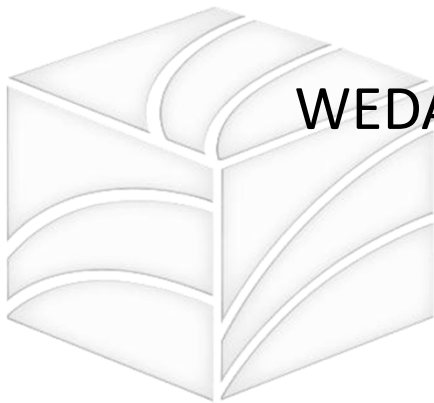


Welcome

Dredging and Capping for the East Branch of the Grand Calumet River

Kenneth R. Mika, PE



WEDA Dredging Summit and Expo 2014
June 15 - 18, 2014
Toronto, Ontario, Canada

Contributing Authors

- Tyler Lee – J.F. Brennan Company, Inc.
- Chris Musson – Natural Resource Technology, Inc.
- Rich Weber, PE – Natural Resource Technology, Inc.

GLSR Team

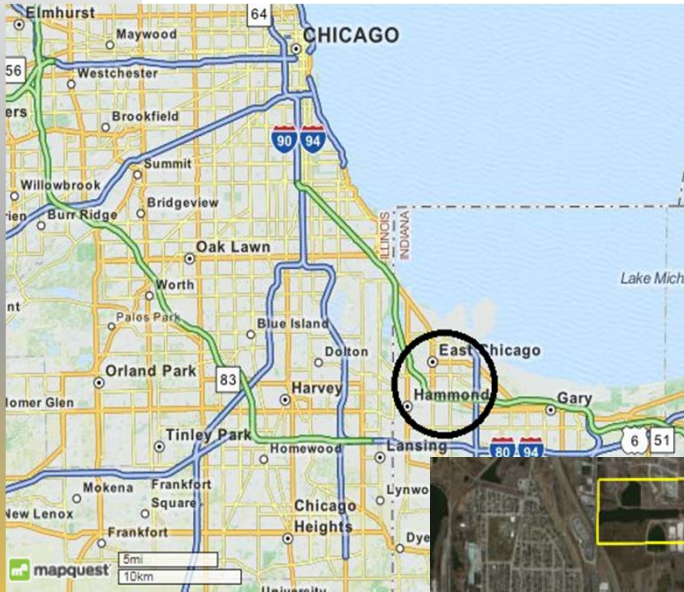
- Great Lakes Sediment Remediation, LLC (GLSR)
 - Natural Resource Technology, Inc.
 - Quality assurance and control
 - J.F. Brennan Company, Inc.
 - Marine operations
 - Environmental Restoration, LLC
 - Upland operations
 - Subcontractors and Suppliers
 - Infrastructure Alternatives, Inc.
 - Sediment dewatering and water treatment
 - Cardno JFNew
 - Invasive species control and restoration
 - AquaBlok, Ltd.
 - AquaGate

Overview of Presentation

- Project location, goals, and objectives
- Upland support area
- Pipeline and railroad bridge demolition
- Sediment basin excavation and sheet pile installation
- Hydraulic dredging of river and wetlands
- Excavation of wetlands and marsh
- Sediment capping and sand placement
- Wetland restoration
- Construction quality assurance and control
- Project metrics

Project Location, Goals, and Objectives

Grand Calumet River Area of Concern (AOC)



Source: <http://www.epa.gov/glnpo/aoc/grandcal/index.html>

Grand Calumet River AOC (continued)

- Beneficial Use Impairments
 - Restrictions on fish and wildlife consumption
 - Eutrophication or undesirable algae
 - Tainting of fish and wildlife flavor
 - Restrictions on drinking water consumption, or taste and odor
 - Degradation of fish and wildlife populations
 - Beach closings
 - Fish tumors or other deformities
 - Degradation of aesthetics
 - Bird or animal deformities or reproduction problems
 - Added costs to agriculture or industry
 - Degradation of benthos
 - Degradation of phytoplankton and zooplankton populations
 - Restriction on dredging activities
 - Loss of fish and wildlife habitat

Partners and Stakeholders

- U.S. Environmental Protection Agency – Great Lakes National Program Office (Great Lakes Legacy Act funded 65%)
- State of Indiana (funded 35%)
 - Indiana Department of Environmental Management
 - Indiana Department of Natural Resources
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Shirley Heinze Land Trust
- The Nature Conservancy
- Save the Dunes Conservation Fund
- E.I. du Pont de Nemours and Company
- Resco Products Company
- SulTRAC (Engineer of Record)
 - Joint venture between Sullivan Engineering and Tetra Tech

Project Goals and Objectives

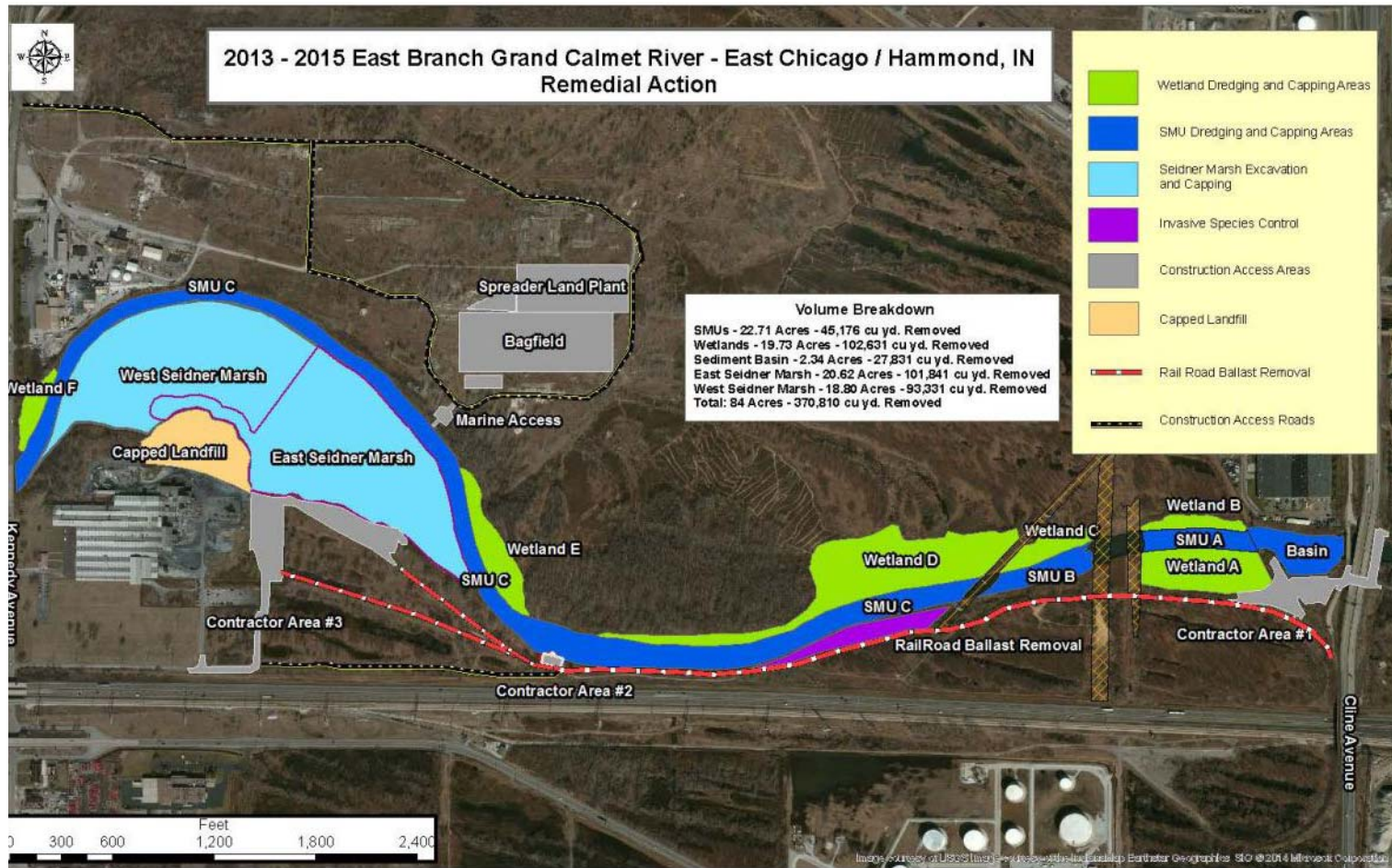
- Remove PCB and SVOC contaminant mass
- Reduce risks to aquatic life and human health
- Reduce contaminant transport to Indiana Harbor and Lake Michigan
- Improve water quality in EBGCR and Grand Calumet River AOC
- Advance the AOC toward delisting thru removal of beneficial use impairments
- Improve biota, fish, and wildlife habitat

Schedule and Funding

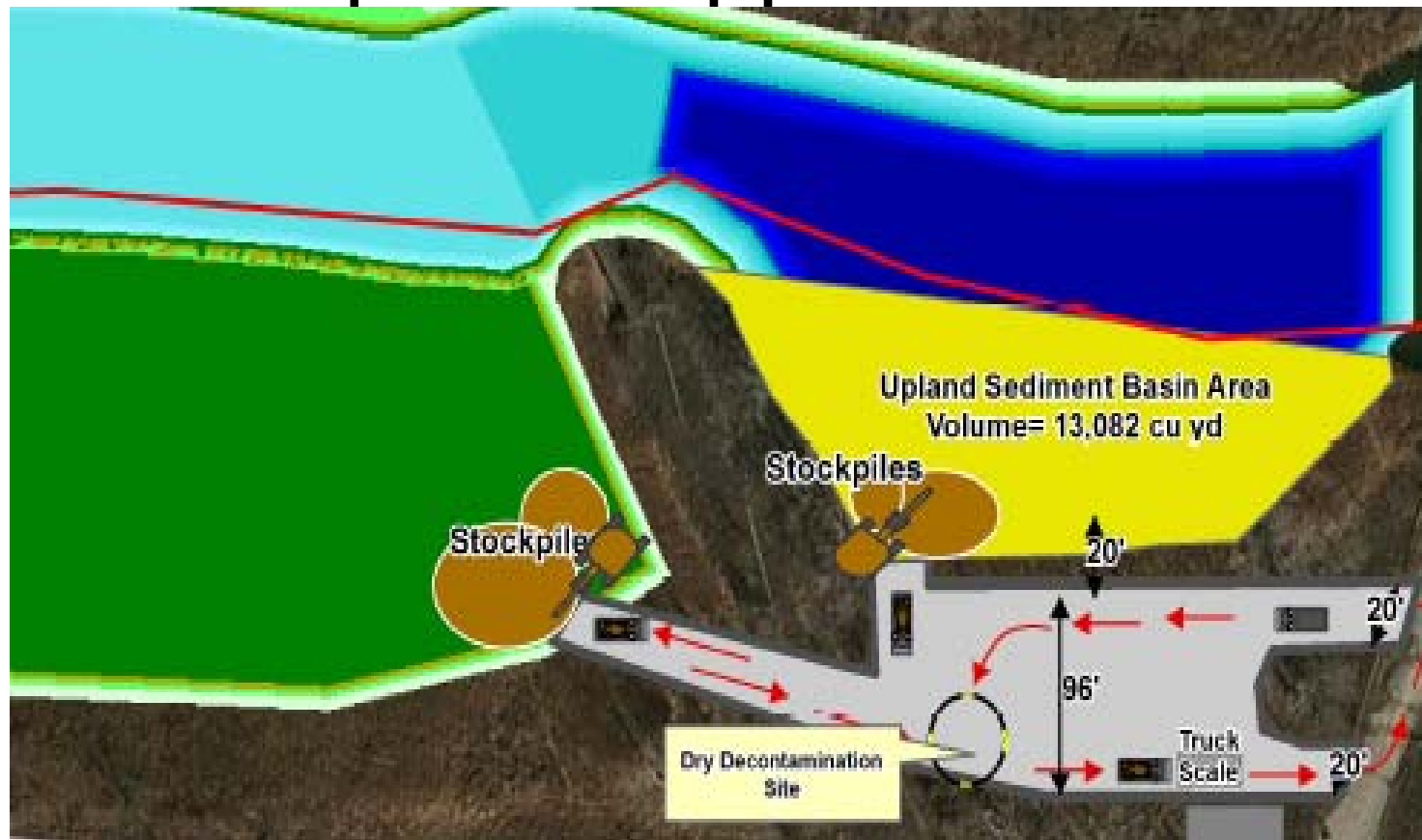
- Base – Begun Mar. 2013
 - Construction Contractor Quality Assurance Project Plan, Bonds, Mobilize, Site Prep, Demo, Dredge/Excavate Sediment Basin & Wetland A
- Option A – Begun Jul. 2013
 - Invasives Control, Dredge River & Wetlands B-F, Restore Wetland A
- Option B – Begun Jan. 2014
 - Excavate & Backfill East Marsh
- Option C – Begin Jul. 2014
 - Restore Wetlands B-F, River Sediment Capping
- Option D – 2015
 - Excavate & Backfill West Marsh, Demobilize
- Habitat Maintenance – 2016

Upland Support Areas

Upland Support Areas



Site Preparation: Upland Support Area 1



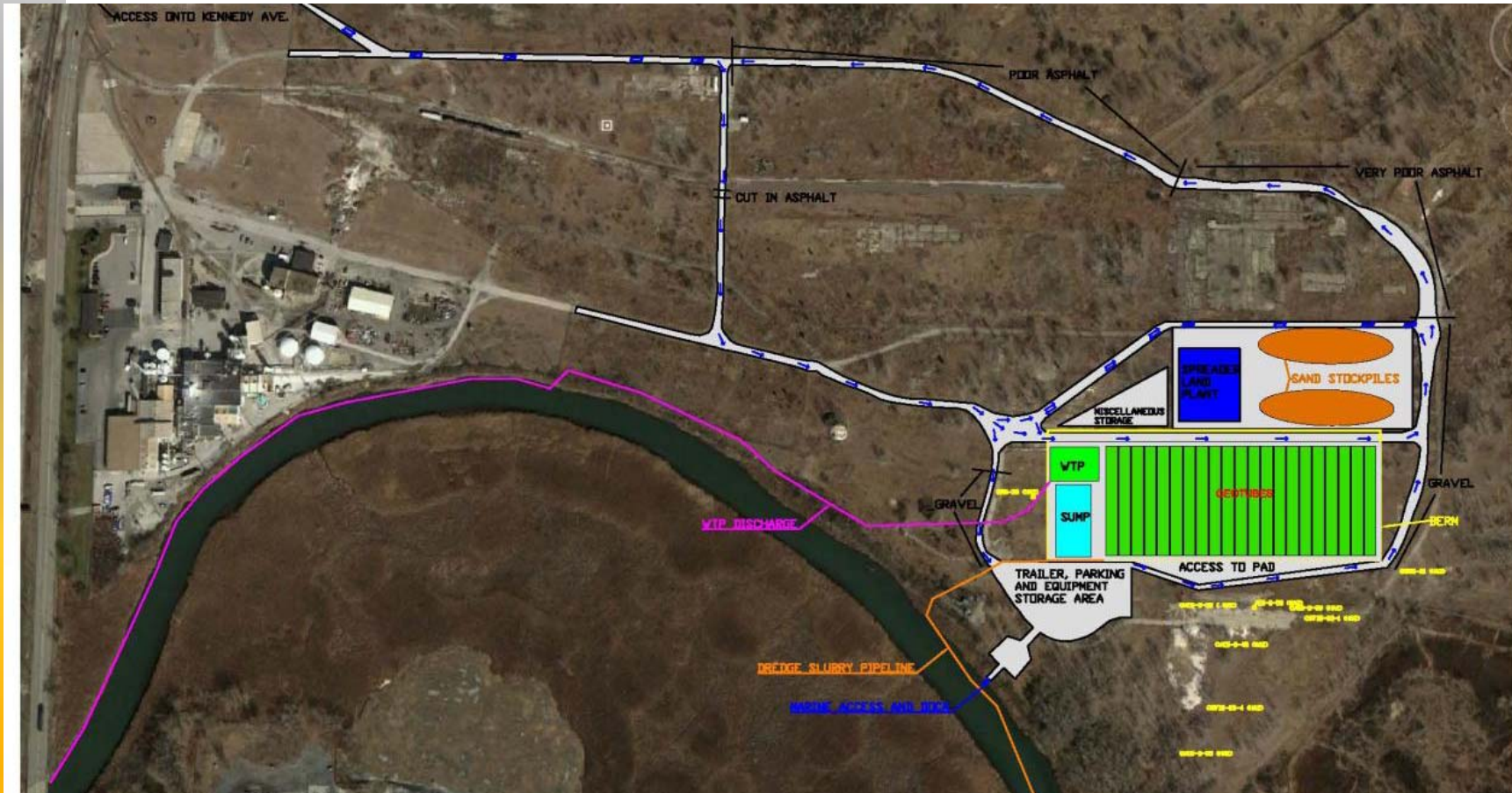
Site Preparation: Upland Support Area 2



Site Preparation: Upland Support Area 3



Site Preparation: Upland Support Area 5



Site Preparation: Upland Support Area 5 Aerial

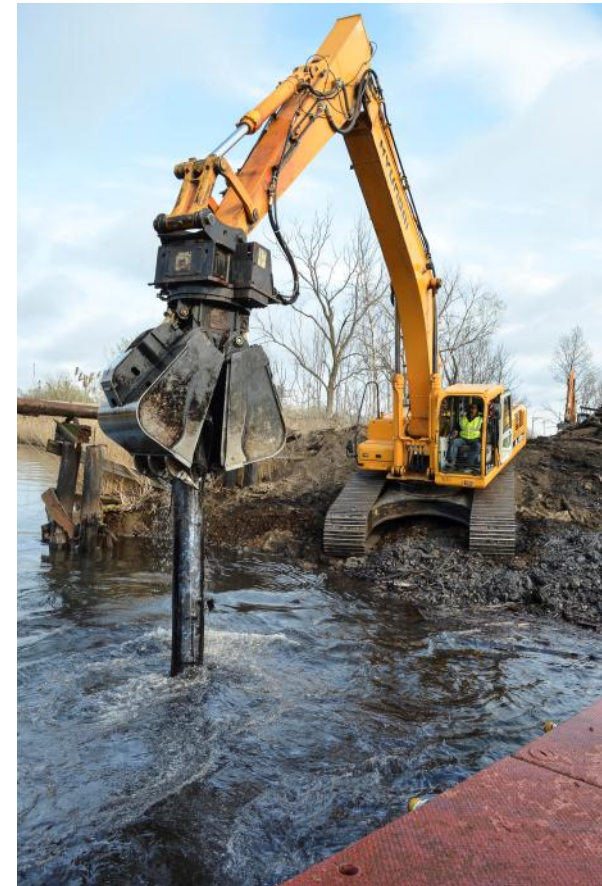
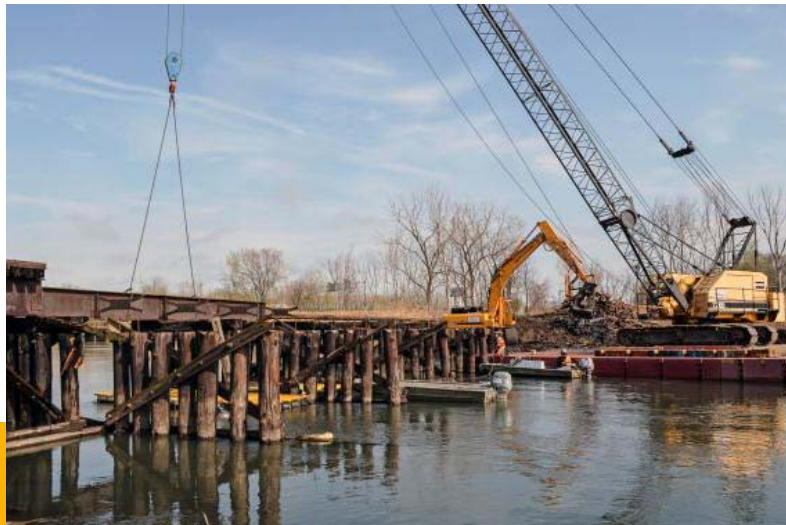


Source: SulTRAC

Pipeline and Railroad Bridge Demolition

Railroad Bridge Removal

- Testing and removal of abandoned gas pipeline
- Removal of ties and walkways
- Tested for lead based paints
- Disassembly of girder sections
- Removal of timber piling
- Debris removal and load out



Sediment Basin Excavation and Sheet Pile Installation

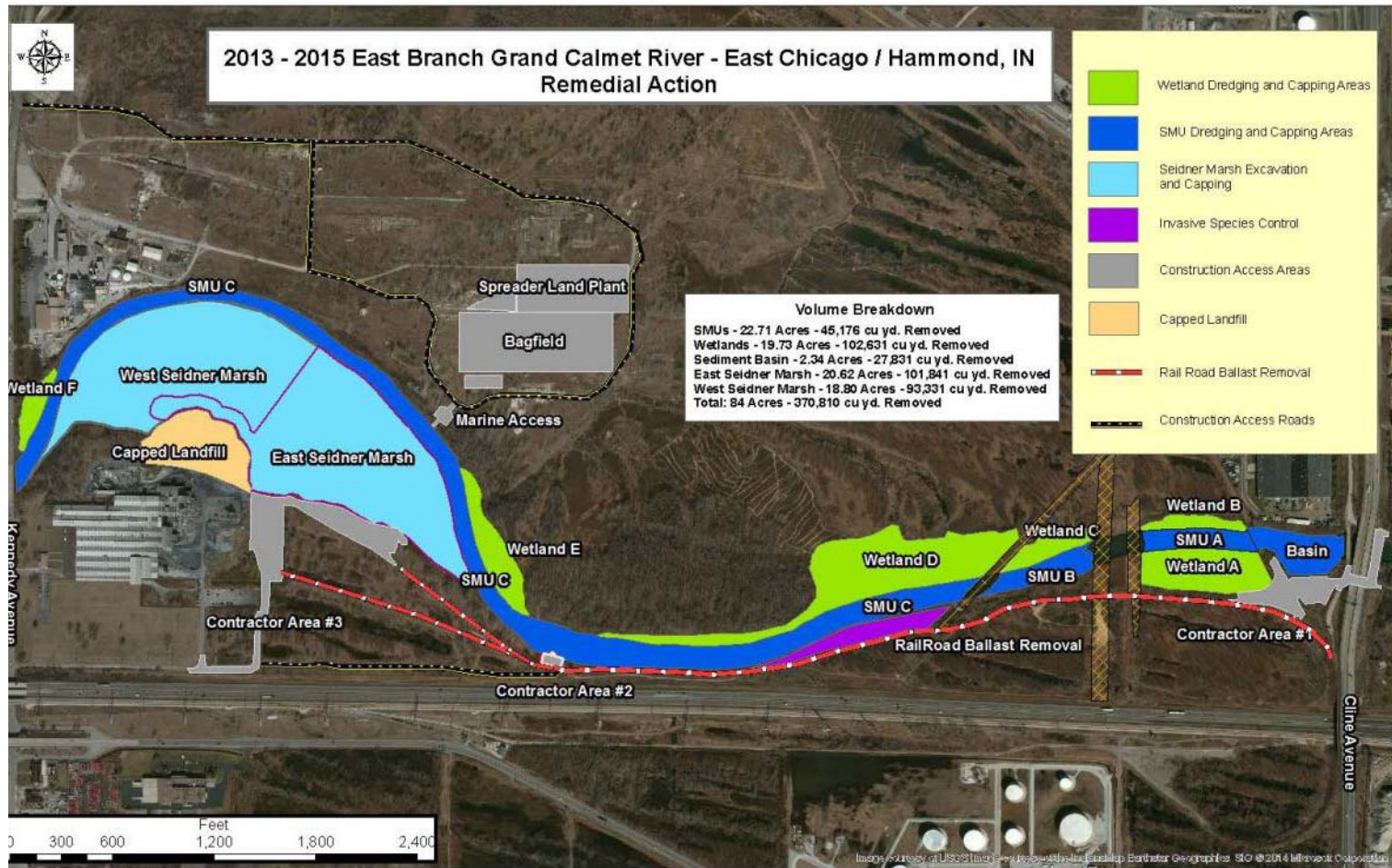
Installation of Sediment Basin

- Created to provide sediment trap for upstream contaminated sediments
 - Hydraulically dredged 13,000 m³ (17,000 cy)
 - Mechanically excavated 8,500 m³ (11,000 cy)
- 410 m² (4,400 ft²) sheet pile wall driven across downstream end
 - Raises water elevation 0.3 m (1 ft) above normal
 - Functions as a weir, trapping sediment behind it



Hydraulic Dredging of River and Wetlands

Hydraulic Dredging



Hydraulic Dredging

- Two 20 cm (8 in) cutterhead dredges with “surgical” dredging capabilities used
 - Both dredges had RTK-GPS equipment



Area	Volume (m ³)	Volume (cy)
Sed. Basin	13,000	17,000
SMU A	3,800	5,000
SMU B	3,100	4,100
SMU C	20,900	27,300
Wetland B	3,100	4,100
Wetland C	4,200	5,500
Wetland D	37,700	49,300
Wetland E	9,300	12,200
Wetland F	3,100	4,100
Totals	98,300	128,600

Survey

- Multiple RTK-GPS Surveys per day
 - Hydrographic
 - Marshland
 - Land-based
- QA/QC real-time



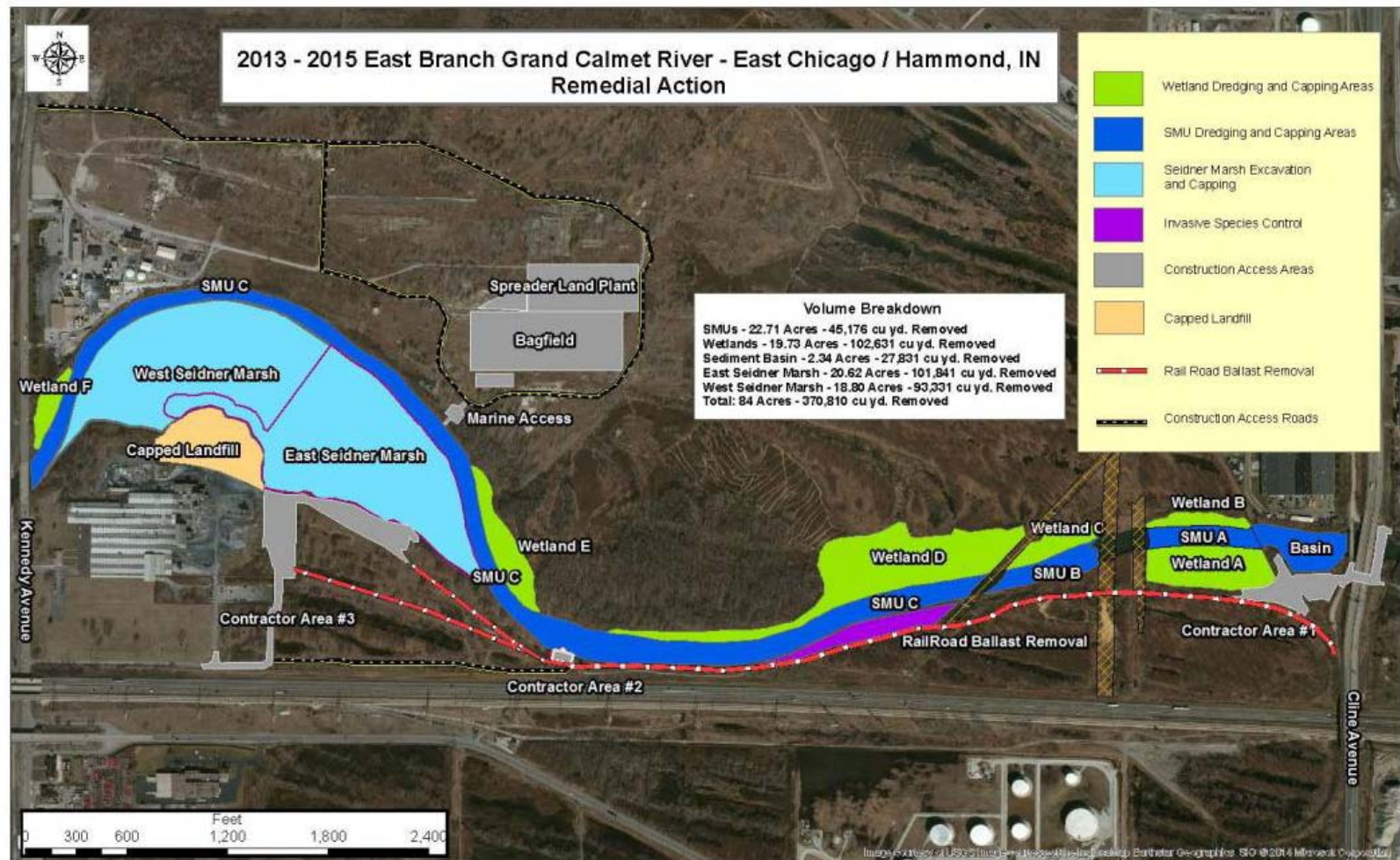
Geotextile Tubes and Water Treatment

- The temporary, lined pad is 140 m by 275 m (450 ft by 900 ft)
- 60 tubes staked in three layers to minimize pad foot print
- The temporary water treatment system was sized to treat up to 19 million liters per day (5 million gallons per day) during hydraulic dredging operations



Excavation of Wetland A and Marsh

Wetland A & Marsh Excavations

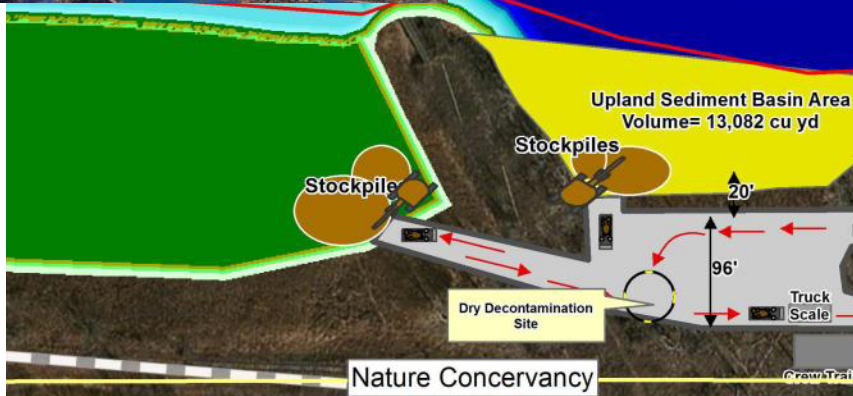
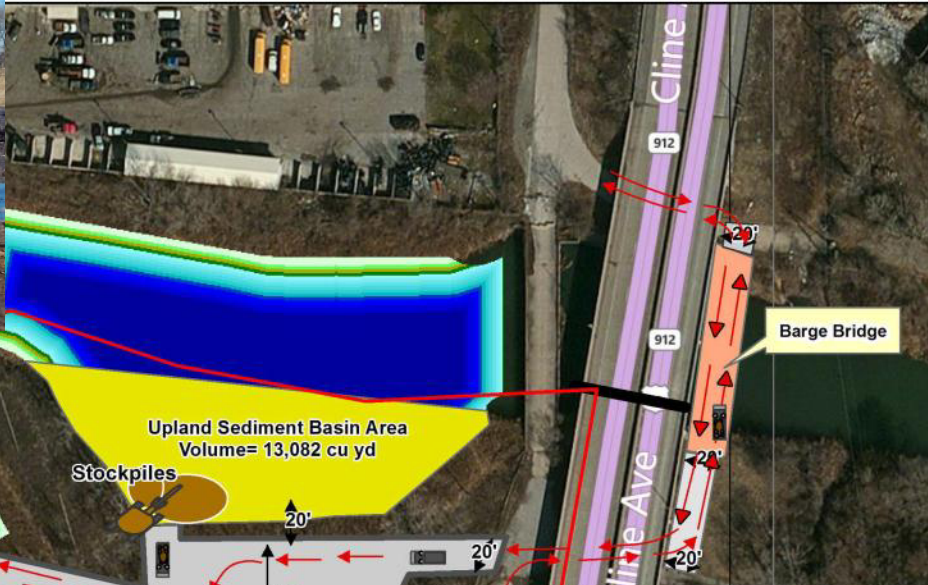


Wetland A & Marsh Excavations

- Three Parts
 - Wetland A
 - 15,300 m³ (20,000 cy)
 - East Seidner Marsh
 - 73,200 m² (95,800 cy)
 - West Seidner Marsh
 - 71,300 m² (93,300 cy)
- Mechanical excavation using amphibious equipment, excavators, and trucks
 - Amphibious truck capacity 12 m³ (15 cy)



Wetland A



2012 - 2013 East Chicago, IN East Branch Grand Calumet River
Figure #1a - Contractor Area 1

East Branch Coordinate Systems	
Horizontal Coordinate System	NAD 83 - IN-1302 Indiana West, US Survey Feet
Vertical Coordinate System	NGVD 29, US Survey Feet

Legend

Notes: Total Area of parking Gravel: 0.75 Acres
Scale: 1" = 120'

GLSR
GREAT LAKES SEDIMENT
REMEDATION, LLC

Sediment Basin and Wetland A Before Excavation



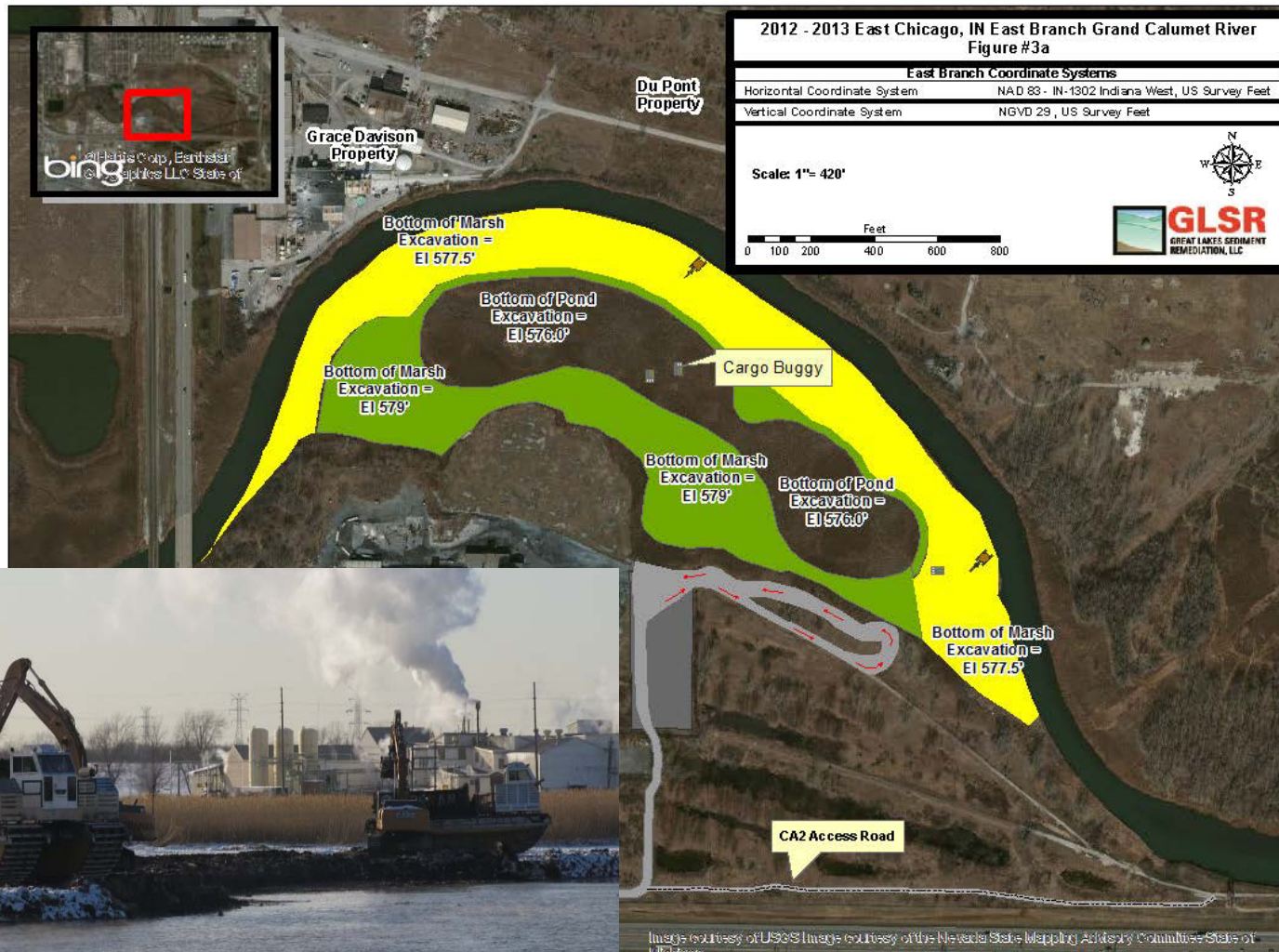
Source: SulTRAC

Sediment Basin and Wetland A After Excavation



Source: SulTRAC

Seidner Marsh



East Seidner Marsh Before



Source: SuTRAC

East Seidner Marsh During



Source: SulTRAC

Sediment Capping and Sand Placement

Sediment Capping and Sand Placement

- Broadcast Capping System (BCS)[™]
 - Evenly and gently distributes sand while minimizing intermixing with underlying sediments
- Wetlands A – F
 - 42,900 m³ (56,100 cy) of sand to be placed with BCS[™] and mechanically
- River segments
 - 7,000 m³ (9,200 cy) of Absorptive Cap (AquaGate+ORGANOCLAY[™]) with BCS[™]
 - 16,900 m³ (22,048 cy) of armored cap with BCS[™]
- Sedimentation Basin
 - 600 m³ (800 cy) of sand with BCS[™]
- East and West Seidner Marsh
 - 87,000 m³ (113,700 cy) of sand placed mechanically and using the BCS[™]



Wetland Restoration

Invasive Species Control

- Eradication of invasive vegetation (phragmites, cattails)
 - Herbicide application
 - Prescribed burning



Source: SulTRAC



Maintenance and Monitoring

- Performance Standards
 - Coverage (Native and Invasive)
 - Representation
 - Survival
- 12 months from EPA preliminary acceptance (2016)



Construction Quality Assurance and Control

Pre- and Post-Construction Soil Sampling

- Verify that construction activities will not result in residual contamination of upland support areas



Water Quality Monitoring During Dredging and Capping

- Real time turbidity monitoring as a surrogate measurement to evaluate TSS
- Advisory (25 NTU) and Action (50 NTU) levels established via TSS : Turbidity correlation



Water Treatment Plant Effluent Sampling

- Document treated water meets discharge permit requirements



Additional QA/QC Activities

- Cap thickness documentation
- AquaGate™ content verification (organoclay loading)
- Other:
 - Sampling imported material for geotechnical & chemical characterization (sand backfill, armor gravel, topsoil)



Project Metrics

- Project length: 2.9 kilometers (1.8 miles)
- River depth: Pre-dredge ~0->3 m (0->10 ft); Post-dredge ≥ 1.8 m (≥ 6 ft)
- River sediment and wetland dredging volume: $\sim 122,300$ m³ (160,000 cy)
- Marsh excavation volume: $\sim 144,500$ m³ (189,000 cy)
- Sediment cap profile: 22.9 cm (9 in.) armor over 12.7 cm (5 in.) isolation [reduced to 7.6 cm (3 in.) and 7.6 cm (3 in.) over buried pipelines]

Project Metrics (continued)

- Water treatment: 13,200 LPM (3,500 GPM) during hydraulic dredging; now downsized for weep water and precipitation; discharge back to river under NPDES permit
- Dewatering: ~60 geotextiles tubes stacked 3-high
- Wetlands and marsh invasive species control of 190,200 m² (47 acres) and restoration of 299,500 m² (74 acres)
- Project duration: ~3 years plus 12 months revegetation maintenance
- Project budget: ~\$80 million

Questions?