

Remedial Options (ROPs) Program Update

August 19, 2015

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SRST ROPs Activities 2015

1. Floodplain Soil Amendment Pilot (Ceil Mancini, Bill Reese, AECOM)

Objective: Test the efficacy of biochar application in floodplain soils to reduce uptake of Hg or MeHg by biota.

- ROPs Updates: May, Aug, Dec

2. Design and implement Phase I Interim Measures for SR AOC4 (Anchor QEA / AECOM)

Objective: Prepare preliminary and final design for RRM 0 to 2

- ROPs Updates: Feb, May, Aug, Oct, Dec

3. Enhanced Adaptive Management Model (Christy Foran, USACE)

Objective: Complete spreadsheet model and training to help define and facilitate the SR adaptive management process.

- ROPs Updates: Aug, Oct

4. Dynamic Mercury Cycling Model (Reed Harris)

Objective: Further refine the conceptual model and mass balance for Hg and MeHg in the aquatic environment under baseline flow and storm conditions.

- ROPs Updates: May, Jul, Oct, Dec

5. Reactive Capping Simulations (Danny Reible, Texas Tech University)

Objective: Identify capping design element parameters through laboratory mesocosms and modeling.

- ROPs Updates: Oct or Dec

Phase II- Field Pilot

- Validate the effectiveness and potential unintended consequences of using carbon amendments *in situ*
- Treatments: Control, 5% Biochar (unsaturated and saturated), 10% Biochar (unsaturated)
- Reps: 3
- Progress:
 - Deployed
 - Aged
 - Worms added



Phase II- Study Metrics



Analysis at 4&8 Weeks

- Adult and juvenile earthworm tissue: THg, MeHg, lipids
- Survival and growth
 - Number, length and mass of adults
- Reproduction:
 - Number and length of juveniles or cocoons produced
- Soil: THg, MeHg, organic carbon; Continuous redox and moisture monitoring

Discussion

1. Suggestion to measure geochemistry outside of cages to compare with natural conditions
2. How representative is Augusta Forestry Center floodplain soils?
3. What would Phase III look like?

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Phased Implementation in Upper 2 Miles

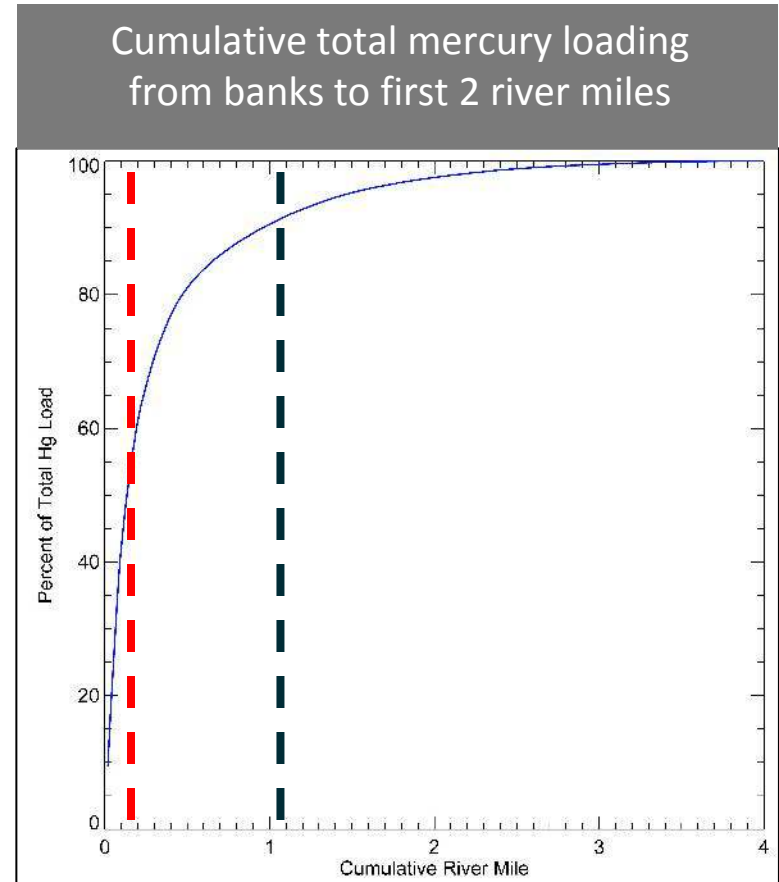
- Phase 1A
 - City of Waynesboro-owned bank management areas (BMAs) in upper 2 miles
 - Pre-design data collection
 - Ongoing discussions with City of Waynesboro on remedy scope
- Phase 1B
 - Non-City owned BMAs in upper 2 miles
 - Remedy scope informed by outcome of Phase 1A

Roughly 90% of total mercury load to first 2 river miles attributable to 25% of banks

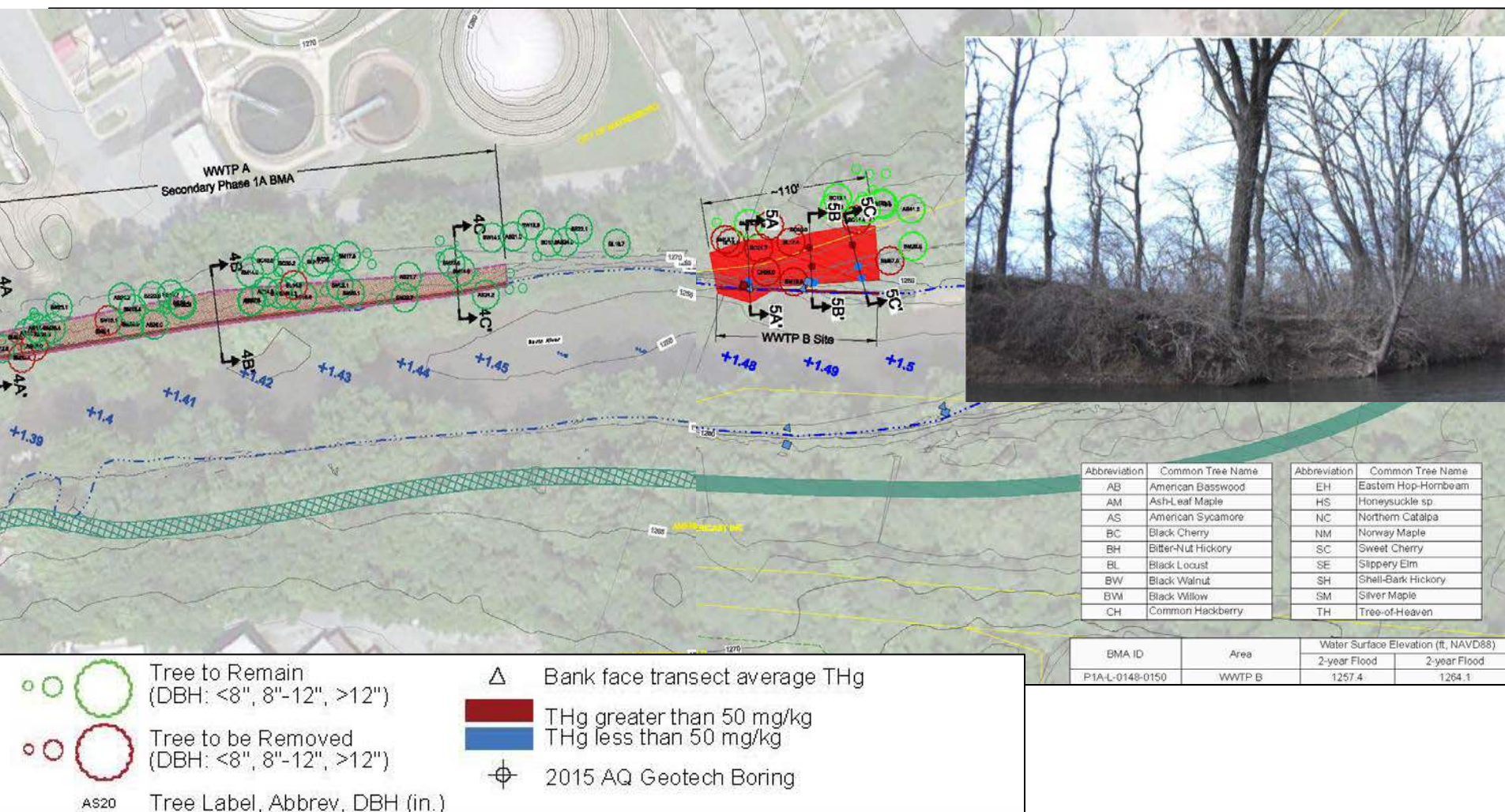


BMA Remedies Based on Mercury Loading

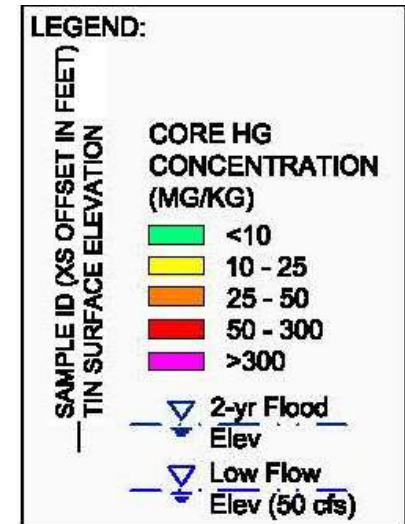
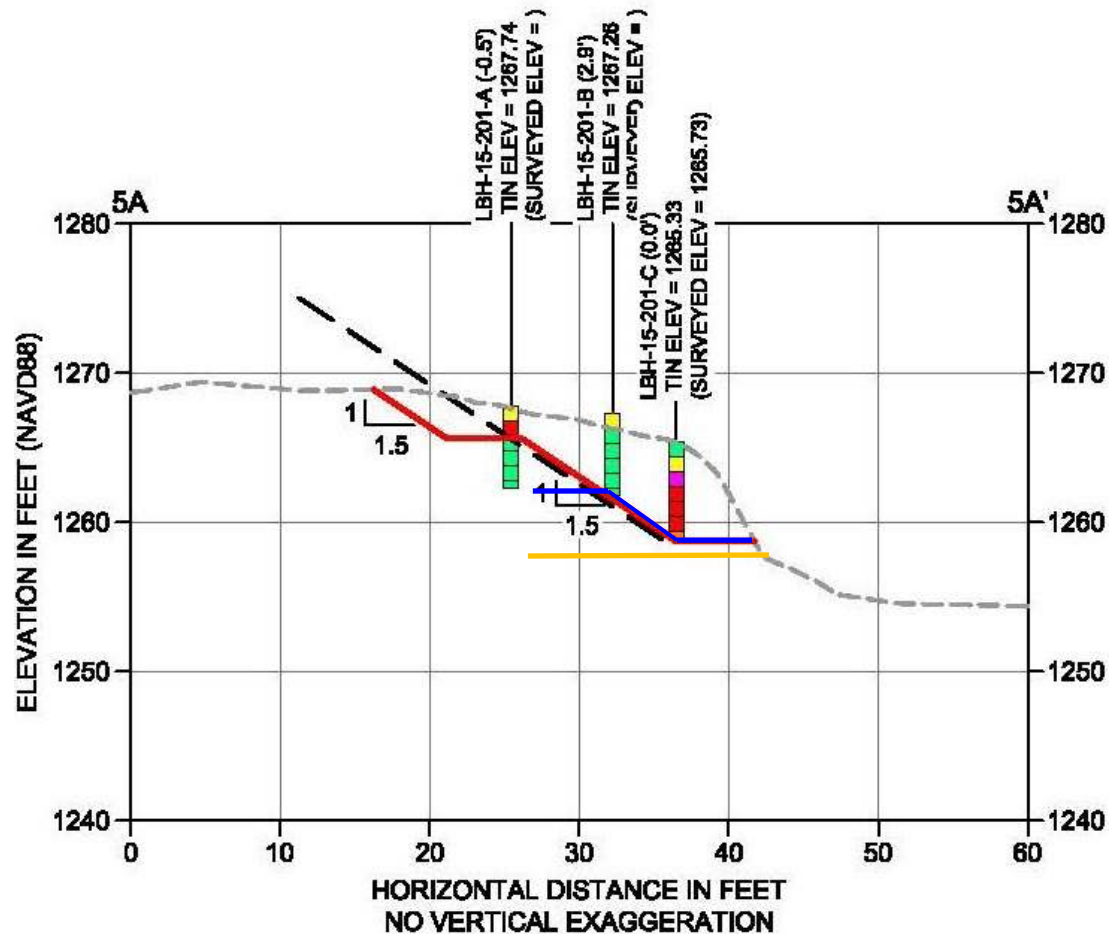
- Primary BMAs
 - Approximately 5% of banks represent roughly 50% of total Hg loading from banks
 - Localized removal and replanting
- Secondary BMAs
 - Approximately 20% of banks represent roughly 40% of total Hg loading from banks (i.e., 90% from Primary + Secondary)
 - Enhanced vegetative stabilization



WWTP BMA Remediation Areas

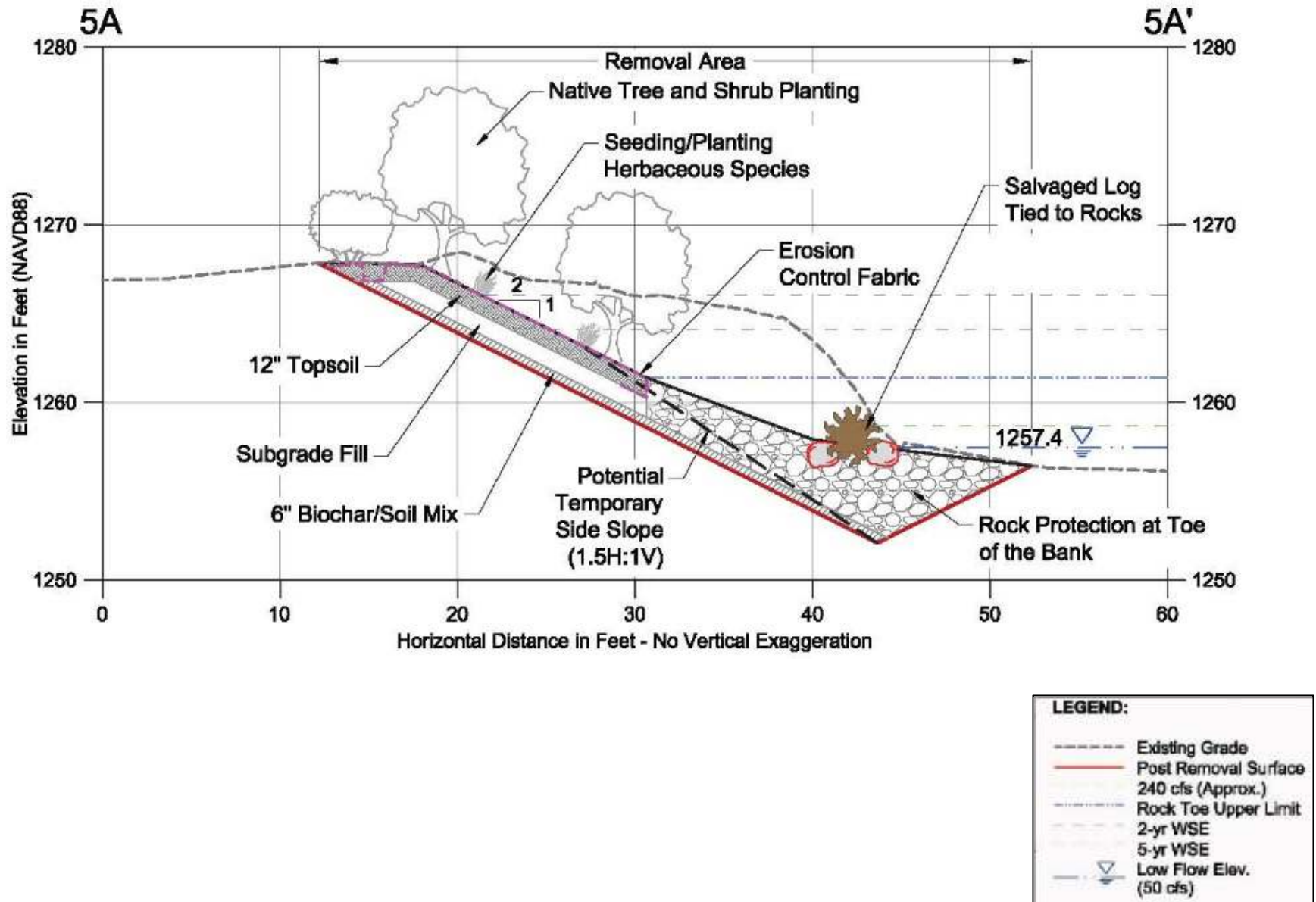


WWTP Primary BMA Removal Section

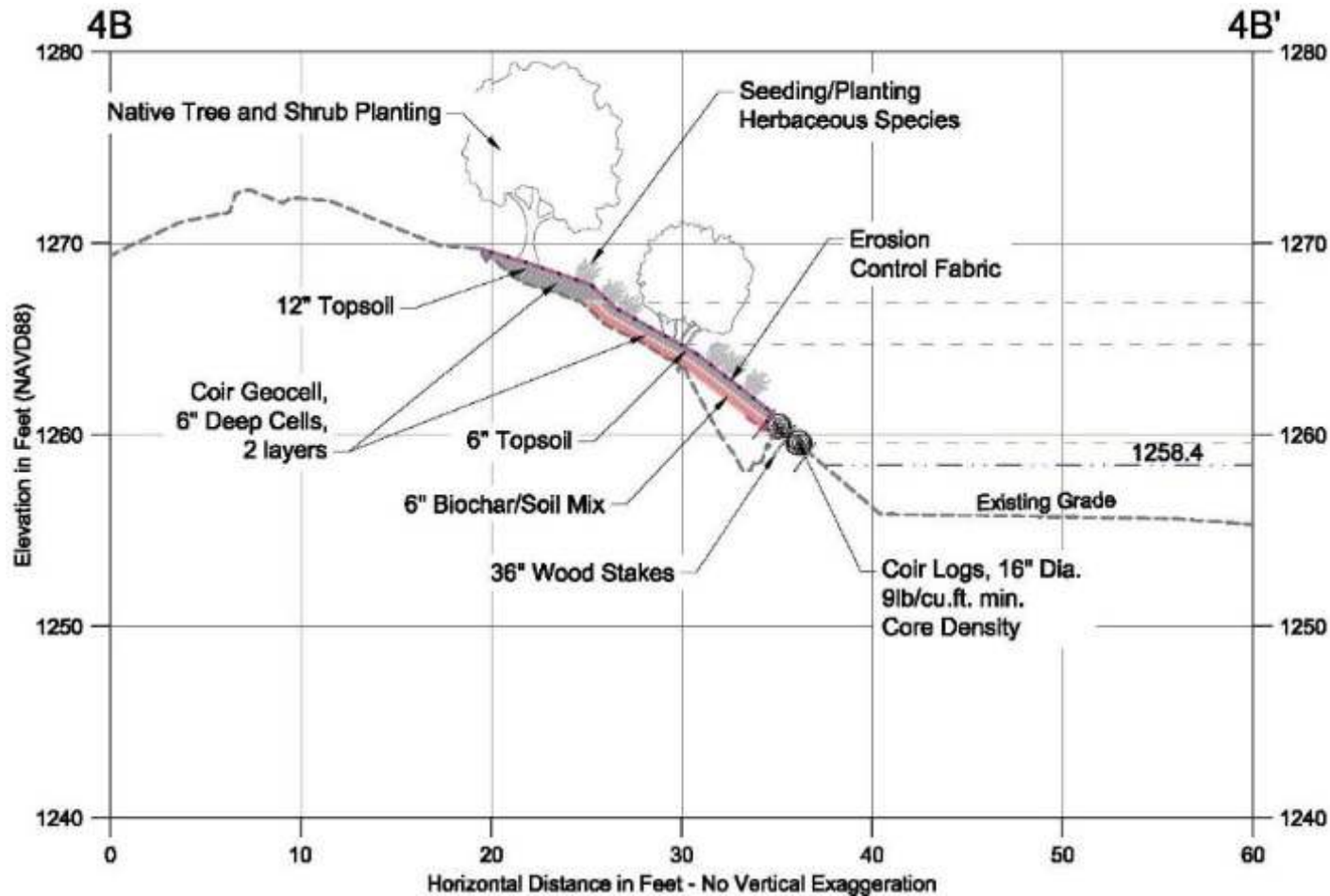


- Gravel Bed ———
- Bedrock ———

WWTP Primary BMA Restoration Section



WWTP Secondary BMA Section



LEGEND:

- Existing Grade
- 240 cfs (Approx.)
- 2-yr WSE
- 5-yr WSE
- Low Flow Elev. (50 cfs)

Discussion

1. Anchor QEA and Dupont are continuing to work with stakeholders to balance remediation and habitat concerns
2. What methods will be used to avoid release of bank soils to the river during construction?
3. How will biochar be incorporated into the vegetative stabilization designs? and will it be effective?

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6. Characterization /Treatment of Sediment / Soil (Carol Ptacek, Waterloo)

Objective: Characterize the leaching behavior of SR soil and sediment and test treatments that can be utilized in the South River.

- ROPs Updates: Jul, Oct, Dec?

7. Aquanty HydroGeoSphere Modeling (Steve Berg, Aquanty)

Objective: Estimate the post-storm volume of bank face seepage and GW flow to assist in bank stabilization design

- ROPs Updates: Feb, May, Oct**

8. Pore Water Measurements (Danny Reible, Texas Tech)

Objective: Further explore use of the DGT probes and voltammetry to increase understanding of the bioavailable pool of mercury (methylmercury production) and geochemical processes in the South River.

- ROPs Updates: Oct or Dec

9. Stable Isotope Analysis (Joel Blum, U Michigan)

Objective: Explore stable Hg isotopes as a tool for forensics and Hg fate and transport

- ROPs Updates: Feb, Jul, Dec

Discussion

1. Suggestions for October meeting
 - Presentation of new data
 - Any particular projects of interest
 - Relevant discussion topics