A New Floating Dry Dock for San Diego Bay:
Design and Implementation of A Multi-Phased Study to Maximize the Beneficial Reuse of Sediment

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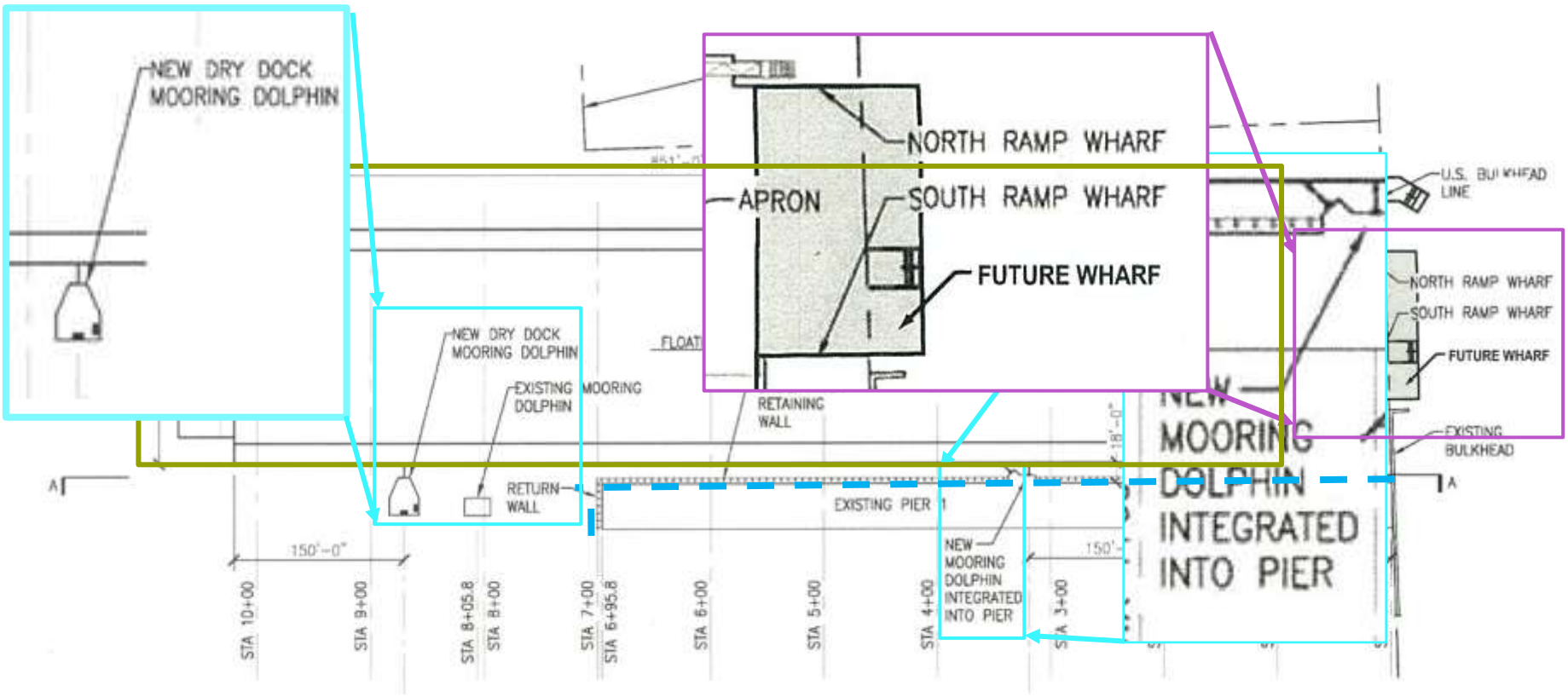
Project location

Project: Pier 1 North Dry Dock Installation:
Project Need and Importance

- The US Navy plans to rebalance assets to support a strategic pivot towards Asia Pacific
  - 19 additional ships will be homeported to San Diego by 2020
    - Not enough dry dock capacity to support this shift!
  - The Port of San Diego is the **only** California port with US Navy industrial repair capacity, if future capacity needs cannot be met, the Navy would have to go elsewhere (likely outside California) for repairs ☹
  - Additional capacity would allow the Navy ship's force to stay in San Diego (and near their families) during the dry dock repair period
    - Often ≥ 6 months long

Pier 1 North Dry Dock Project:
Project Elements



- Dredging
  - -65 feet MLLW
  - 395,000 yds^3 of dredging
- Disposal
  - Beneficial Reuse
  - Ocean
  - Upland

Pier 1 North Dry Dock:
Purpose and Use

Dry Dock: 950 ft long by 205 ft wide, 55,000 long-tons


Amphibious Assault Ships


Auxiliary Ships


Cruisers


Detroyers


Transport Dock and Dock Landing Ships


Littoral Combat Ship

Pier 1 North Dry Dock:
Purpose and Use

amec foster wheeler

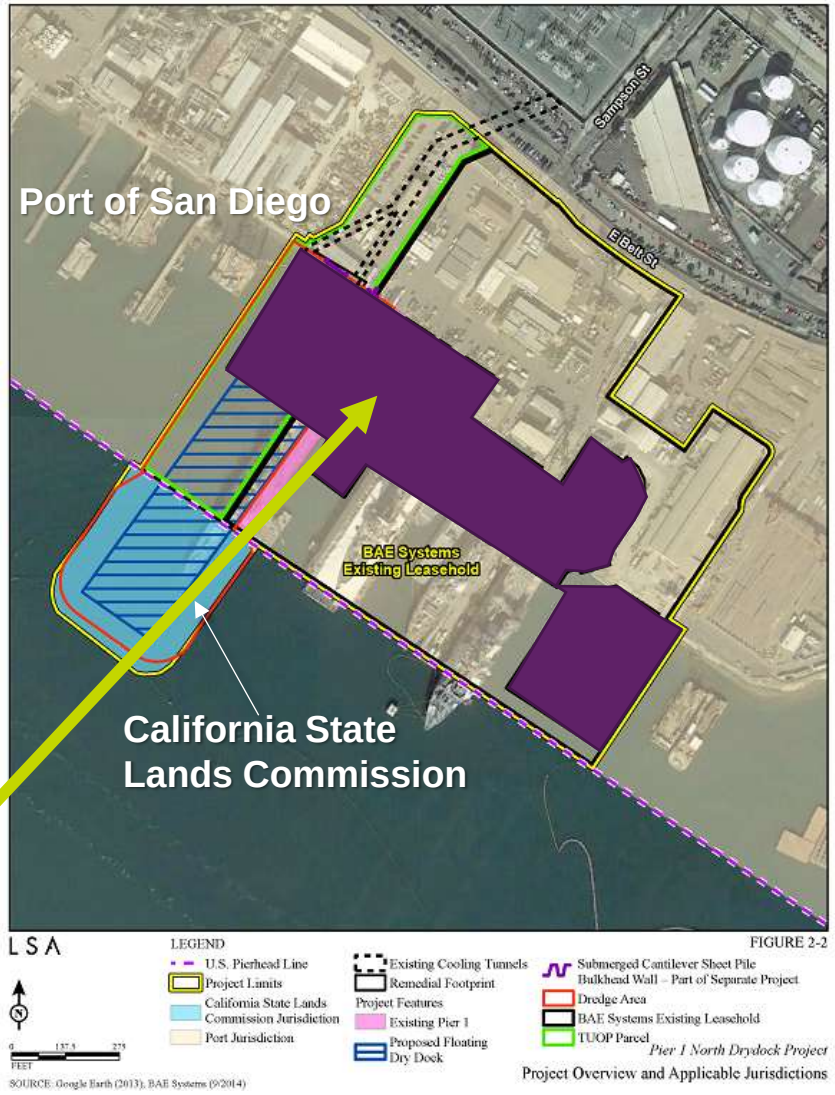
Pier 1 North Dry Dock:
Project Timeline

- **Request for Proposal – Early 2015**
  - Environmental Impact Report
    - Technical Reports
      - Dredged Material Characterization Study
      - Geotechnical Study
    - Environmental Analysis
  - Project Engineering Design
    - Construction and Dredging
    - Eelgrass Mitigation Site
  - Permitting
  - Dredging and Construction
  - ► Dry Dock under construction and scheduled to arrive "in the 4th Quarter of 2016"
  - ► New Orleans scheduled to arrive February or March 2017!

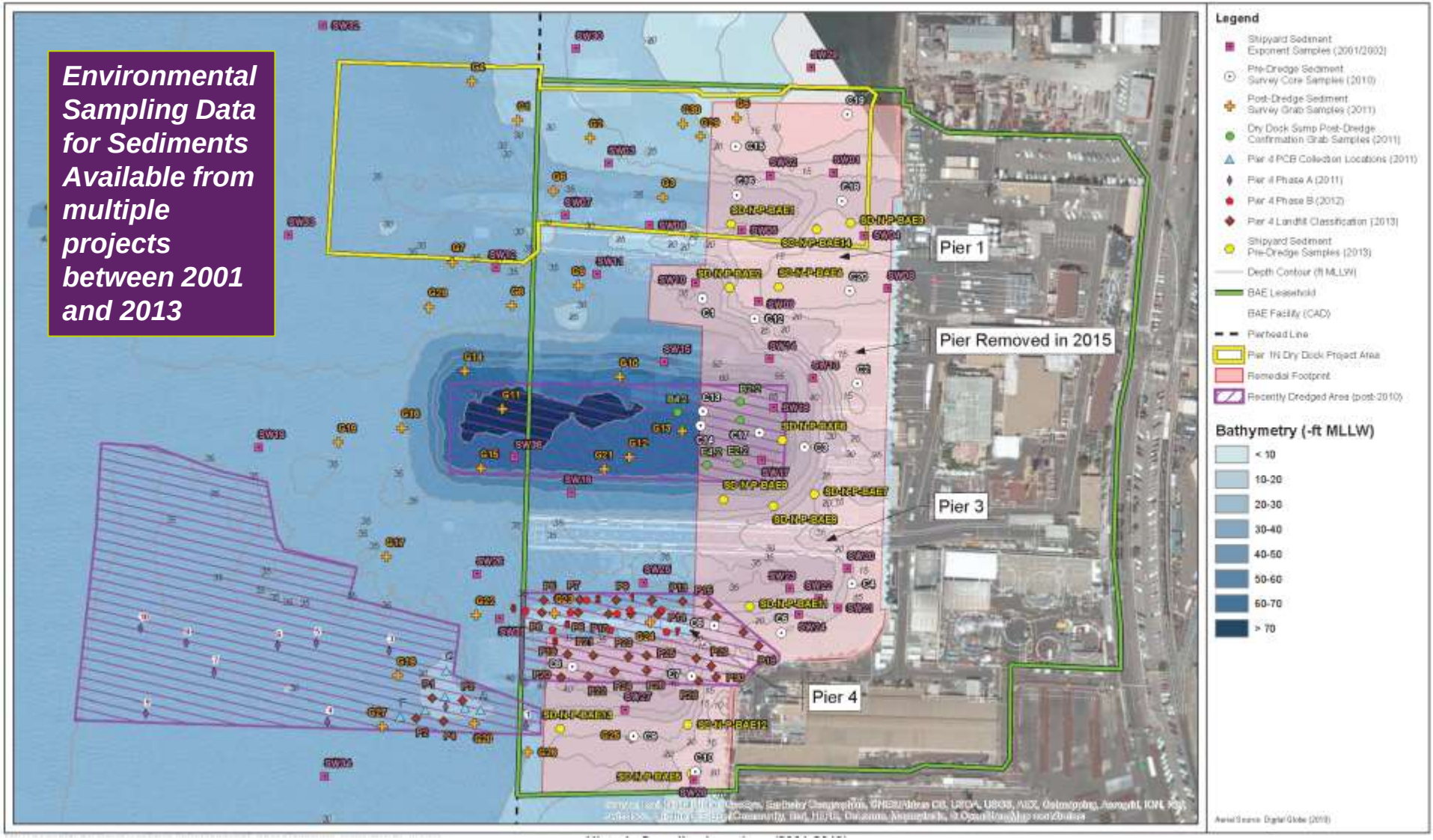
Pier 1 North Dry Dock Project:
Regulatory Setting

- Project footprint overlaps with multiple jurisdictional areas
  - Port of San Diego
  - State Lands
- Shipyards Project Cleanup and Abatement Area
  - Dredging simultaneously with dry dock site characterization
  - Mitigation for impacts required for both projects

Cleanup and Abatement Order (CAO) Area



BAE Systems San Diego Ship Repair
Environmental data



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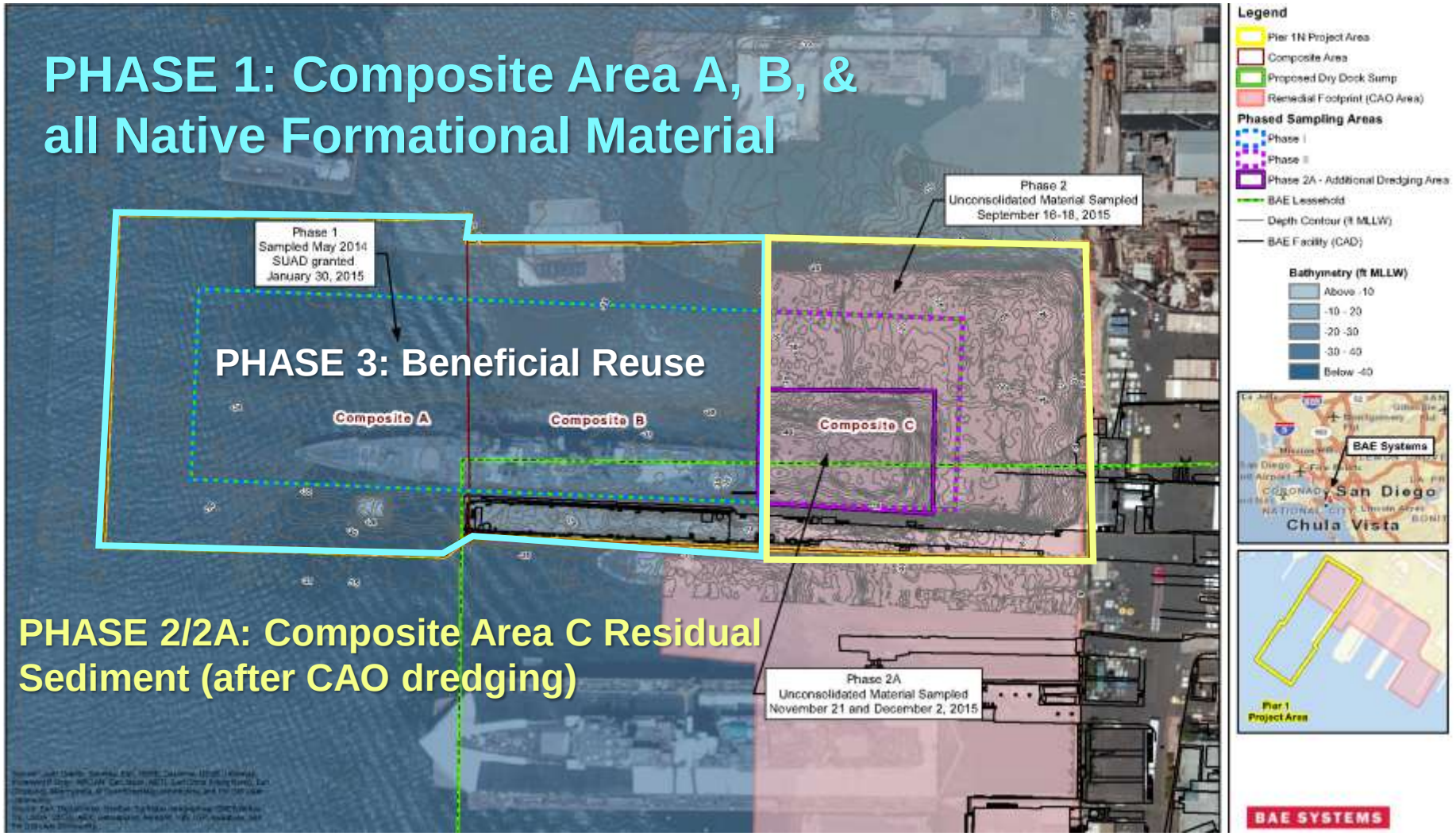
Project approach/activities

Multi-Phased Study

- Determine aquatic disposal suitability
- Maximize beneficial reuse
- Minimize material placed in upland landfill
- Obtain project permits in an accelerated timeframe

Sediment characterization
Project phases



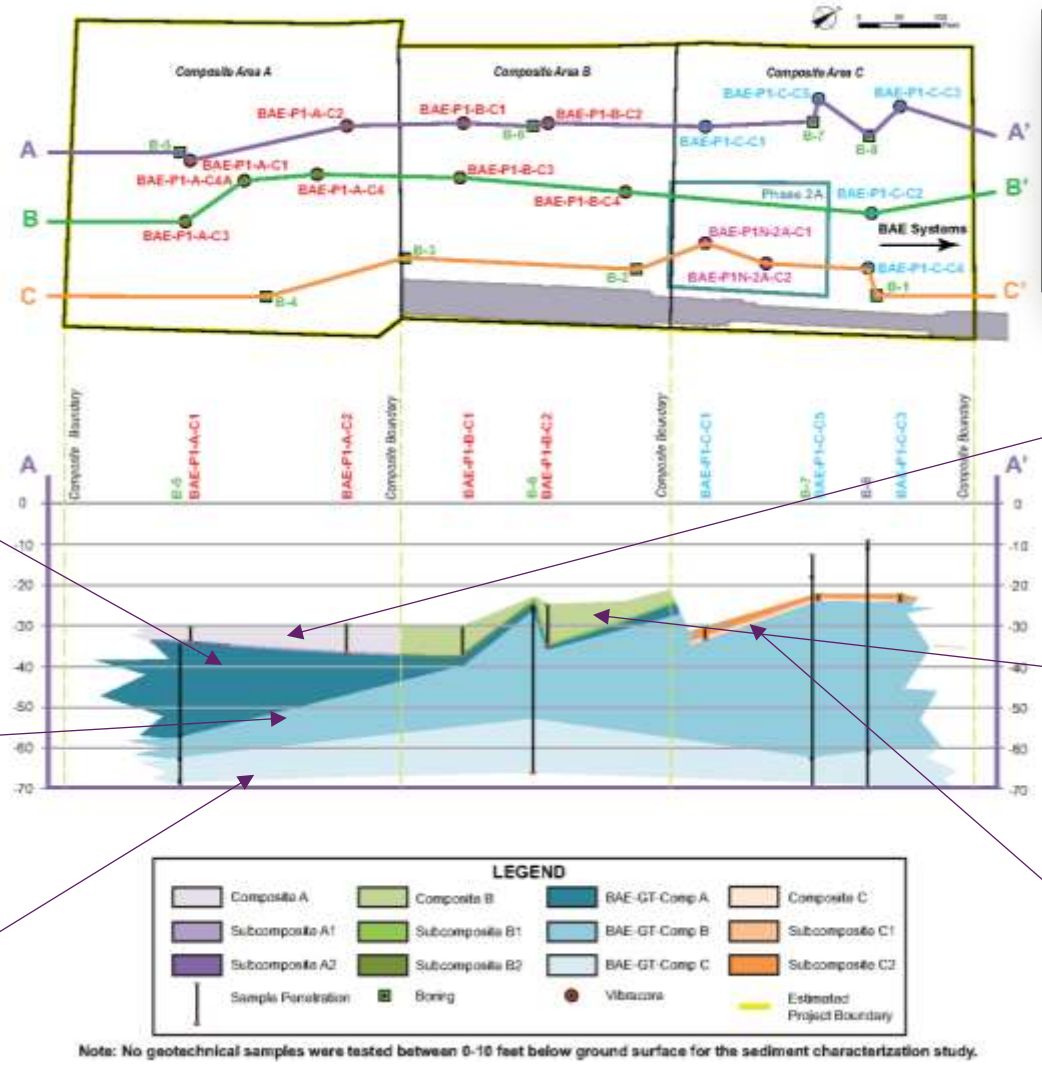
Sediment sampling

- Equipment
  - Vibracore
  - Drill - Diedrich D50 drill rig with a hollow stem auger
- Analysis approach – Phase 1&2
  - GOAL: To Optimize Beneficial Reuse or Ocean Disposal
  - Abbreviated Tier II
  - Green Book Tier III
    - Chemical
    - Physical
    - Toxicological
    - Bioaccumulation
  - Landfill approval – Phase 2/2A
    - Waste Acceptance Guidelines
  - Beneficial Reuse Applicability

Let me blow that up for you…

Project outcome: analysis results

Composite A		
Arsenic	mg/kg	4.19
Cadmium	mg/kg	ND <0.134
Chromium	mg/kg	9.02
Copper	mg/kg	13.4
Lead	mg/kg	5.99
Mercury	mg/kg	0.100
Nickel	mg/kg	5.22
Selenium	mg/kg	ND <0.134
Silver	mg/kg	ND <0.134
Zinc	mg/kg	35.3
TPH	mg/kg	ND <6.60
TRPH	mg/kg	50.0
Total PAHs	µg/kg	244
Total PCBs	µg/kg	25.4
Total DDTs	µg/kg	ND
Tributyltin	µg/kg	6.70



Recent Bay and Holocene Deposits

Younger Quaternary Deposits

Older Quaternary Deposits

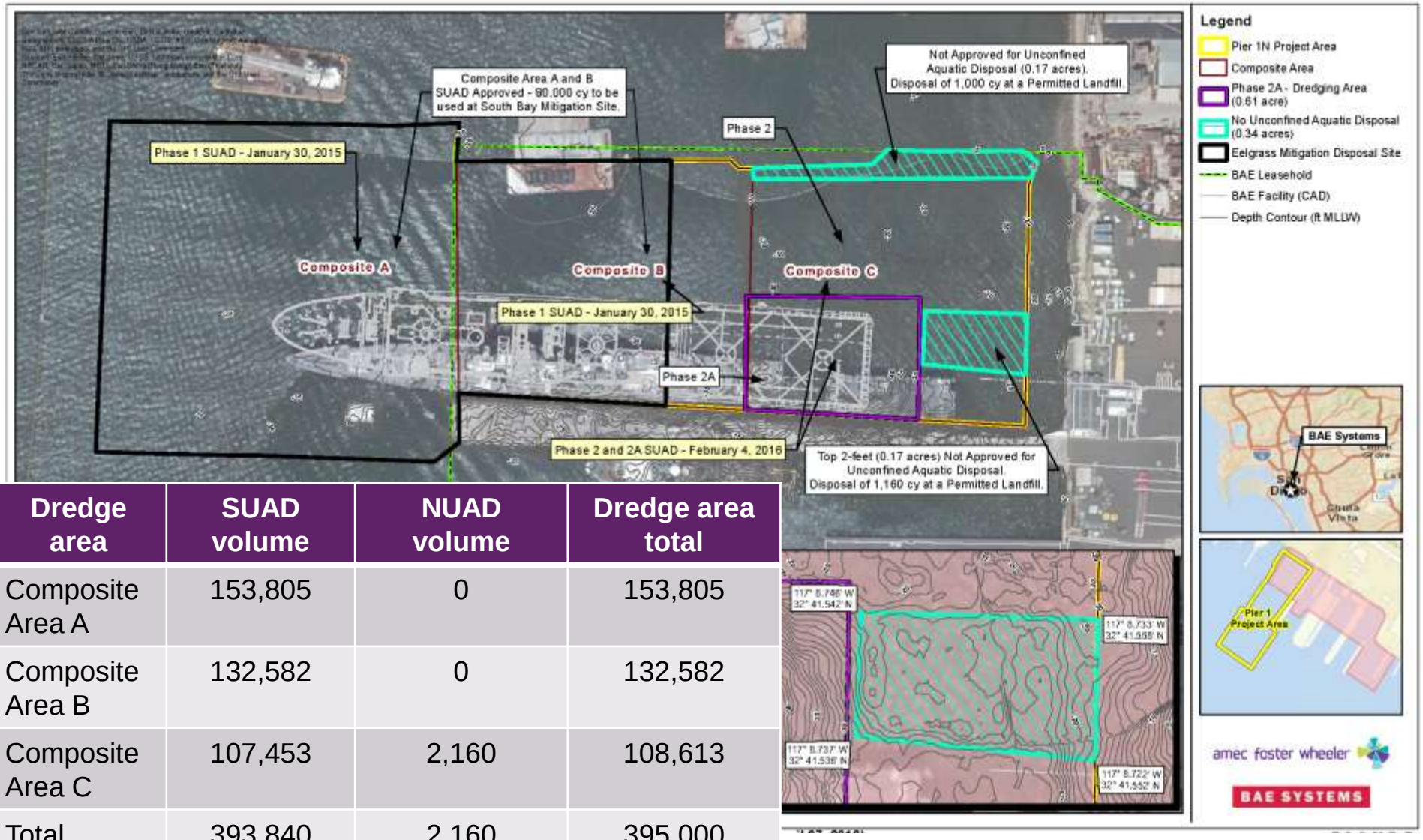
Composite Area A (Phase 1)

Composite Area B (Phase 1)

Composite Area C (Phase 2/2A)

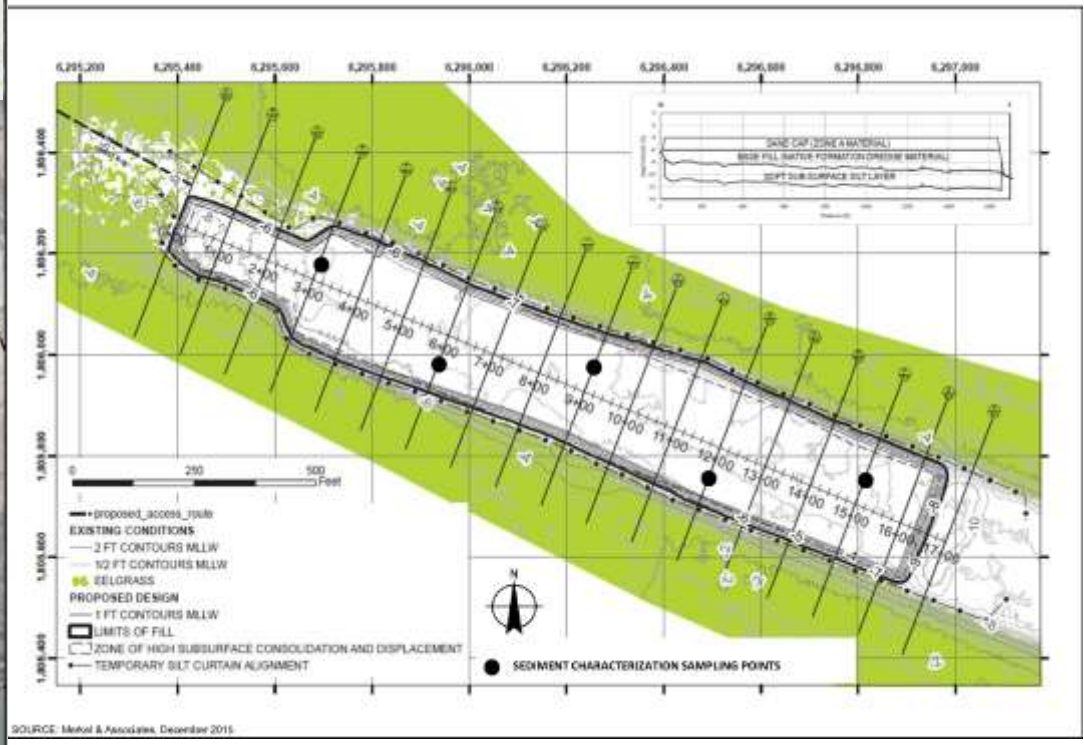
Note: No geotechnical samples were tested between 0-10 feet below ground surface for the sediment characterization study.

Disposal suitability determination



Dredge area	SUAD volume	NUAD volume	Dredge area total
Composite Area A	153,805	0	153,805
Composite Area B	132,582	0	132,582
Composite Area C	107,453	2,160	108,613
Total	393,840	2,160	395,000

Sediment characterization
Project phases - Phase 3



Designed by: Merkel & Associates

Beneficial reuse site
Planning and design

Spill barge placement of project dredge material at mitigation site

- **6.5 acres of eelgrass habitat created**
  - **Raised existing San Diego Bay bottom from ~-11 feet mean lower low water to -4 feet mean lower low water**
- **Perimeter turbidity curtain used during construction**
  - **Silt control**
  - **Prevent impacts to wildlife**
- **Local harvesting and replanting following settlement of dredge material**

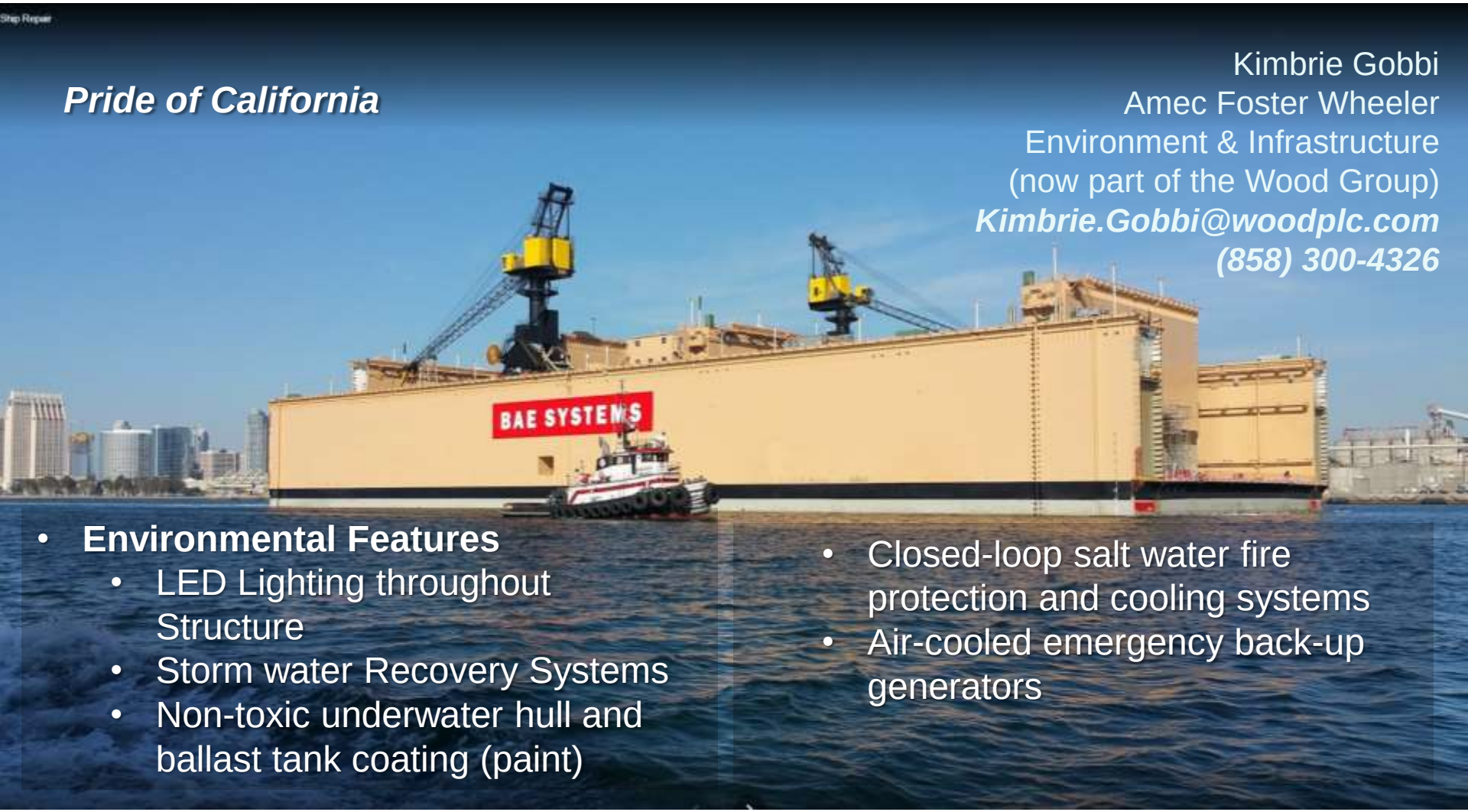
Regulatory requirements

- 5 years of monitoring
- Conservation of site in perpetuity

Environmental considerations

- Turtles
- Birds
- Eelgrass
- Essential fish habitat
- Water quality
- Shading
- Noise
- Traffic
- Air quality
- Hazards and hazardous materials
- Aesthetics

Welcome to the San Diego Bay!



Pride of California

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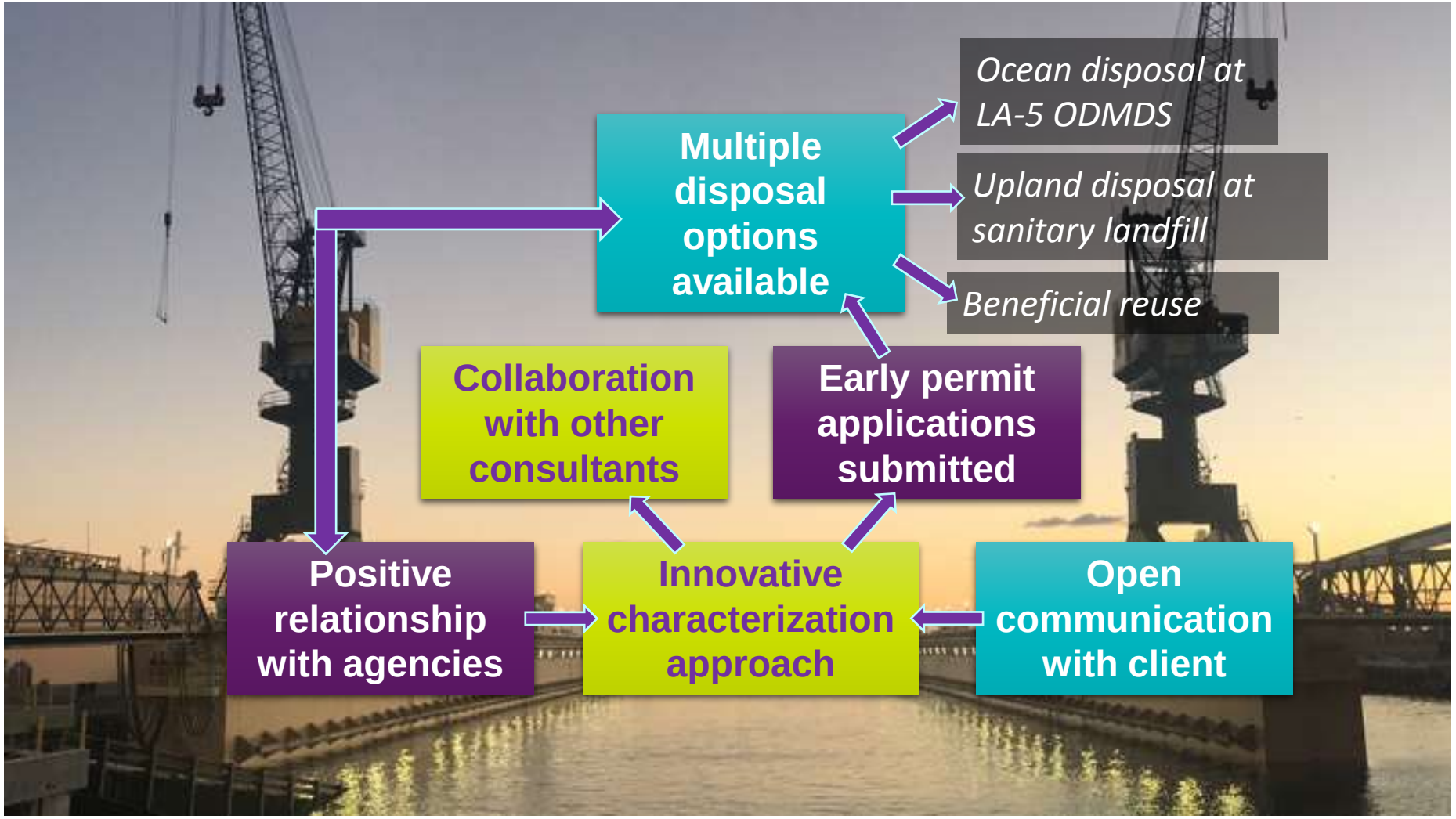
- **Environmental Features**
  - LED Lighting throughout Structure
  - Storm water Recovery Systems
  - Non-toxic underwater hull and ballast tank coating (paint)
  - Closed-loop salt water fire protection and cooling systems
  - Air-cooled emergency back-up generators

Pier 1 North Dry Dock Project:
Building blocks of project success



Questions and Acknowledgements

- Huge Thank You to:
- BAE Systems San Diego Ship Repair
- The following agencies:
  - USACE, USEPA, San Diego Regional Water Board, California Costal Commission, the California State Lands Commission, as well as the San Diego Unified Port District;
- Our friends and fellow consultants at:
  - LSA, Anchor QEA, TerraCosta (and Pacific Drilling), Merkel & Associates, Tierra Data (Pi Environmental and Six Service Scientific);
- The contractor, engineers, and dredgers at RE Stait;
- Republic Landfill
- Our subcontractors:
  - Seaventures, TEG Oceanographic Services, Eurofins Calscience International, and Nautilus Environmental
  - … and many more!

Questions

Project approach/activities

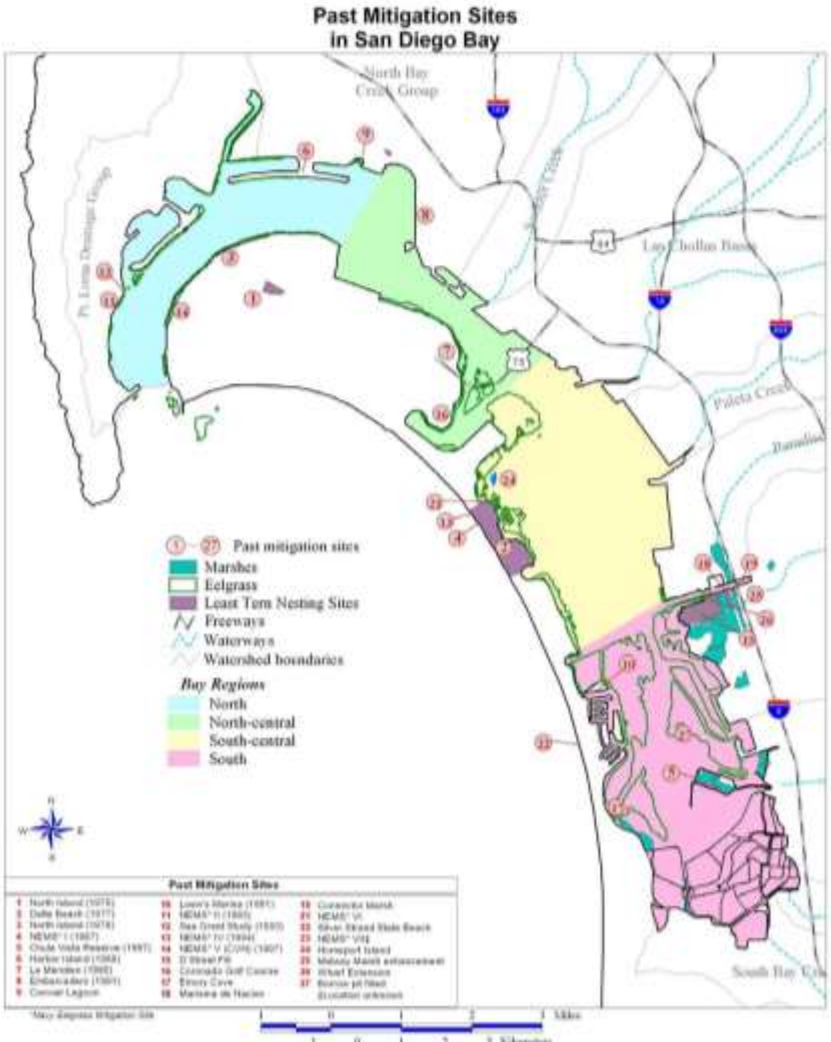
Challenges

- Schedules
  - Active Shipyard
  - Tight timeline
  - Permitting
- Complicated sample collection
- Footprint overlapped with multiple jurisdictional areas
  - Cleanup and Abatement Order
  - Need for mitigation
  - Multiple permits required
- Local residential community interest (light, noise, traffic, diesel, particulate matter)

Solutions

- Communication
  - Advance coordination with shipyard and agencies
  - Phased approach avoided potential sampling complications
  - Project designed to maximize area evaluated while streamlining disposal approval process
- A variety of specialized marine sampling equipment were used to characterize all sediment types
- Integrated project plan
  - Mitigation designed to fulfill needs of Drydock and CAO
  - Permit applications submitted as soon as possible (possible due to phased approach)
- Public Notice and meetings

San Diego Bay beneficial reuse projects



Area	Description and Possible Enhancement Opportunities/Constraints
1—D Street Fill, Chula Vista (potential Port Mitigation Site)	[illegible]
2—Gunpowder Point (USFWS-NWR)	[illegible]
3 F & G Street Marsh, connector marsh, and associated mudflats (USFWS-NWR)	[illegible]
4—J Street marsh, connector marsh, and associated mudflats	[illegible]
5—CVWR	[illegible]
6—South Bay Salt Ponds (USFWS-NWR)	[illegible]
7—Lower Otay River Watershed (USFWS-NWR)	[illegible]
8—Ecological Buffer for Chula Vista Bayfront Master Plan	[illegible]
9—Emory Cove and Reserve (potential Port Mitigation Site)	[illegible]
10—Coastal Strand Dunes (U.S. Navy)	[illegible]
11—Grand Caribe Isle South/Coronado Cays (Port Mitigation Site)	[illegible]
12—Crown Cove (U.S. Navy)	[illegible]
13—Navy Radio Receiving Facility (U.S. Navy)	[illegible]
14—Paleta Creek Mouth (U.S. Navy/City of San Diego)	[illegible]
15—Chollas Creek Mouth (Port/U.S. Navy/City of San Diego)	[illegible]
16—Shoreline Point Loma Naval Station (U.S. Navy)	[illegible]
17—NASNI shoreline (U.S. Navy)	[illegible]
18—NTC boat channel (U.S. Navy)	[illegible]
19—Coronado Bayfront	[illegible]
20—Coronado Golf Course	[illegible]
21—North Delta/NWR (U.S. Navy)	[illegible]
22—South Bay Power Plant includes Telegraph Creek, intake and discharge channels	[illegible]
23—Sweetwater Flood Control Channel (Port/USACE)	[illegible]
24—BF Goodrich Marsh (USFWS-NWR)	[illegible]
25—Convair Lagoon	[illegible]
26—Mudflats off D Street Fill and SWNWR	[illegible]

Source: San Diego Bay Integrated Natural Resources Management Plan, 2013

San Diego Bay beneficial reuse projects

Future need for beneficial reuse

(limited in-water locations in SD Bay)

Port development of mitigation bank

Seaport Village Redevelopment

Harbor Island Redevelopment

Port Salt Pond 20

Homeport Island Beneficial Reuse Project

Channel deepening project for POSD/USACE – sediment placed in South Bay

National City Marine Terminal – sediment placed in South Bay

Still existing channels to be filled in

Navy Pier 5000 Silver Strand

Ballast Point routine beneficial reuse