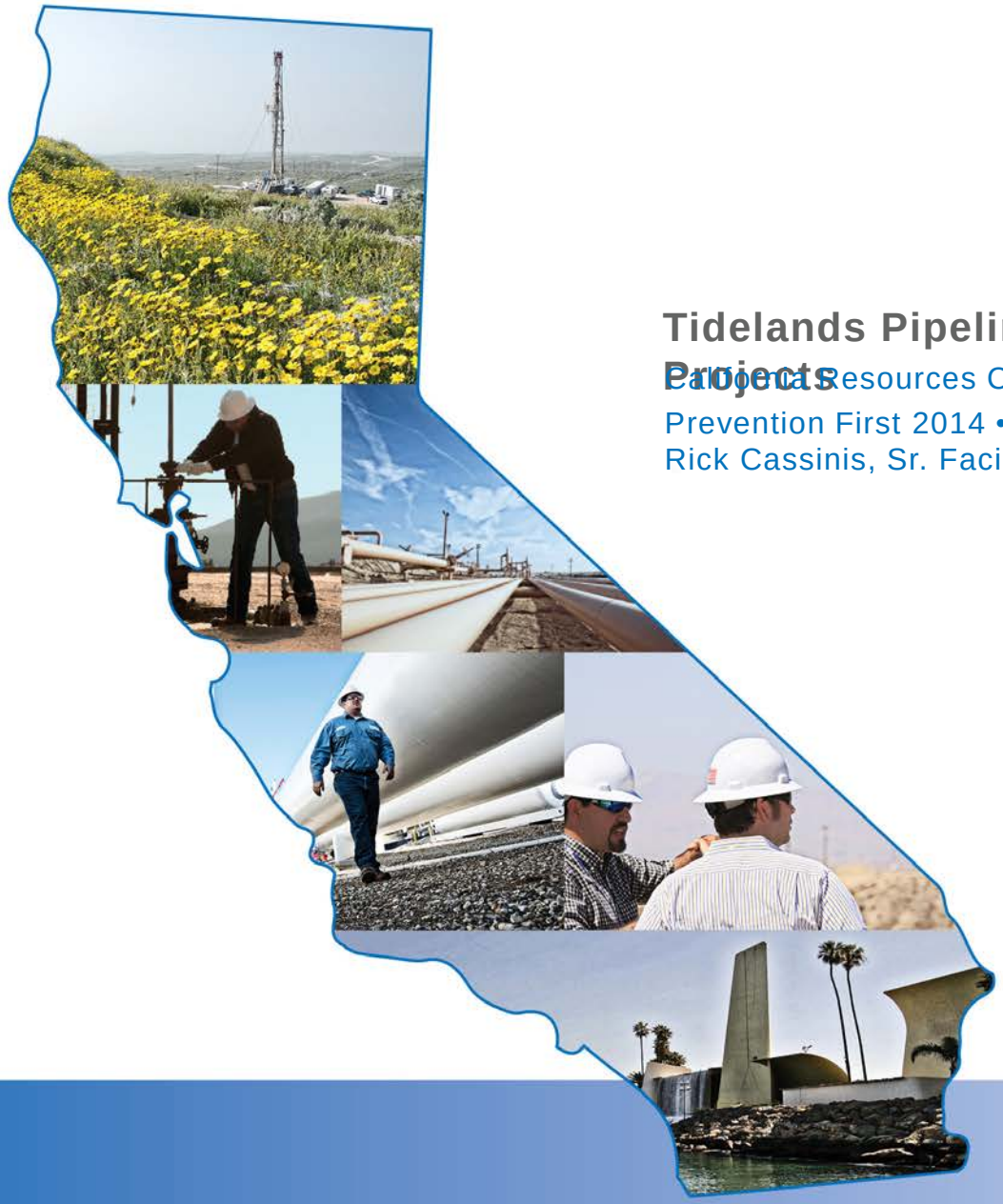

Tidelands Pipeline Corridor Projects

California Resources Corporation

Prevention First 2014 • Long Beach, CA • Oct. 8, 2014 •
Rick Cassinis, Sr. Facility Engineering Advisor

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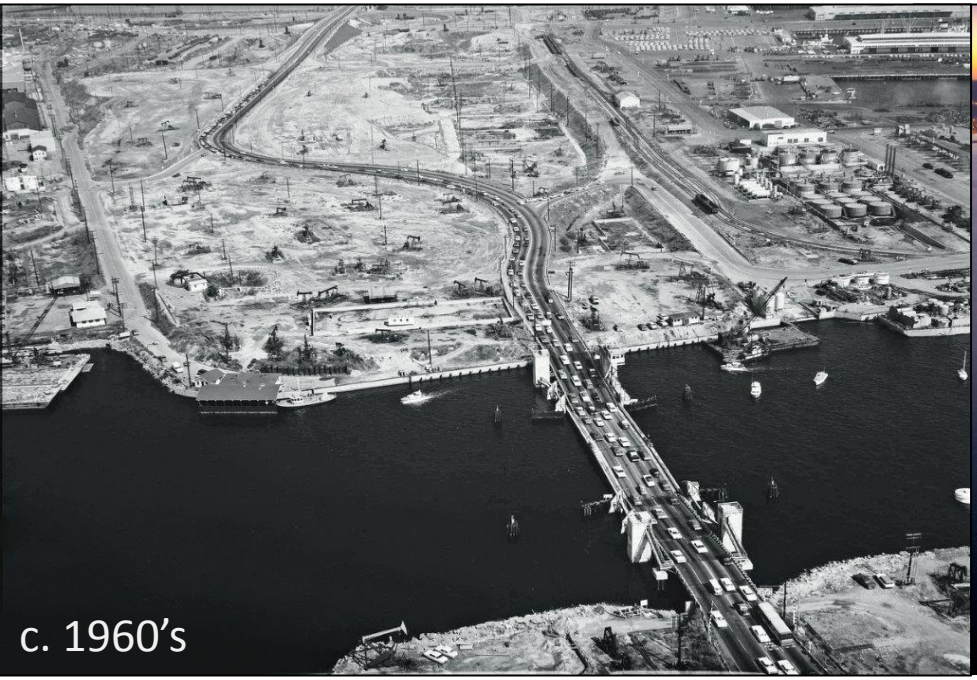
PORT OF LONG BEACH: PAST & PRESENT

1960's:

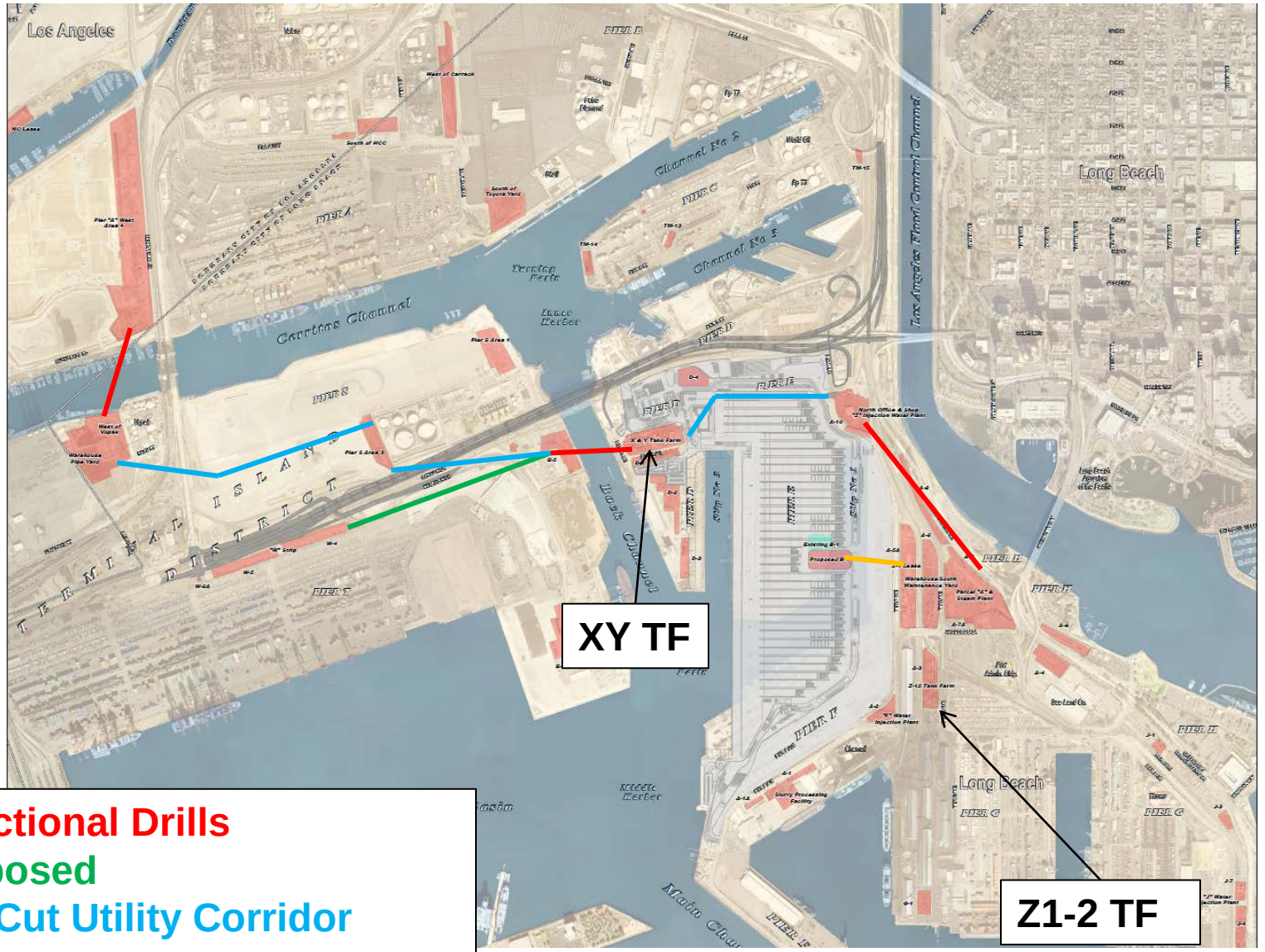
- Wells drilled vertically without regard for land use

Current:

- Wells drilled from centralized oil set aside areas
- Set aside areas connected by utility corridors



OIL SET ASIDE AREAS



3 Directional Drills

1 Proposed

Open Cut Utility Corridor

Jack & Bore

Approx. 40 oil set aside areas

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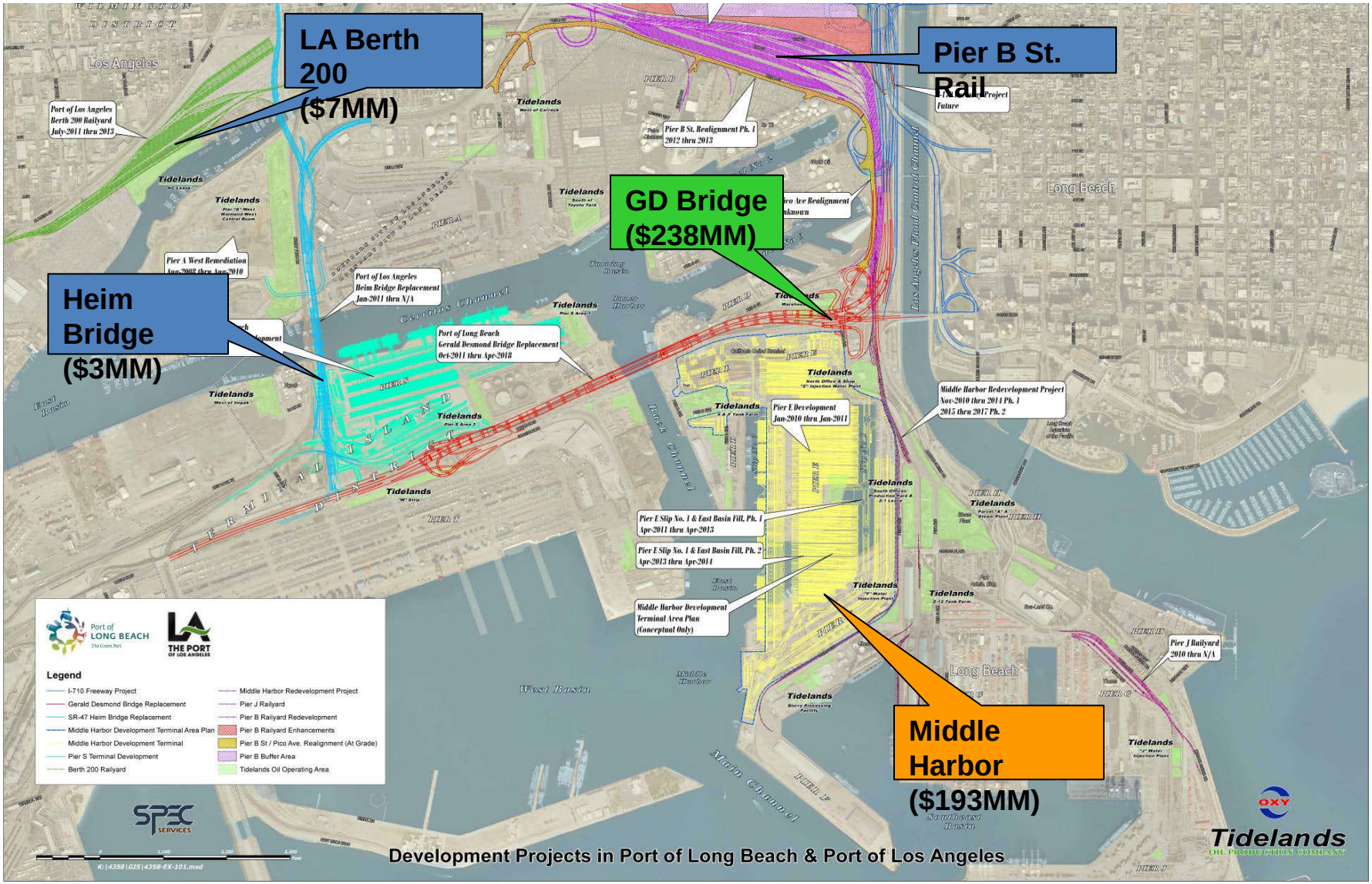
PROJECTS IMPACTING OILFIELD



CONNECTING OIL SET ASIDE AREAS

Methods:

- Horizontal Directional Drill
- Jack & Bore
- Traditional Open Cut Utility Corridors

Directional Drill

Jack & Bore

Open Cut Corridor

UTILITY CORRIDOR

From oil set aside area to tank farm:

- Oil gathering (corrosive)
- Water injection (corrosive)
- Wet gas (corrosive)
- Storm water
- Power
- Communications
- Road access

From tank farm to sales:

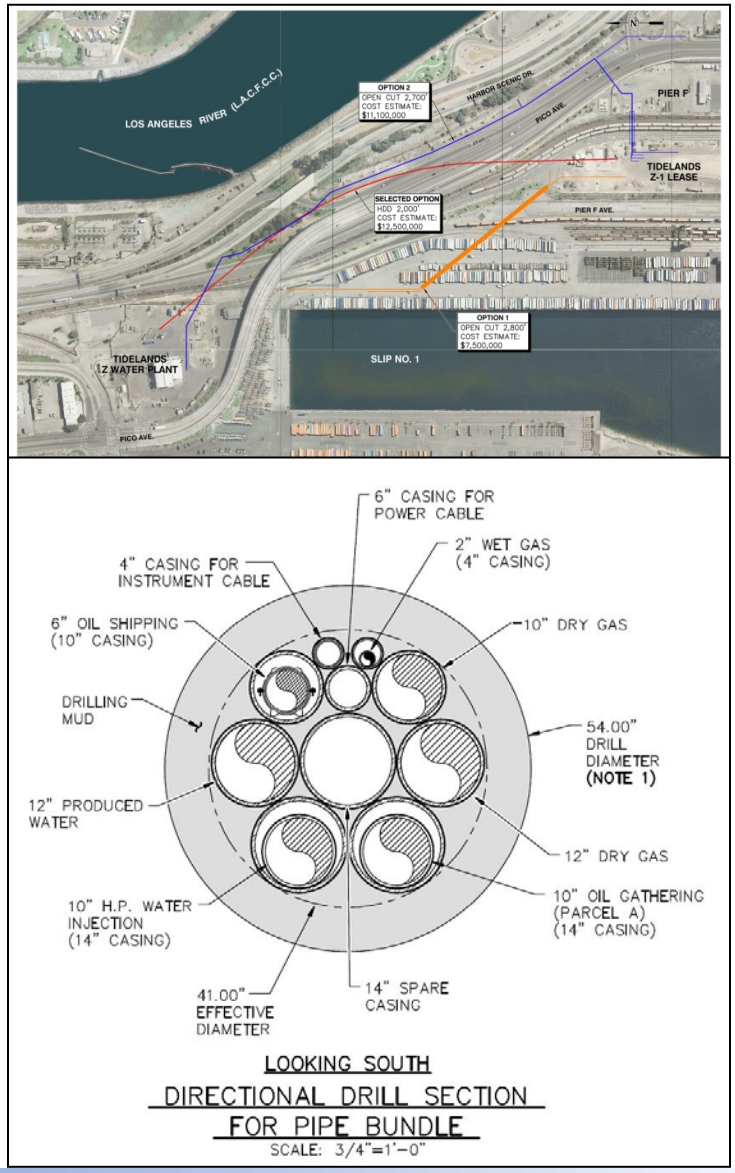
- Oil shipping (DOT)
- Dry gas distribution

Typical open cut utility corridor

HORIZONTAL DIRECTIONAL DRILLING

Design considerations:

- No future easements
- Avoid underground obstructions
- No impact to on-going or future surface operations
- Spare casing
- Cased line for secondary containment
- HDPE lined pipe for internal corrosion protection
- Bundle must be balanced



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HDPE INTERNALLY LINED PIPE

Benefits:

- Holiday free inner liner for guaranteed corrosion protection
- Cost effective option over other coatings
- Only requires standard welding and no inserts

Limitation:

- Require flange to flange pipe design

FIBERSPAR PIPE

Benefits:

- Inner and outer corrosion protection
- No welding

Limitation:

- Susceptible to 3rd party damage if not encased (non-metallic)

HORIZONTAL DIRECTIONAL DRILL

Typical drill rig

Pull back of pipe string

2,100’ of 50” Steel Pipe

Pull head surfacing

Pipe bundle pullback

Pipe bundle arrangement

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HORIZONTAL DIRECTIONAL DRILL

Environmental benefits:

- Full containment
- Avoid 3rd party line damage risk
  - > During installation
  - > Future construction projects

Constraints:

- Long runs w/single pipe
  - > Ex. 15,000’ with 6” pipe
  - > Ex. 3,000’ with 50” bundle
- Requires laydown area for pipe string

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JACK & BORE INSTALLATION

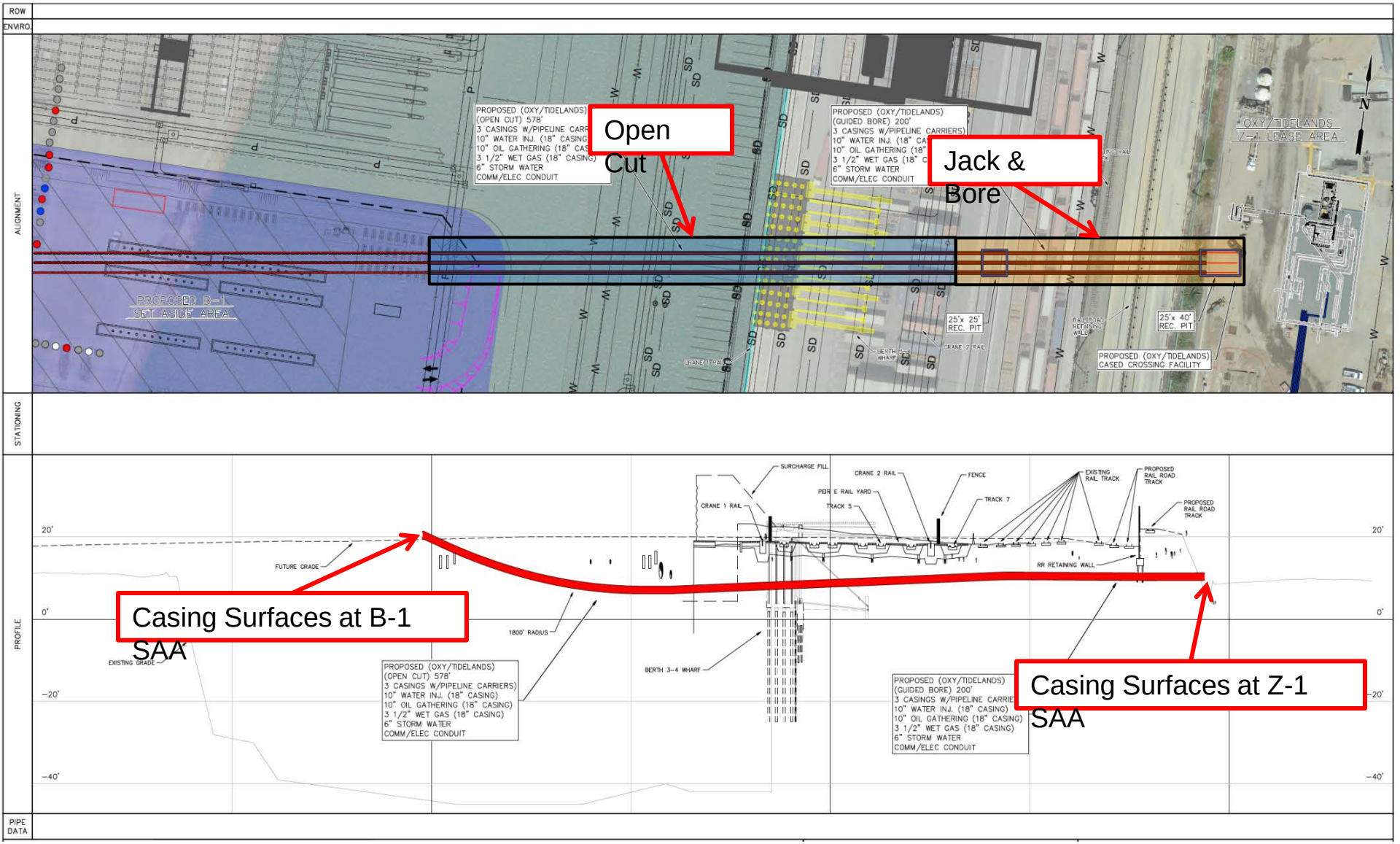
Design considerations:

- DigAlert required
- 24” or larger bore diameter
- Guided directional bore
- Avoid bore pit if possible (slope)
- Mandatory for rail crossings

Environmental benefits:

- Secondary containment
- Protected against construction activities

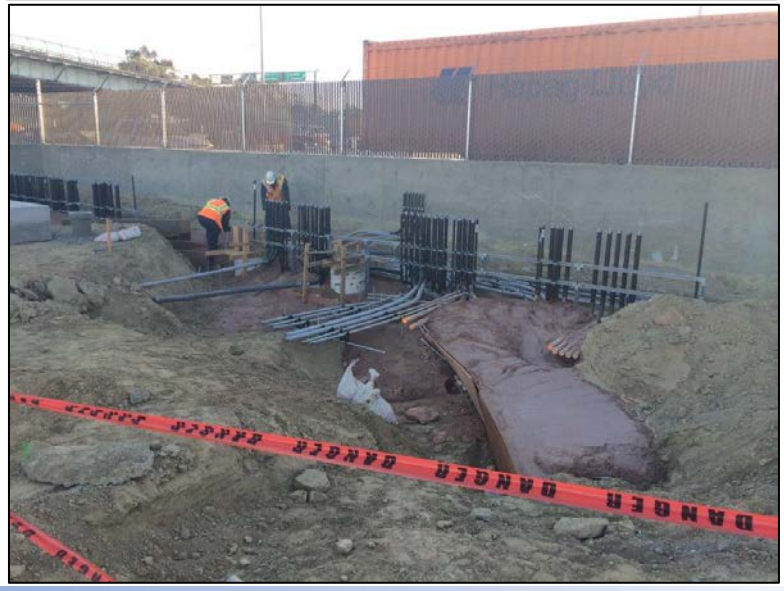
JACK & BORE USING HDD CONCEPT



OPEN CUT UTILITY CORRIDORS

Design considerations:

- Use Dig Alert to identify 3rd party obstructions
- Pothole to verify obstruction depth
- Internal and external coatings
- Cathodic protection
- Red concrete for conduit
- Warning tape above lines



UTILITY CORRIDORS

PREVENTION FIRST IN CONSTRUCTION

Considerations:

- Dedicated fire watch
- Welder qualification
- Qualified welding procedure
- Certified welding inspection
- Non-destructive testing (ultrasonic or X-ray)
    - > Ultrasonic preferred in Port terminals
- ASME B31.4 / B31.8 design and construction
- Pressure testing in accordance with ASME standards

PREVENTION FIRST IN CONSTRUCTION

Pipe corrosion and leak protection

- Internal
  - > Lining: FBE, cement, HDPE
  - > Non-metallic pipe: Fiberspar
- External
  - > Coating: FBE, 3-layer polythylene, 3-layer polypropylene
  - > Cathodic Protection:
    - – Sacrificial anodes
    - – Impressed current
  - > Jeep testing prior to backfill

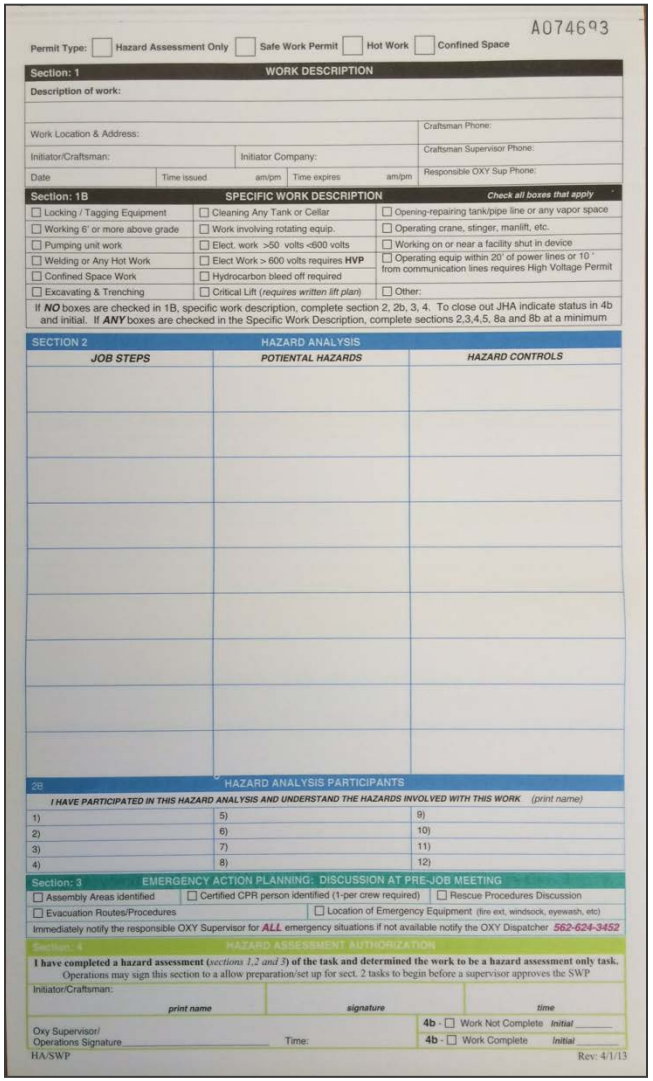
PREVENTION FIRST CULTURE

Company culture in projects

- Safety and environmental over schedule and budget

Implementation:

- Environmental and safety training for all contractors
- Daily job safety analysis
- Daily construction supervisor inspection
- Job specific safety plans
- Management audits
- Management of change process



A074693

Permit Type: ☐ Hazard Assessment Only ☐ Safe Work Permit ☐ Hot Work ☐ Confined Space

Section: 1 WORK DESCRIPTION

Description of work:

Work Location & Address: | Craftsman Phone:

Initiator/Craftsman: | Initiator Company: | Craftsman Supervisor Phone:

Date | Time issued am/pm | Time expires am/pm | Responsible OXY Sup Phone:

Section: 1B SPECIFIC WORK DESCRIPTION *Check all boxes that apply*

☐ Locking / Tagging Equipment	☐ Cleaning Any Tank or Cellar	☐ Opening-repairing tank/pipe line or any vapor space
☐ Working 6' or more above grade	☐ Work involving rotating equip.	☐ Operating crane, stinger, manlift, etc.
☐ Pumping unit work	☐ Elect. work >50 volts <600 volts	☐ Working on or near a facility shut in device
☐ Welding or Any Hot Work	☐ Elect Work > 600 volts requires **HVP**	☐ Operating equip within 20' of power lines or 10' from communication lines requires High Voltage Permit
☐ Confined Space Work	☐ Hydrocarbon bleed off required	
☐ Excavating & Trenching	☐ Critical Lift (*requires written lift plan*)	☐ Other:

If ***NO*** boxes are checked in 1B, specific work description, complete section 2, 2b, 3, 4. To close out JHA indicate status in 4b and initial. If ***ANY*** boxes are checked in the Specific Work Description, complete sections 2,3,4,5, 8a and 8b at a minimum

SECTION 2 HAZARD ANALYSIS

JOB STEPS	*POTIENTAL HAZARDS*	*HAZARD CONTROLS*

2B HAZARD ANALYSIS PARTICIPANTS

I HAVE PARTICIPATED IN THIS HAZARD ANALYSIS AND UNDERSTAND THE HAZARDS INVOLVED WITH THIS WORK *(print name)*

1)	5)	9)
2)	6)	10)
3)	7)	11)
4)	8)	12)

Section: 3 EMERGENCY ACTION PLANNING: DISCUSSION AT PRE-JOB MEETING

☐ Assembly Areas identified ☐ Certified CPR person identified (1-per crew required) ☐ Rescue Procedures Discussion

☐ Evacuation Routes/Procedures ☐ Location of Emergency Equipment (fire ext, windsock, eyewash, etc)

Immediately notify the responsible OXY Supervisor for ***ALL*** emergency situations if not available notify the OXY Dispatcher ***562-624-3452***

Section: 4 HAZARD ASSESSMENT AUTHORIZATION

I have completed a hazard assessment (*sections 1,2 and 3*) **of the task and determined the work to be a hazard assessment only task.**
Operations may sign this section to a allow preparation/set up for sect. 2 tasks to begin before a supervisor approves the SWP

Initiator/Craftsman: *print name* | *signature* | *time*

Oxy Supervisor/ Operations Signature _____ Time:

4b - ☐ Work Not Complete *Initial* _____

4b - ☐ Work Complete *Initial* _____

HA/SWP Rev: 4/1/13

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LESSONS LEARNED - DIGALERT

Use DigAlert for engineering phase

No response does not equal no conflict

Responses do not include line depth; potholing required

Company line finders may not be aware of recently installed utilities

Approach non-steel lines with additional care

Prepare contingency plans in the event lines are damaged


LA Flood District Culvert


Long Beach Gas Dept. Line

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TAKEAWAYS

Evaluate utility corridor options:

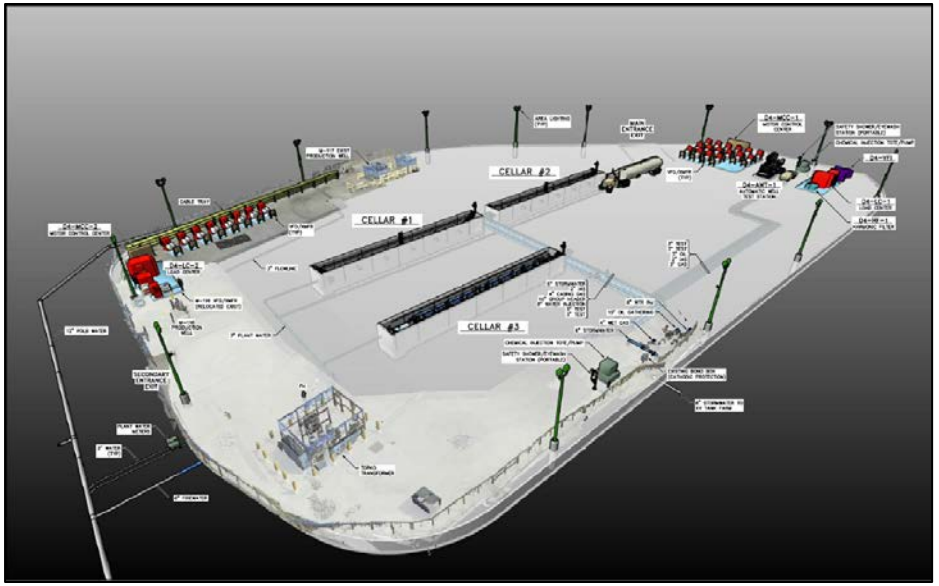
- HDD, Jack & Bore, Open Cut

Consider:

- Secondary containment using casings
- HDPE liners with carbon steel pipe
- Non-metallic pipe such as Fiberspar
- Combine communications and power conduit
- Utilize storm water, zero discharge

Use DigAlert aggressively

- During engineering and construction phases
- Potholing investigation follows DigAlert



QUESTIONS? COMMENTS…

Thank you