

Northwest Oil Drain Canal: Sediment Remediation Using Bypass and Excavation

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Overview

2



- ▶ The recently completed Northwest Oil Drain (NWOD) Canal remediation project in Salt Lake City, Utah, proved successful in implementing a bypass and excavation method of sediment remediation
- ▶ ~86,100 tons of contaminated sediment was excavated, stabilized, and shipped to Pacific West for recycling
- ▶ Remediation was split into 5 construction seasons due to weather limitations, working August-November

NWOD Canal

- ▶ NWOD canal is located in northern Salt Lake County, Utah
- ▶ 3 miles long
- ▶ Canal was originally constructed in the 1920s by Salt Lake City
- ▶ NWOD canal is critical City infrastructure receives up to 30-35 MGD discharge from Salt Lake City's Wastewater Reclamation Facility (WRF)
- ▶ Part of the stormwater conveyance system which brings peak flows to near 75 cfs on average
- ▶ Peak Canal Flows: 2-yr 100 cfs; 25 yr 400 cfs. Peak flows in summer



Objectives of Remediation

- ▶ Sediment Removal down to original bottom/native flowline of the canal, restoring conveyance capacity to its original design
- ▶ Remove sediment to achieve the following dry-weight hydrocarbon concentrations in the exposed soil:
 - ▶ 100 mg/kg total petroleum hydrocarbons – diesel range organics (TPH-DRO)
 - ▶ 300 mg/kg oil and grease (O&G)



Technology Evaluation

5

- ▶ Technologies Evaluated
 - ▶ Mechanical dredging
 - ▶ Hydraulic dredging
 - ▶ Bypass and excavate



U-shaped canal cross section

- ▶ EFFECTIVENESS CRITERIA
 - ▶ Residuals Control
 - ▶ Sheen Control – no sheen releases to Great Salt Lake Wetlands
 - ▶ Aquitard Protection – avoid digging into shallow aquitard

Technology Ranking

– Bypass and Excavate - high

Equipment and Removal Method	Effectiveness			
	Residuals Control	Sheen Control	Aquitard Protection	Overall Effectiveness
Mechanical Dredge				
Conventional clamshell – wire rope	Low	Low-medium	Low	Low
Enclosed level cut bucket – wire rope	Low-medium	Low	Low-medium	Low-medium
Articulated bucket (excavator)	Medium	Medium	Low-medium	Medium
Hydraulic Dredge				
Conventional cutterhead	Low	Low	Low	Low
Swinging ladder cutterhead	Low	Low	Low	Low
Horizontal auger	Low	Low	Low	Low
Bypass and Excavation				
Mechanical excavator	High	High	High	High



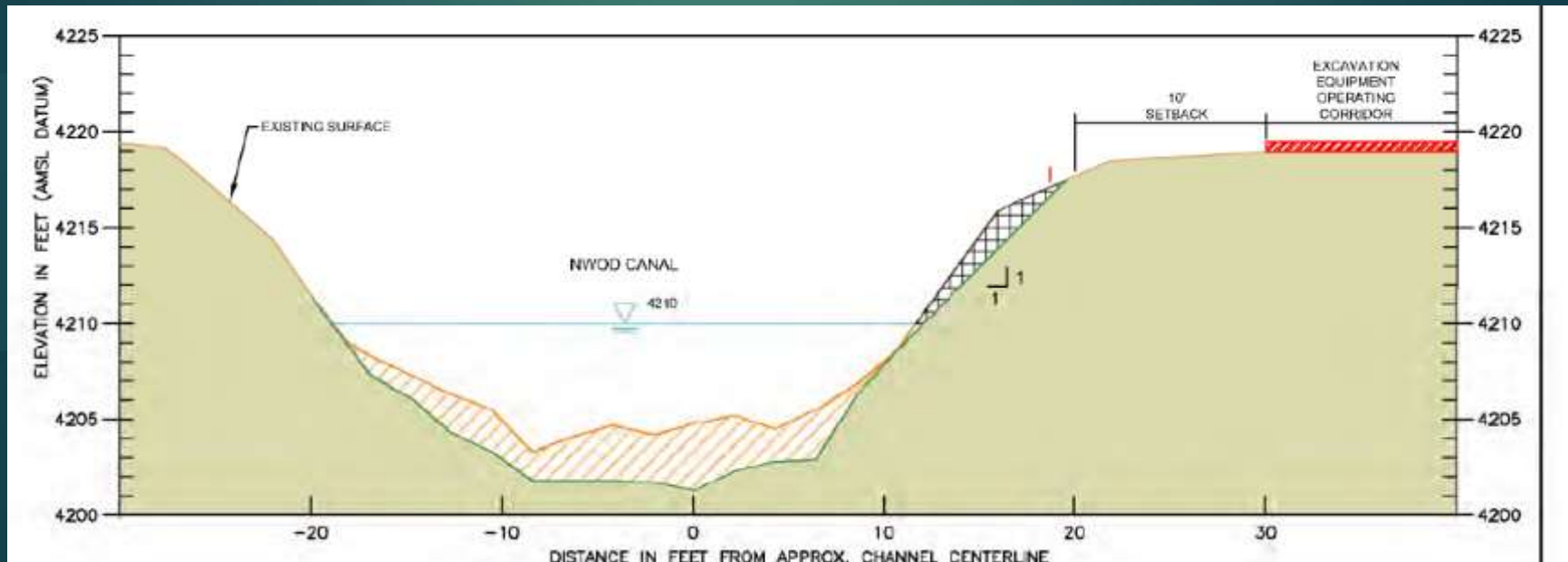
Bypass and Excavation



- ▶ Install diversion dams at each end of segment
- ▶ Flatten bank on working side of canal to improve bank stability
- ▶ Install high-capacity bypass pumps
- ▶ Pump water from work area to drain canal and expose bottom of canal
- ▶ Install sump pumps for seepage water
- ▶ Remove sediment from canal with long reach excavator
- ▶ Confirm and document successful removal of sediment with visual observation and post removal sampling

Bank Instability - BMPs

- ▶ Unstable side slopes
- ▶ Controlled drawdown of canal, 2-4 ft per day
- ▶ Bank flattening before sediment excavation
- ▶ Equipment setback for bank stability



Water Management

Contact Water Treatment

- Seepage water
- Four 21,000 gal. Weir tanks
- Two Oil/Water Separators
- Two Particulate Filters
- 1,000 gpm

Bypass Pumps –

- 140 cfs main channel
- 25 cfs secondary channel



Drained Canal

10



Sediment Excavation

11



Sediment Processing Area

12



Sediment Processing

13

- ▶ Removed sediment trucked to Sediment Processing Area (SPA)
- ▶ Asphalt paved and HDPE lined basin
- ▶ Material stabilized with drying agent as needed to pass the paint filter test
- ▶ Zap-Zorb ~0.2% by wt.
- ▶ Loaded into trucks for offsite disposal



Confirmation Sampling

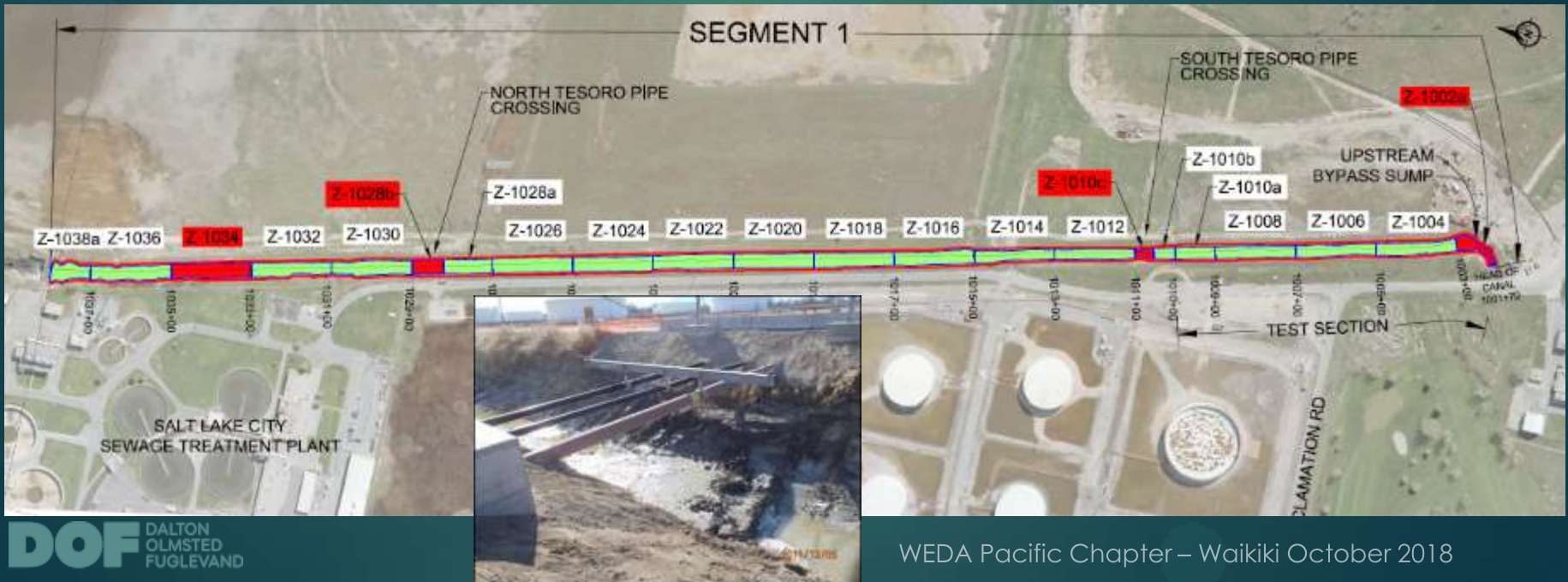
- ▶ Visual confirmation of removal of dark, soft, and wet sediment
- ▶ 6-point composite sample from 200-ft-long confirmation zones
- ▶ Canal bottom residuals – impacted soil left in place with Agency approval – further excavation threatened utilities.
- ▶ Canal sidewall residuals – along length of canal



Results



- ▶ 95% of Canal passed cleanup criteria
- ▶ Exceptions – pipeline crossings, road abutments, bank stability
- ▶ Agency approval



Other Project Details

Traffic Control



Geotechnical Measures

Water Management



Conclusions

- ▶ Bypass and excavate was a successful remediation method for this project
- ▶ 95% of remediated area met 100/300 performance standards
- ▶ 5% that did not meet standards was due to areas with geotechnical concerns that couldn't be fully excavated with Agency approval.





Questions?

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