The New Normal: Planning for Sediment Project Water Management Considering Climate Change

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Background/Objectives. Many remediation projects occur in urbanized areas where rain storms can cause significant surface runoff in short periods of time. In recent decades, frequency or intensity of extreme weather has increased, making it more difficult to predict the size of rainstorms one could expect during a remediation project. This presentation will outline design methodology and highlight challenges and lessons learned from a recent large remediation project which involved sediment removal via excavation “in the dry” from a tidally influenced urban creek, followed by stream reconstruction and restoration.

Approach/Activities. The site in the mid-Atlantic region includes an upland stream, tidal and non-tidal wetlands, and a tidal creek. Sediment impacted with PCBs, PAHs and metals was removed from the upland stream and tidal creek via excavation. A bypass pump-around system consisting of diesel pumps, 24-inch HDPE bypass piping, sandbag dams and a bladder dam were used to create dry working conditions needed for sediment removal by excavation. Per regulatory requirements, dam heights were designed for the 24-hour, 2-year flow event with 1-foot freeboard. Pumping equipment was over-designed to handle the 24-hour, 10-year flow event, which as a safety factor was more conservative than the 2-year requirement. Upstream water was pumped around the work area, without treatment, and discharged downstream. Per regulatory requirements, potentially contaminated contact water that accumulated within the work area was treated using a water treatment system and then discharged downstream under a NPDES permit.

The design and additional conservative steps taken proved insufficient to prevent overtopping of the dams during the multiple large storm events encountered during the project. Consequences included schedule delays due to inundation of the work area, overwhelming of the water treatment system due to the need to treat significantly more contact water than planned for, and release of untreated contact water downstream of the work area. Corrective actions included construction of additional dams and impoundments, reduction of active excavation areas and optimization of the excavation water treatment system. These corrective actions were sufficient for completion of the excavation and subsequent restoration efforts. Following excavation of creek sections, the creek was reconstructed and then restored. Restoration included floodplain reconstruction, wetlands restoration, development of emergent wetlands, slope stabilization and restoration of submerged aquatic vegetation. As with excavation, much of the creek reconstruction and restoration required dry conditions for completion of the work.

Results/Lessons Learned. Multiple dam over-toppings and inundation of the work area occurred during the project due to a 24-hour storm event that approached a 25-year storm and due to multiple short duration (1-hour and 2-hour) high intensity storm events. The design, based on regulatory requirements, was not sufficient for storm events encountered during the construction period. Despite the challenges encountered, the construction was successfully completed. This presentation will outline the approach and process of more conservatively planning for and performing sediment remediation via excavation in the dry through lessons learned during implementation of the project.