

GLSR

**GREAT LAKES SEDIMENT
REMEDICATION, LLC**

East Branch of Grand Calumet River, Reaches 4A/4B

WEDA WODCON XXI

June 13-17, 2016

The Hyatt Regency, Miami, FL

Project Representatives



- Agencies and Stakeholders

- USEPA Great Lakes National Program Office
- State of Indiana
- Adjacent Property Owners

- Great Lakes Sediment Remediation (GLSR), a Joint Venture

- Natural Resource Technology
- J.F. Brennan Company
- Environmental Restoration



- Subcontractors and Suppliers

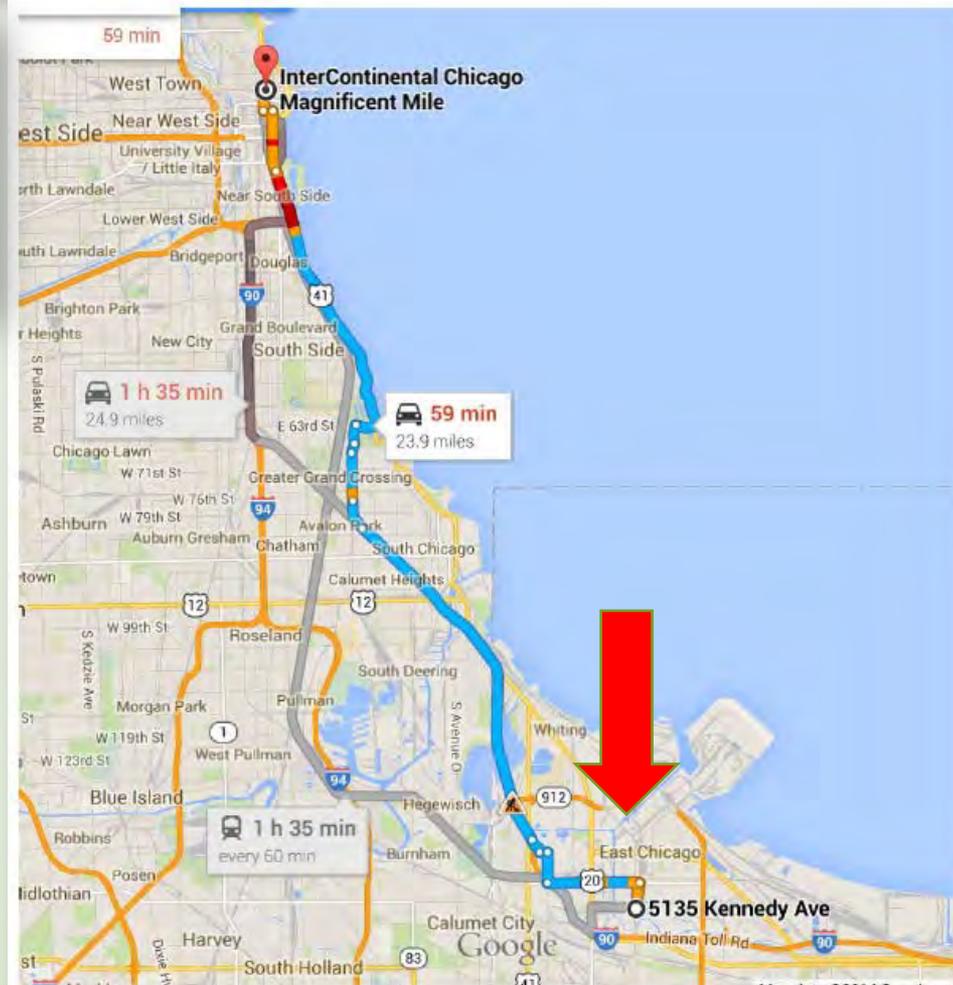
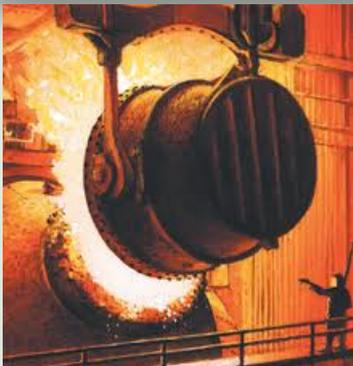
- Infrastructure Alternatives
- Cardno
- AquaBlok



Site Location



Site Location



Google Suggested Route to East Chicago

Grand Calumet River AOC



Grand Calumet River AOC Background



- AOC includes East and West Branches of Grand Calumet River, and Indiana Harbor and Ship Canal
- 90% of flow originates as municipal and industrial effluent, cooling and process water, and storm water overflows
- Large number of former and existing industrial facilities, CERCLA and RCRA sites, USTs/ASTs, and CSOs, in addition to urban runoff and contaminated groundwater
- Legacy pollutants in sediments (non-point source) include PCBs, PAHs, and heavy metals, in addition to high fecal coliform bacteria, BOD, suspended solids, and oil & grease in water column
- All 14 beneficial use impairments (BUIs) included in 1991 remedial action plan

Reach 4A/4B 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
- Achieved through dredging & capping remedy

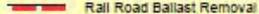
Reach 4A/4B Major Project Components



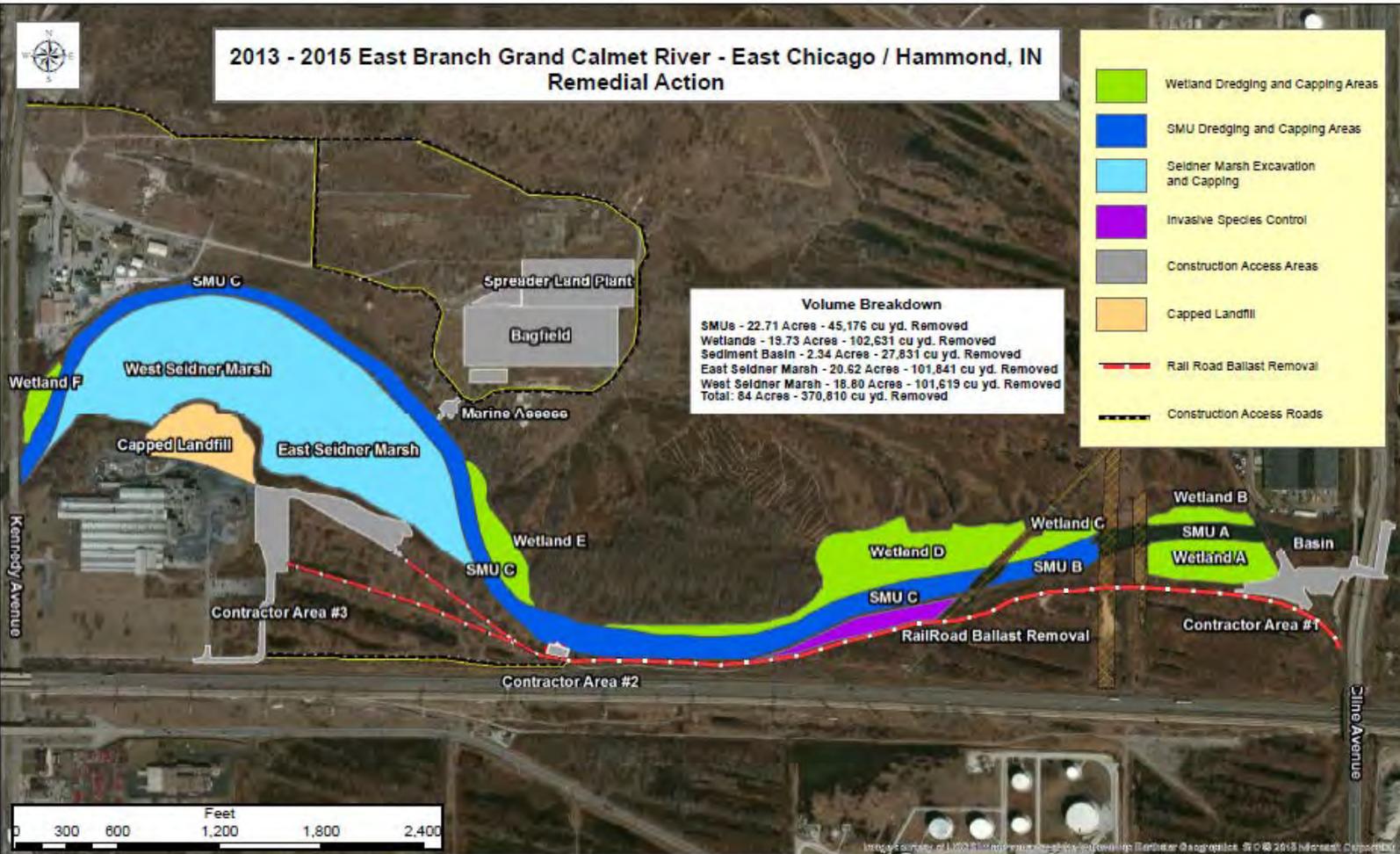
- Remove abandoned railroad bridge and miscellaneous upland site debris
- Excavate sedimentation basin to protect remedy from upstream contaminants
- Construct temporary upland support areas
- Partially dredge contaminated river sediments
- Excavate adjacent wetlands to remove invasive phragmites and place sand backfill with ponds for habitat improvement
- Dewater sediments and treat water
- Offsite transportation and disposal
- Place amended isolation cap over remaining sediments
- Habitat restoration including planting native species

Project Map - Reaches 4A/4B

2013 - 2015 East Branch Grand Calmet River - East Chicago / Hammond, IN Remedial Action

-  Wetland Dredging and Capping Areas
-  SMU Dredging and Capping Areas
-  Seidner Marsh Excavation and Capping
-  Invasive Species Control
-  Construction Access Areas
-  Capped Landfill
-  Rail Road Ballast Removal
-  Construction Access Roads

Volume Breakdown
 SMUs - 22.71 Acres - 45,176 cu yd. Removed
 Wetlands - 19.73 Acres - 102,631 cu yd. Removed
 Sediment Basin - 2.34 Acres - 27,831 cu yd. Removed
 East Seidner Marsh - 20.62 Acres - 101,641 cu yd. Removed
 West Seidner Marsh - 18.80 Acres - 101,619 cu yd. Removed
 Total: 84 Acres - 370,810 cu yd. Removed



Metrics



- Project length: 1.8 miles
- River depth: Pre-dredge ~0 to >10 ft; Post-dredge \geq 6 ft
- River sediment and wetland hydraulic dredging volume: ~156,000 cy
- Wetland A and marsh mechanical excavation volume utilizing amphibious equipment: ~224,000 cy
- Sediment cap profile: 9 in. armor over ~7 in. isolation (reduced to 3 in. and 3 in. over buried pipelines)
- Cap amendment: AquaGate+ORGANOCLAY™ (4A: 21.5 pcf/4B: 7.2 pcf)

Schedule



Pre-Construction During Final Design

- Field Sampling Support

Spring 2012

Construction

- Base: CCQAP, Bonds, Mob, Demo, Site Prep, Dredge/Excavate Sed Basin & Wetland A
- Option A: Invasives Control, Dredge River & Wetlands B-F, Restore Wetland A
- Option B: Excavate & Backfill East Marsh
- Option C: Restore Wetlands B-F, River Sediment Capping
- Option D: Excavate & Backfill West Marsh, Demob
- Habitat Maintenance

Mar. - Jul. 2013

Jul. 2013-Jan. 2014

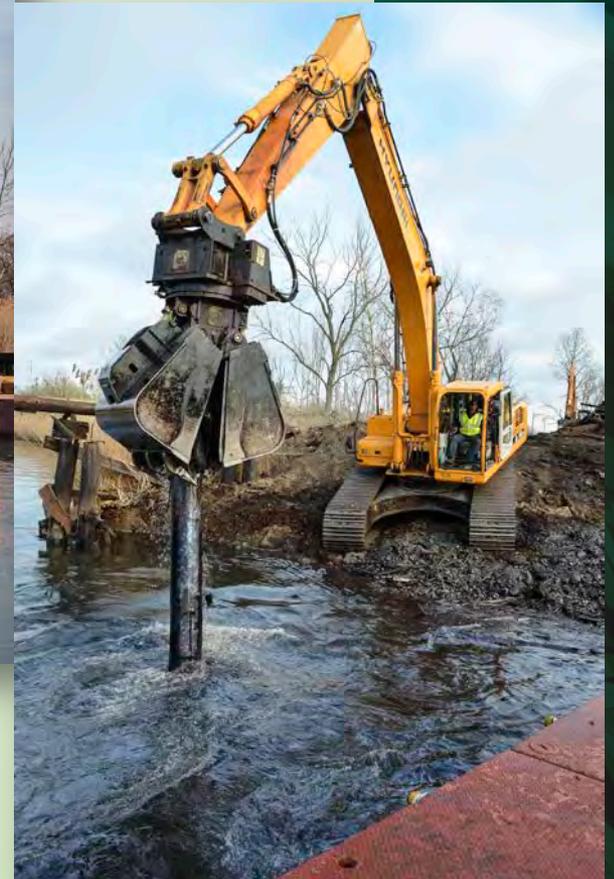
Jan. - Jul. 2014

Jul. 2014-Jan. 2015

Jan. - May 2015

2016

Railroad Bridge Removal



Installation of Sediment Trap



Dewatering Facility Construction



Bag Field Construction

- Cleared 9 acres
- Graded a 900 feet x 400 feet dewatering area
- Excavated WTP sump & constructed a 2' High berm around the perimeter
- Constructed a level pad for the WTP
- Place 6" of sand, graded & sloped to sump
- Placed & welded 40-mil HDPE liner
- Installed double-sided layer of Geo-Net



River Hydraulic Dredging

- Sediment faces ranged from 6 inches to over 4 feet in thickness
- 99%+ of designated material was successfully removed
- Average over-dredge depth across the entire project was <3 inches
- ~156,000 CY removed



Marsh & Wetland A Excavations

- ~224,000 CY
- 3 Parts
 - Wetland A
 - East Seidner Marsh
 - West Seidner Marsh
- Mechanical excavation using amphibious equipment, excavators, and trucks
- 1st two segments carried out during winter months



Marsh Before



Marsh During



QC and QA Surveys



Geotextile Tube Dewatering Pad



- Sloped to sump
- Sump to collect weep water prior to treatment
 - 700,000 gal capacity with 5 hours detention time
 - 5' working depth
 - 30-50 NTU average effluent
- 57 tubes
- 75 - 80 foot circumference tubes, 305 to 245 feet in length
- 20,080 lineal ft tubes
- Stacked to 3 layers

Geotextile Tube Dewatering & Water Treatment



Stacked Geotextile Tubes



Water Treatment System



- 375 hp high head electric pump delivered weep water from the sump to the water treatment system
- 3 pairs of bag filters in lead-lag configuration
 - 100 micro bags for lead units; 10 micron bags for lag units
- 6 pairs of activated carbon vessels in lead-lag configuration
- 3500 gpm treatment capacity
- Average influent flow of 2400 gpm
- Discharge to EBGCR and sample per NPDES

WTP Operations



Dewatered Sediment Sampling



- Weekly “pre-characterization” of dewatered river sediment and marsh materials
- Document meets nonhazardous waste landfill acceptance criteria prior to disposal



Transportation & Disposal



- Disposal: Republic Services Newton County Landfill, Brook, IN

- Ensures utilization of truck capacity
- Provides opportunity for inspection of incoming materials
- Prevents overloading



Sand Backfill in Wetlands & Marsh



- 313,000 tons

Marsh After



Adsorptive Capping Material



Aquagate₊ ORGANOCLOY™



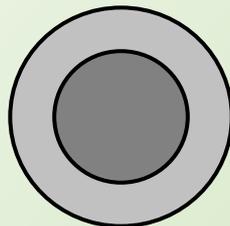
Aggregate: Nominal AASHTO #8 (1/4-3/8") or custom-sized to meet project-specific need *
Limestone or non-calcareous substitute, as deemed project-appropriate

Binder: Cellulosic polymer

Permeability: 1×10^{-2} to 1×10^{-5} cm/sec

Dry Bulk Density: 65 – 85 lbs/ft³

Moisture: 10 – 20% (maximum)



REMEDICATION TECHNOLOGIES
Technical Data
CETCO

ORGANOCLOY® P

ORGANIC ADSORPTION MEDIA (POWDER GRADE)

Product Description:

Organocloy® P is a proprietary powder adsorption media effective in removing oils, greases other non-aqueous phase liquids (NAPL) and other dissolved high molecular weight/low solubility organic contaminants.

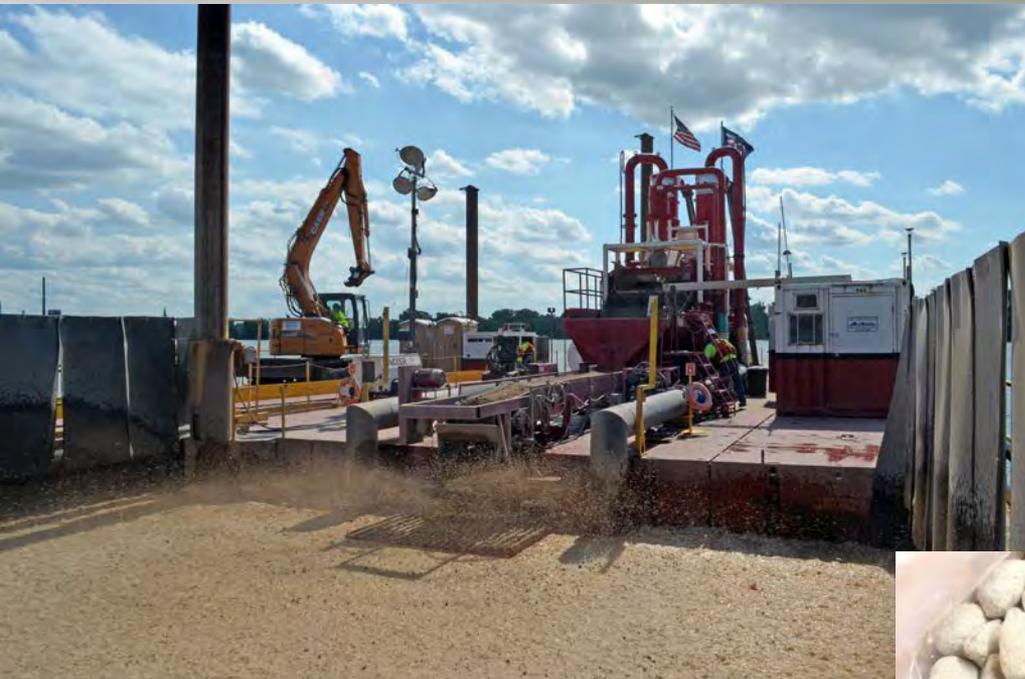
Characteristics:

- Hydrophobic; will not absorb water or swell when wetted
- Non-toxic to marine and benthic organisms
- High adsorption capacity of oils, greases and other NAPL
- Demonstrates noncompetitive sorption—can sorb multiple contaminants

Properties:

Property	Value	Test Method
Particle Size	70% Min. passing 200 mesh sieve	CETCO Test Method
Bulk Density	50-54 lbs/ft ³	CETCO Test Method
Oil Adsorption Capacity	0.5 lb/lb Min.	CETCO Test Method
Quaternary Amine Content	25% Min.	CETCO Test Method

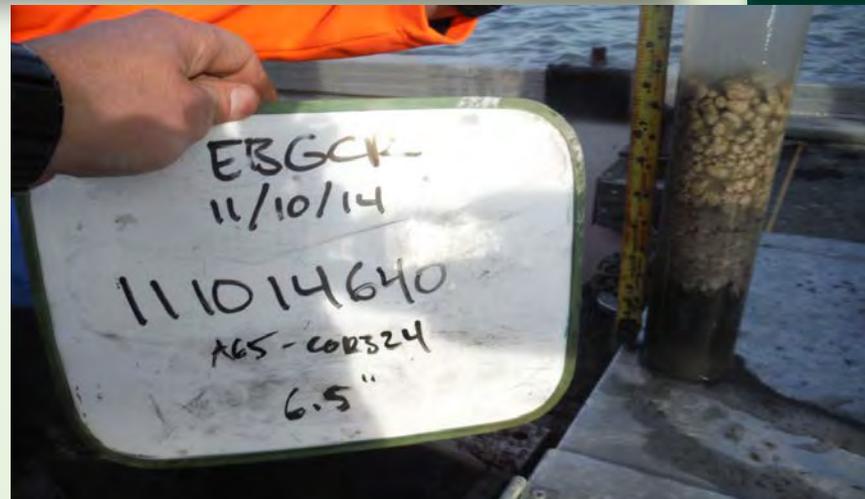
Broadcast Capping System in River



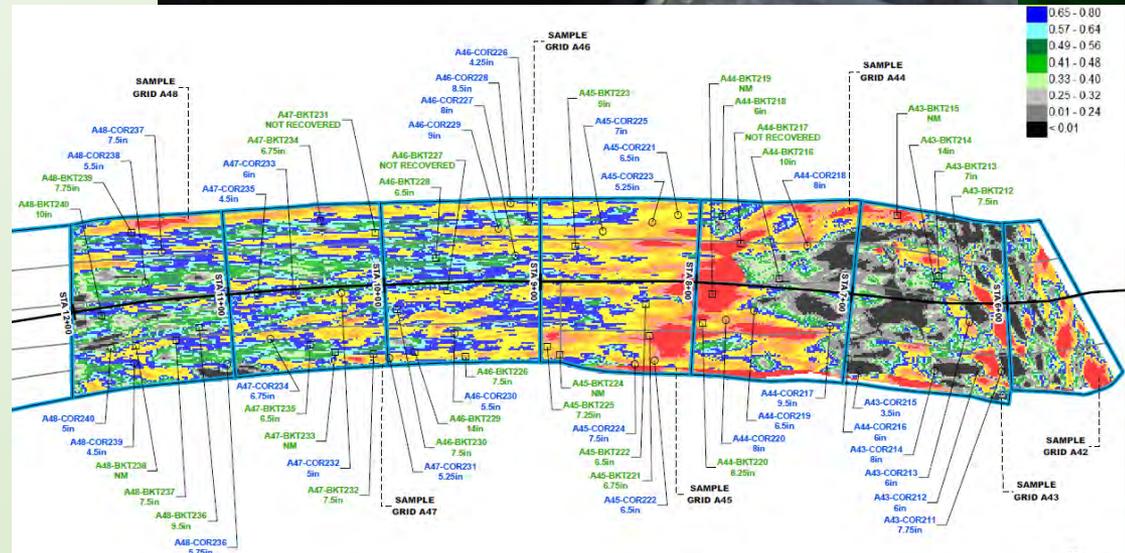
- A-Cap Loading 21.5 pcf
- B-Cap Loading 7.2 pcf
- 16,000 CY Aquagate
- 7,500 ton bulking aggregate



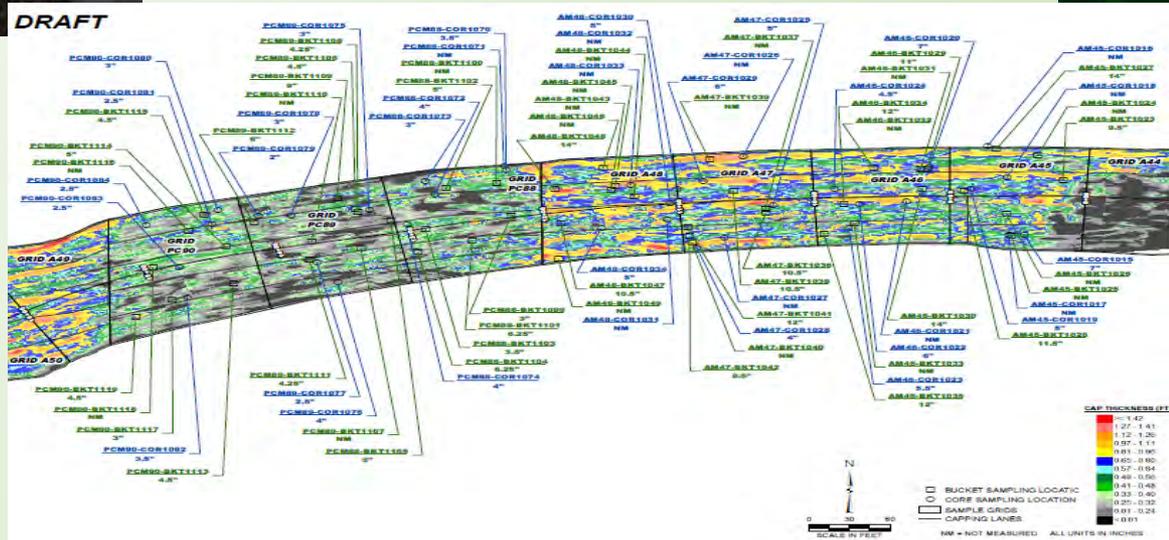
Adsorptive Layer Cap Placement QA



Reach	Adsorptive Cap	Average Required Adsorptive Cap Thickness (inches)
SMU A, SMU B, SMU C Zone A	AquaGate (A Cap)	6.4
SMU Zone B	AquaGate bulking aggregate (B Cap)	7.6
Natural Gas Pipeline Corridors	AquaGate (A Cap)	3



Armor Layer Cap Placement QA



- 9" armor layer thickness
- 3" above pipelines
- Max stone size 1"
- $D_{50} = 3/4"$
- 40,000 tons armor

Ecological Significance



- Numerous environmental stakeholders
 - Shirley Heinze Land Trust
 - Save the Dunes
 - Department of Natural Resources
 - The Nature Conservancy
- Globally rare dune and swale complex
- Rare Species
 - Wild Lupine
 - Harebell
 - Fringed Gentian
 - White Indigo
 - Blazing Star



Invasive Species Control



- Wetlands and marsh invasive species control (47 acres)



Revegetation

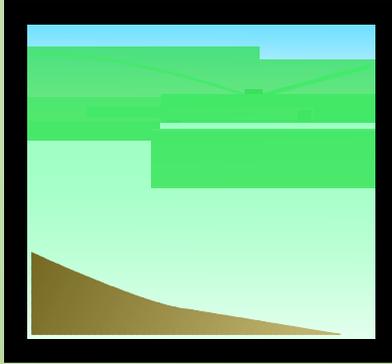


- 74 acres; 170,000 native plant plugs



Maintenance and Monitoring





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Questions?