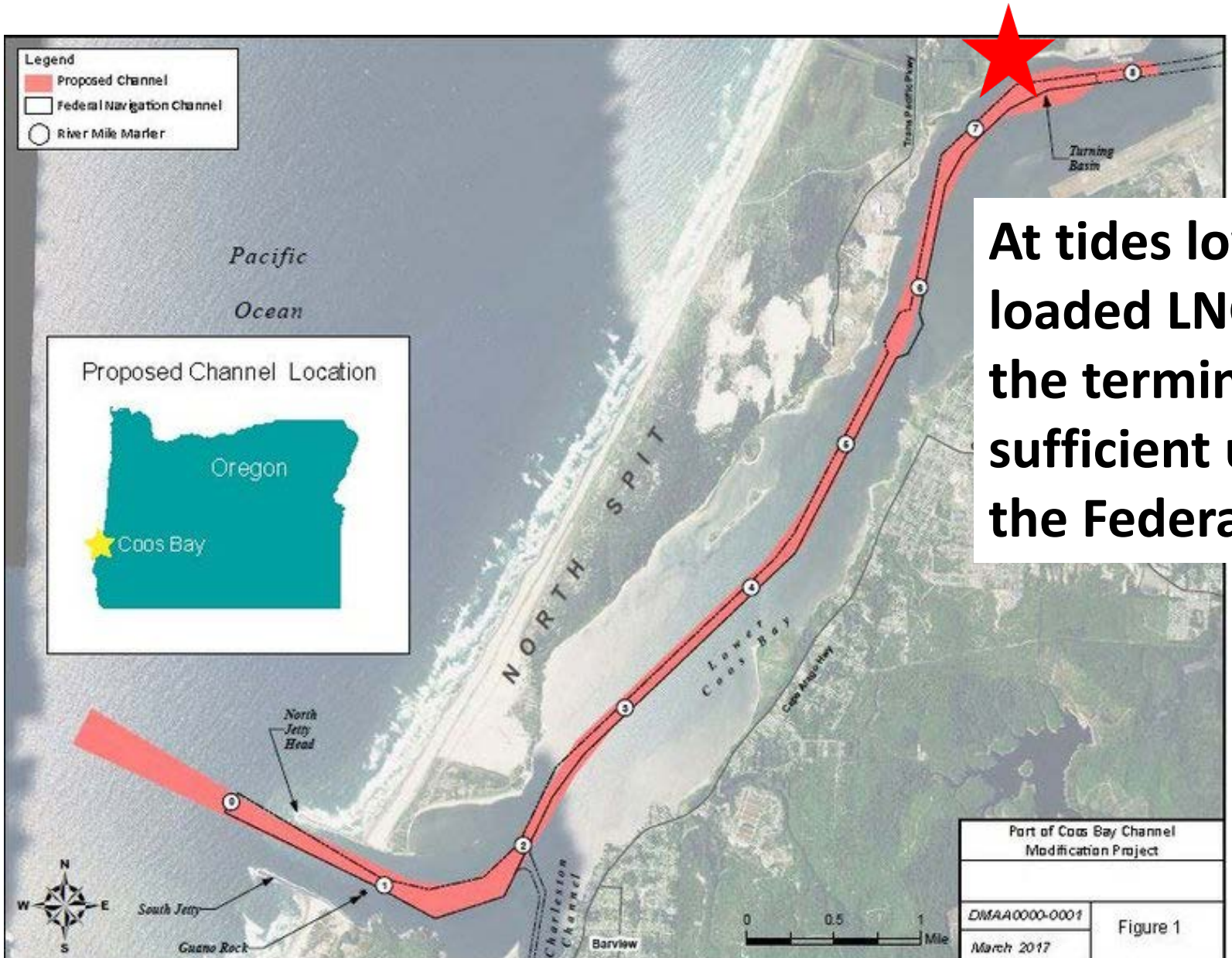
SIGTTO RECOMMENDATION FOR TERMINAL SITING

LNG terminals should not be sited on an outside bend of a shipping channel

This minimizes the risk of other ships colliding with a berthed LNG tanker if the ship fails to make the turn

SIGTTO RECOMMENDATION FOR TERMINAL SITING

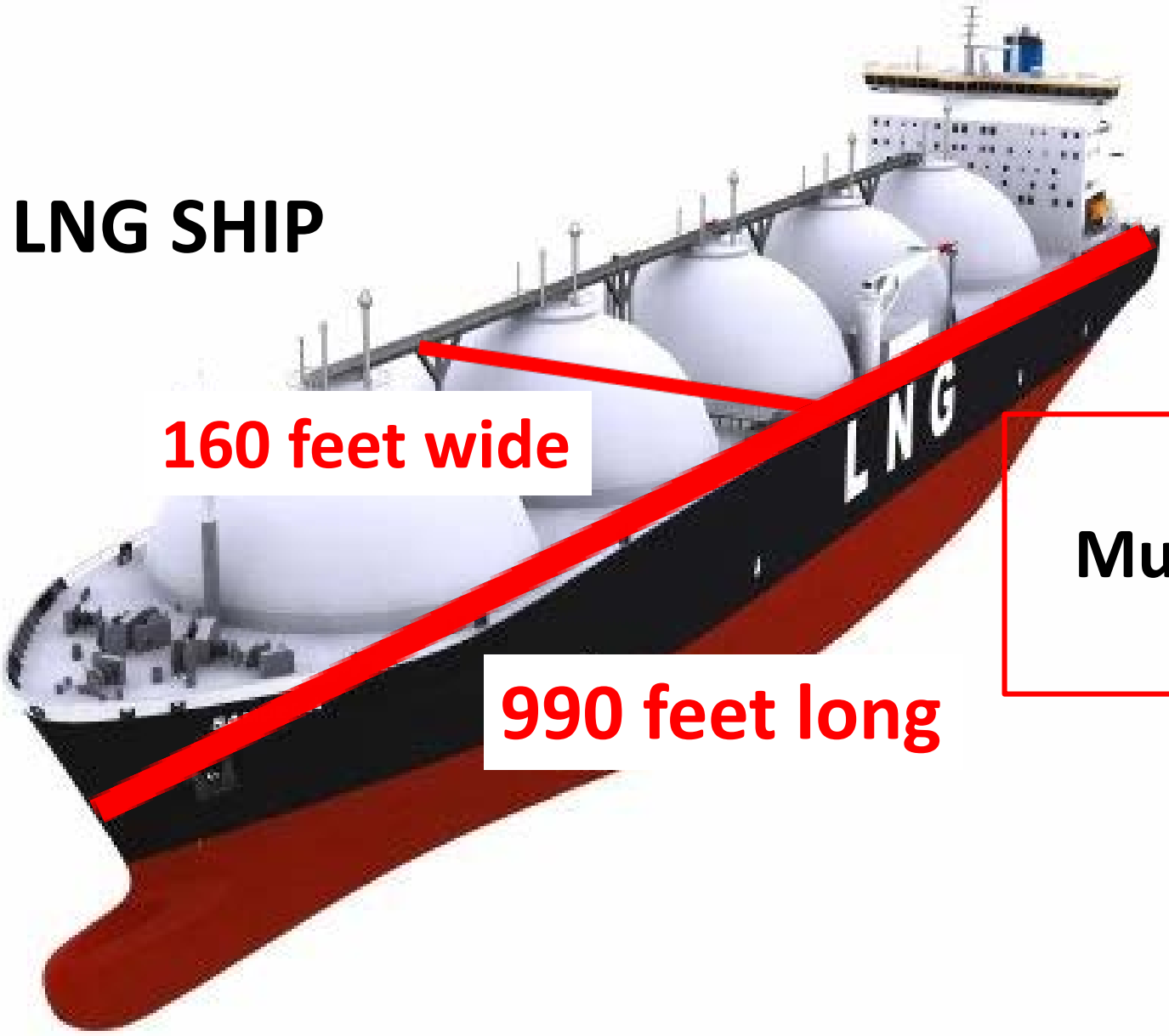
LNG Tankers should have a ready escape route to open water



At tides lower than 6 feet a loaded LNG tanker cannot leave the terminal as there is not sufficient under keel clearance in the Federal navigation channel

SIGTTO RECOMMENDATION FOR TERMINAL SITING

LNG SHIP



Harbor channels should have a minimum width equal to five times the width of the largest ship to allow for safe manouvering

160 feet x 5 = 800 feet

Much of the Coos Bay channel is only 300 feet wide

SIGTTO

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INFO PAPER NO14 IS AVAILABLE ON THE COOS BAY L of WV WEB SITE

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Application of Amendments to Gas Carrier Codes Concerning Type C Tank Loading Limits	£25.00	2012
Crew Safety Standards and Training for Large LNG Carriers. Esssential best practices for the industry	£75.00	2003
ESD Arrangements & Linked Ship/ Shore Systems for Liquefied Gas Carriers	Free	2009
ESD Arrangements & Linked Ship/ Shore Systems for Liquefied Gas Carriers (2009) - Addendum	Free	2017
Fire Prevention in the Cargo Containment Systems of Liquefied Gas Carriers in Shipyards	Free	2001