

REMEDY DESIGN FOR COST-EFFECTIVE DREDGING AND DISPOSAL OF CONTAMINATED SEDIMENTS

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PRESENTATION OUTLINE

Site Location and Description

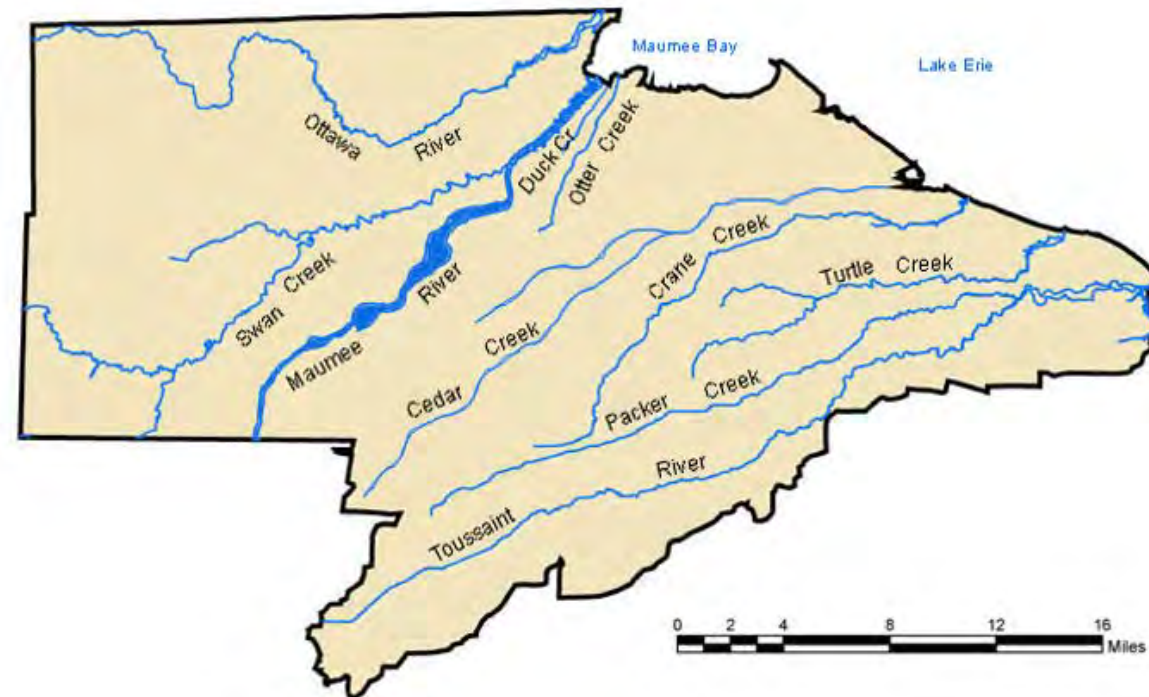
Site Investigations and Preferred Remedy

Remedy Design Approach

Challenges and Lessons Learned

OTTER CREEK LOCATION

- Located in northwest Ohio, part of the Maumee Watershed
- Discharges into Maumee Bay, western basin of Lake Erie
- Located with Maumee Area of Concern (775-acre area)



SITE DESCRIPTION

- Industrial area
 - East – railroad yards / West – phragmites wetland
 - Pipelines located adjacent to creek
 - Commercial and industrial properties
 - Municipal and industrial outfalls discharge into creek



SITE DESCRIPTION (CONTD.)



Confluence looking southeast



Closeup of Creek looking south

PAST INVESTIGATIONS

1990s:
State Agency
sampling

2007-2010:
Sediment
investigation

2010-2011:
Data gap and
confluence
investigations

2012-2013:
Focused
feasibility
study

2016-2018:
Predesign
Remedial
Investigation

PRE-DESIGN REMEDIAL INVESTIGATION (2016 – 2018)

1

Sediment and porewater sampling and analysis

2

Sediment geotechnical evaluations

3

Upland and sediment elevation surveys

4

Hydraulic monitoring at two locations (near confluence & 0.9 miles upstream)

5

Drone video and photography

REMEDIAL OBJECTIVE

Remedial Action Objective (Creek and Confluence Area)

Reducing benthic invertebrate exposure to chemicals of concern and associated toxicity below levels of concern

Chemicals of Concern

- Polycyclic aromatic hydrocarbons (PAHs)
- Diesel range organics (DROs)

PREFERRED REMEDY ALTERNATIVE

Sediment removal and cover placement

Creek

- Remove sediments up to a depth of 4 feet below the sediment surface or to native clay (whichever is less)
- Place 1 foot of cover material over dredged areas

Confluence

- Remove sediments at depths ranging from 1 to 5.5 feet
- No cover except for deep dredge area (i.e., 5.5-ft area)

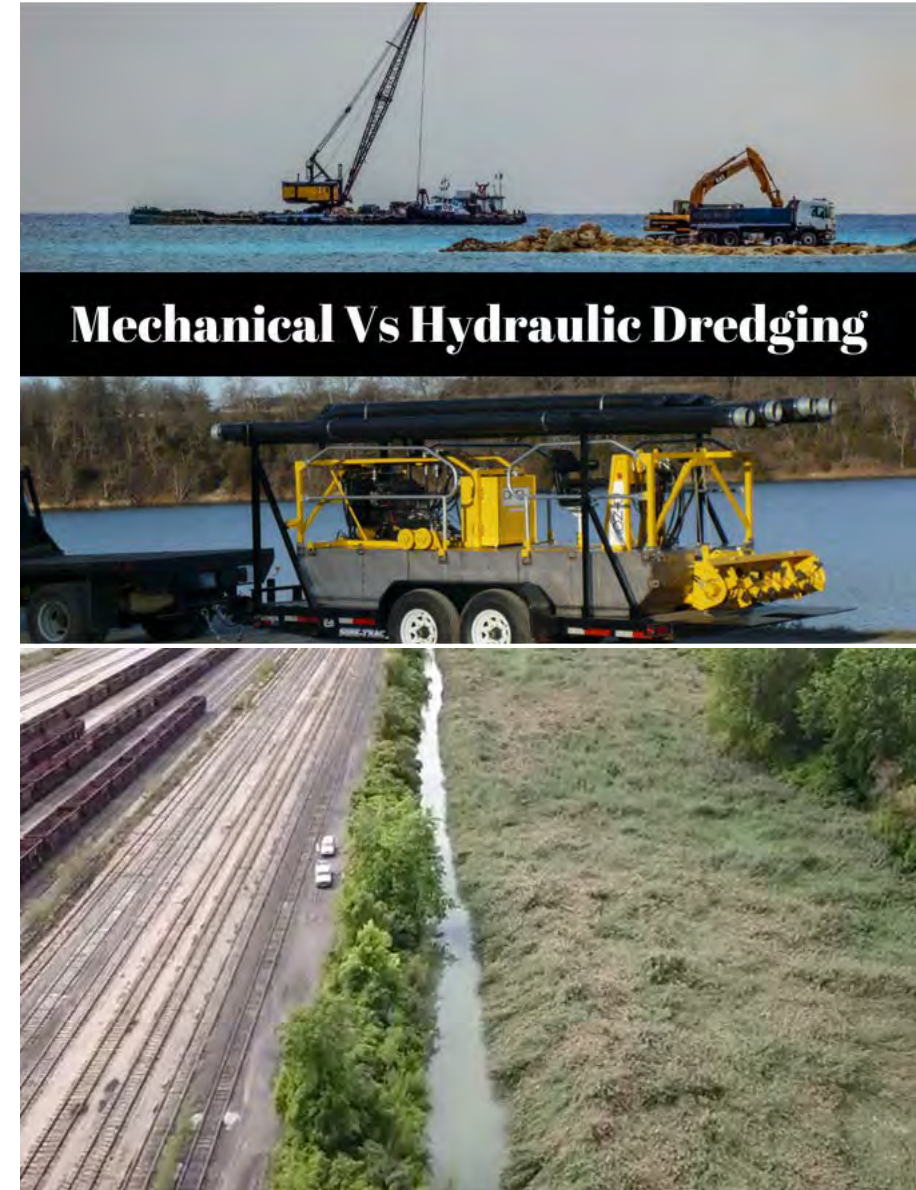
SEDIMENT MANAGEMENT AREA (SMA)

- Creek
 - Lower 1.7 miles
 - Width of creek: 25 to 85 ft
- Confluence
 - 5.5 Acres



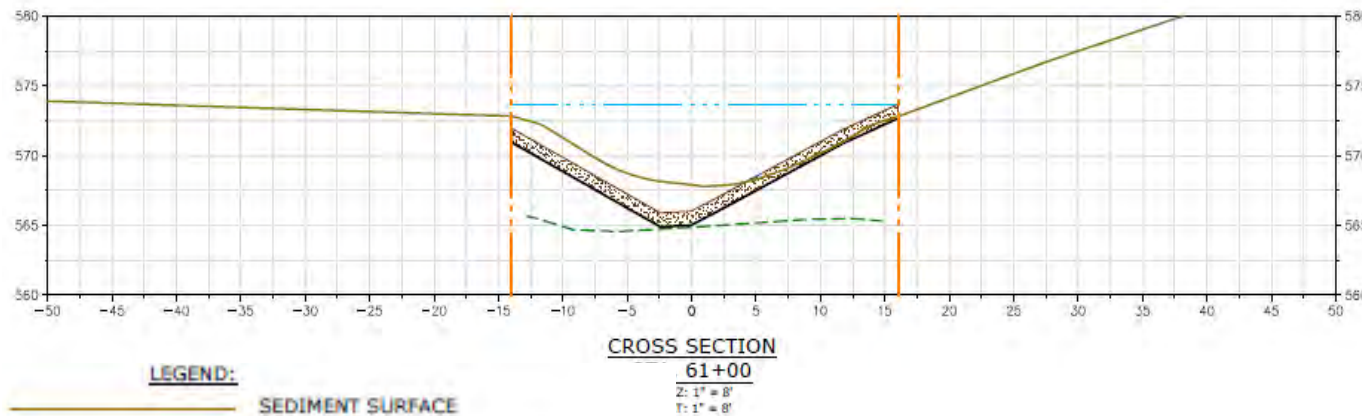
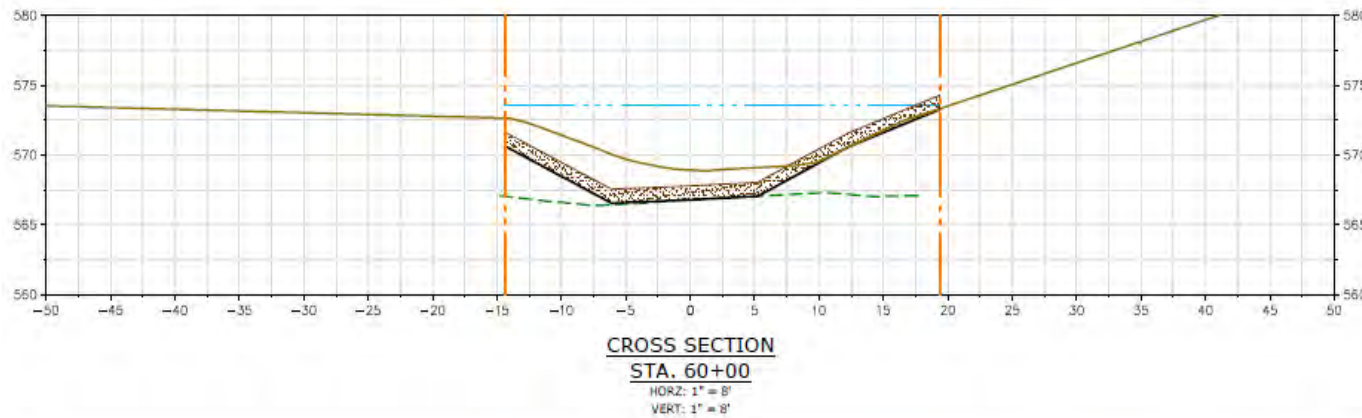
DREDGE DESIGN

- Sediment remedy is currently in design phase
- Approximately 50,000 CY of sediment identified for removal
- Sediments are proposed to be hydraulically dredged
- Advantages of hydraulic dredging over mechanical dredging
 - Cost and time efficient
 - Can be **implemented with minimal footprint** and lesser impacts to adjacent wetland areas
 - Lesser potential for sediment resuspension
 - Energy efficient & environmentally sustainable



TYPICAL DESIGN CROSS-SECTIONS OF CREEK

Upstream



LEGEND:

- SEDIMENT SURFACE
- INTERPOLATED TILL SURFACE
- PROPOSED DREDGE LINE
- MEAN LOW WATER LEVEL (573.61' AMSL)
- CREEK SMA BOUNDARY
- COVER MATERIAL

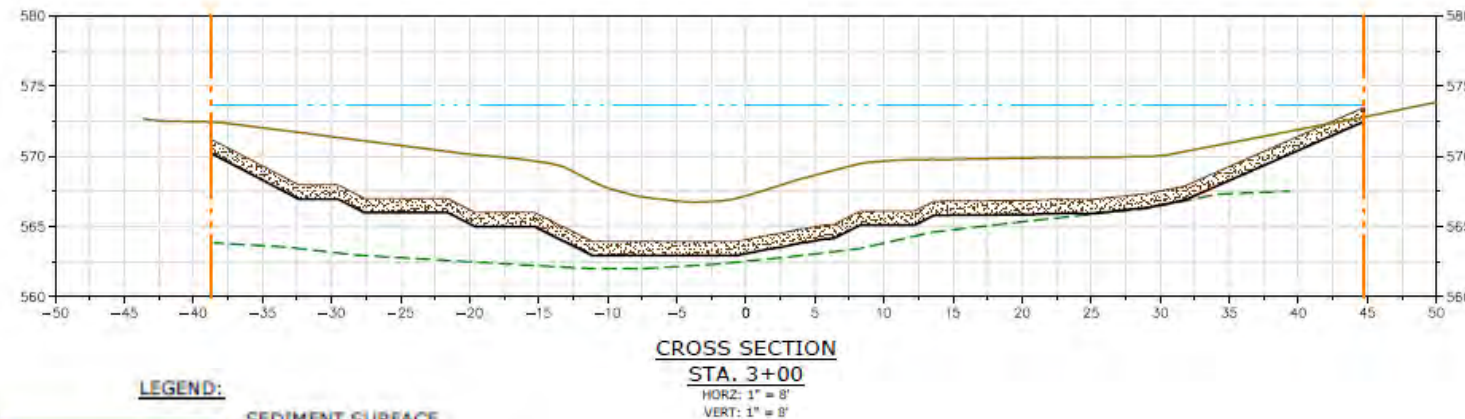
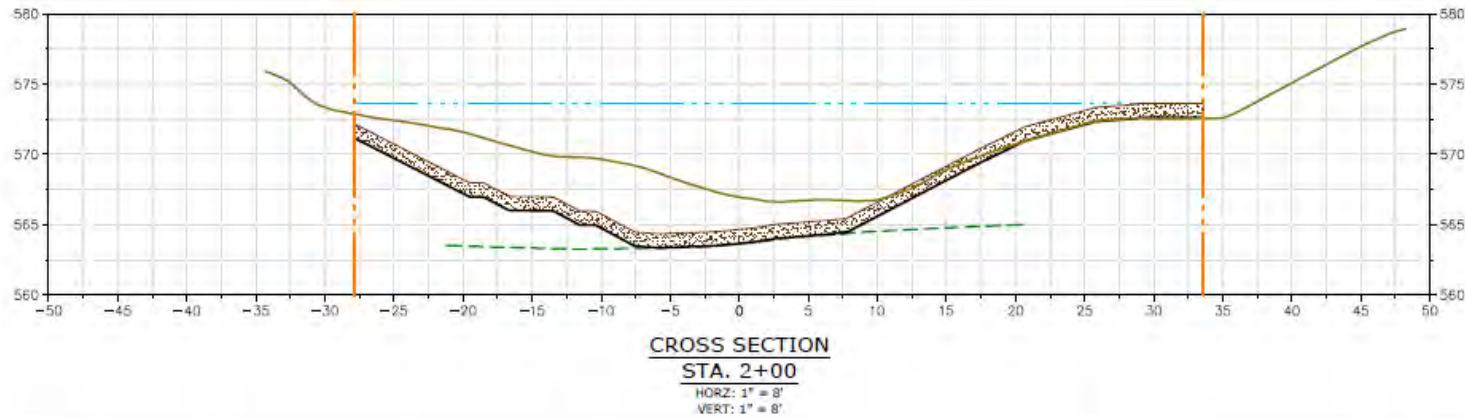


Delineation of creek boundary

- Site walkthrough/ visual survey
- Upland and sediment surface elevation data
- Aerial imagery
- Water elevation
- Sediment surface morphology

TYPICAL DESIGN CROSS-SECTIONS OF CREEK (CONTD.)

Downstream



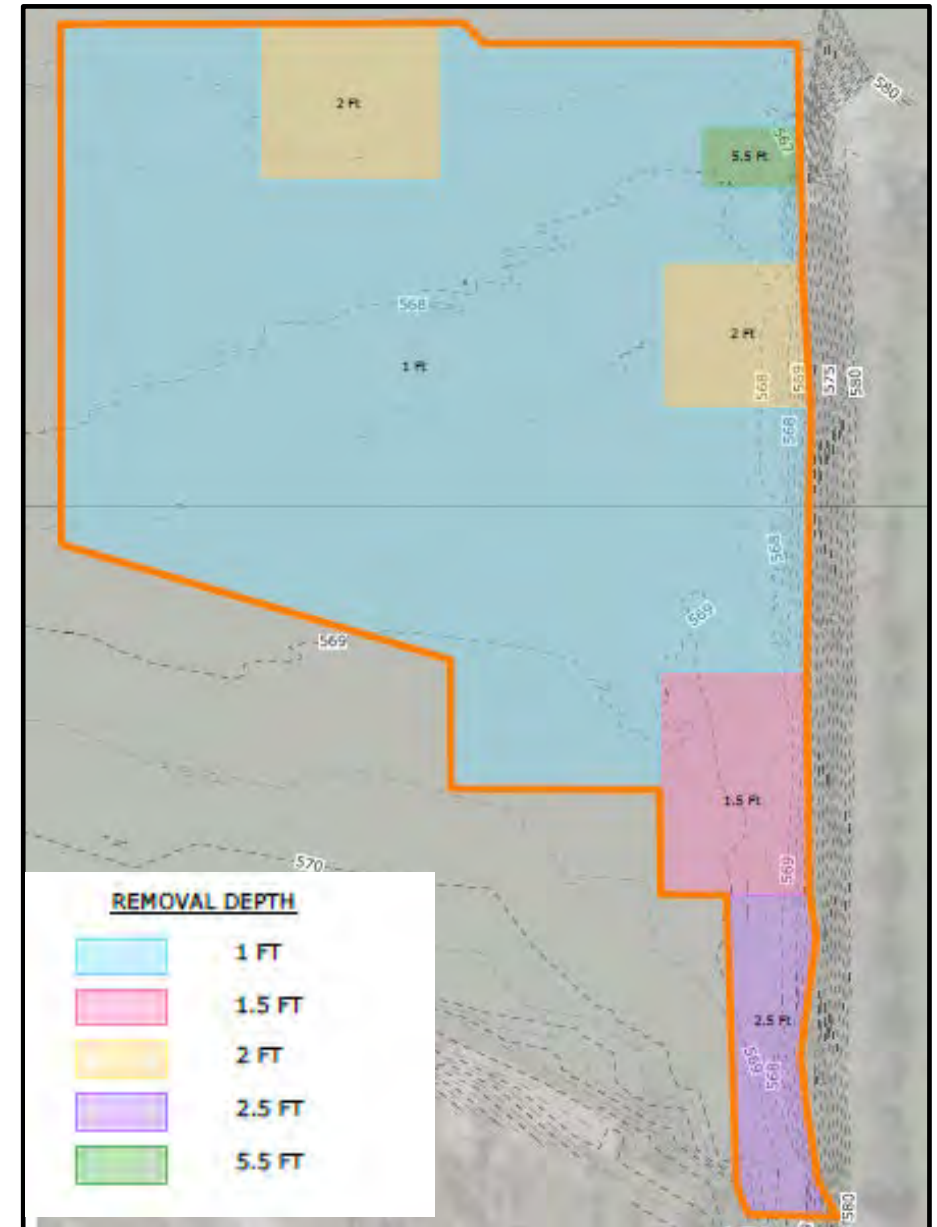
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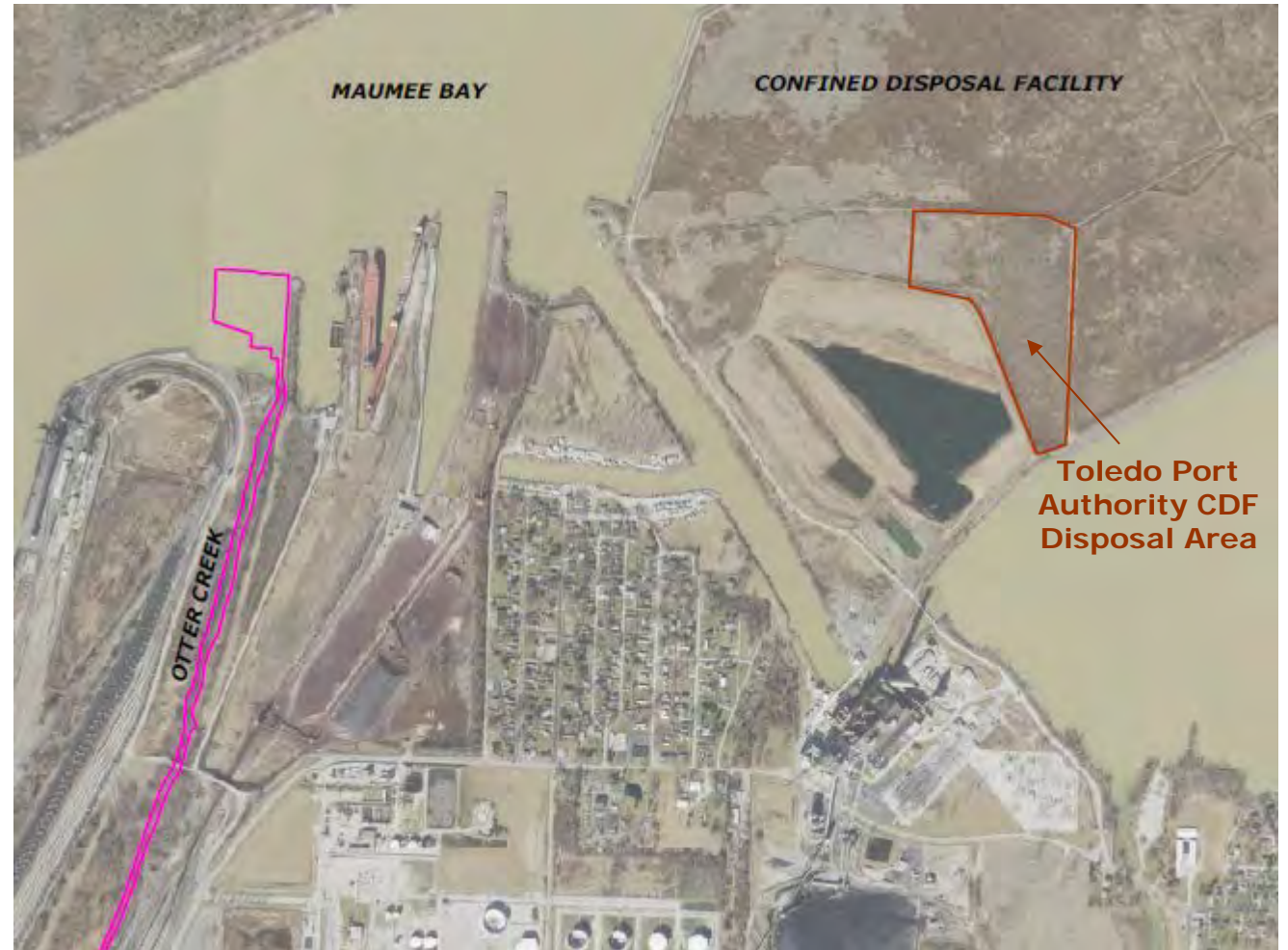
SEDIMENT REMOVAL IN THE CONFLUENCE

Confluence sediment removal depths range from 1 to 5.5 feet



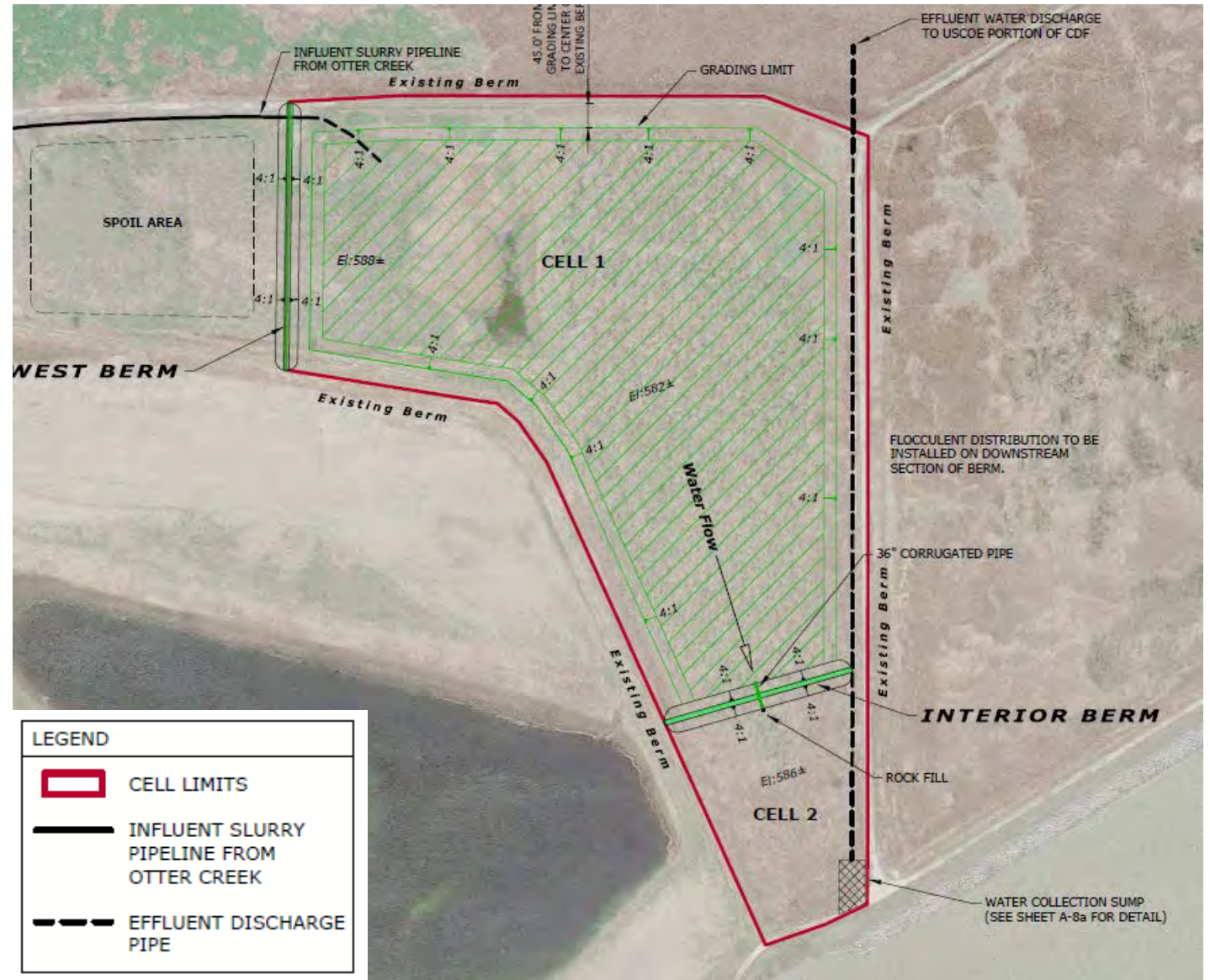
SEDIMENT DISPOSAL

- Hydraulically dredged sediments will be pumped to the nearby Confined Disposal Facility (CDF)
- Potential pipeline routes are being considered:
 - Via water – Pipeline would be submerged and anchored to the bottom floor to prevent interference with boat traffic
 - Over land – Pipeline would be protected at road crossings
- CDF disposal area is designated for contaminated sediment – these sediments are not authorized for reuse



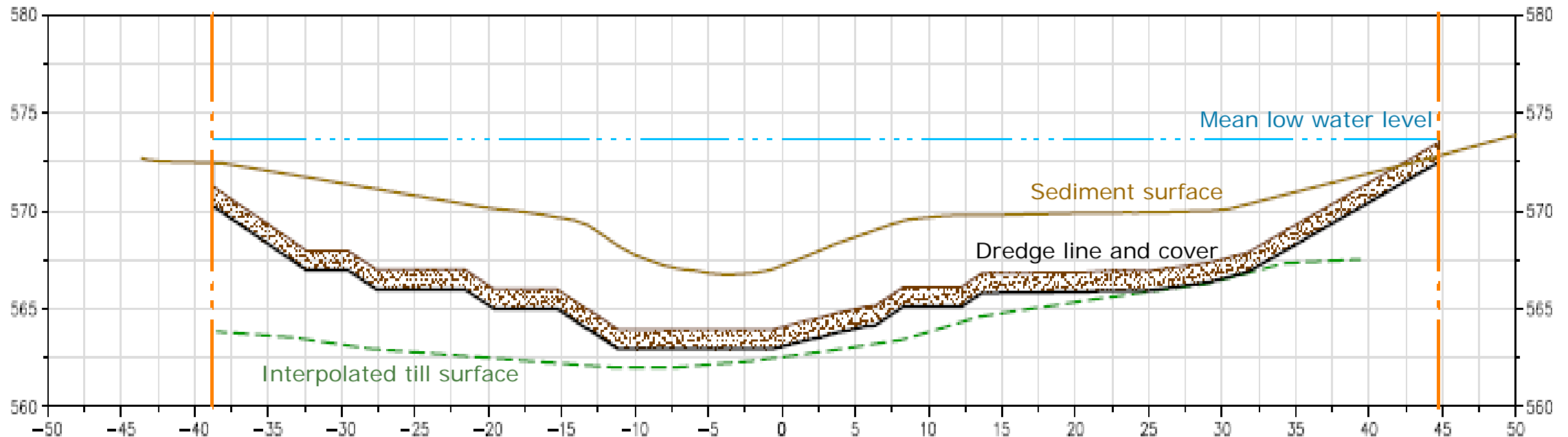
PROPOSED CDF CELL LAYOUT

- Two-stage settling system
- Overflow from Cell 1 within culvert will allow flocculent addition and assist in mixing
- Effluent from Cell 2 will be pumped to USACE CDF



COVER MATERIAL PLACEMENT

- Following removal a 1-ft clean sand layer will be placed on the new sediment surface
- Backfill will be placed in shallow lifts to reduce mixing with underlying sediment
- Dredging and cover placement will start upstream and move downstream to the confluence



CHALLENGES AND LESSONS LEARNED

- Sediment removal in narrow creek:
 - Site-specific benefits of hydraulic dredging versus mechanical dredging
 - Due to low bridge clearance, dredging equipment will need to be removed from creek and replaced on other side of bridges
 - Maintain sufficient safety setback from rail lines along the East; establish safe dredge slopes to maintain integrity of existing creek banks
- CDF
 - Collaboration with USACE and local Port Authority allowed for use of local CDF for disposal of hydraulically dredged material
 - Modifications to Port Authority CDF to facilitate settling of sediments to meet the USACE acceptance criteria for effluent from Cell 2.

QUESTIONS?