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ANCHOR QEA

Memorandum

May 7, 2019

To: Gary Baumgarten, USEPA

From: John Laplante, PE, Anchor QEA

cc: Judy Armour, McGinnes Industrial Maintenance Corporation
Philip Slowiak, International Paper Company
Mitchell Blanchard, GHD

Re: Geotechnical Review of Submerged Northwest Slope Enhancements
San Jacinto River Waste Pits Time Critical Removal Action

5-7-19

STATE OF TEXAS
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Background

This memorandum provides Anchor QEA's geotechnical evaluation of proposed submerged slope enhancements to be constructed on the Time Critical Removal Action (TCRA) armored cap that was constructed for the San Jacinto River Waste Pits Superfund site (SJRWP).

International Paper Company and McGinnes Industrial Maintenance Corporation, collectively the Respondents for the SJRWP, have proposed to enhance the northwestern submerged slope that connects the western cell and the northwestern area of the TCRA armored cap. This enhancement will entail placement of articulated concrete block mat (ACBM) on the slope and anchoring the ACBM with additional armor rock on the shelf above the submerged slope.

On behalf of the Respondents, Anchor QEA presented a work plan to the U.S. Environmental Protection Agency (USEPA) on March 28, 2019, that describes the proposed enhancement. USEPA requested a geotechnical evaluation of the proposed work during a teleconference with Anchor QEA on April 25, 2019.

This memorandum presents the geotechnical evaluation.

Geotechnical Evaluation and Recommendations

Geotechnical shear strength data were collected during pre-design investigations for the TCRA, and more recently in preparation for placing additional armor rock on the shelf above the submerged northwestern slope. These data were collected using an in situ vane shear test device under the maintenance work plan approved by USEPA on July 12, 2018. The same data were used for the current geotechnical evaluation.

The slope enhancement entails placing a 6-inch-thick ACBM cast-in-place armor mat on the slope and anchoring the ACBM with a 10-foot-wide band of armor rock on the shelf above the slope. This

armor rock will be placed to a thickness of 1.5 feet. The ACBM will include a geotextile underlayment that is positively connected to the empty ACBM forms before the concrete grout is pumped into the form.

Anchor QEA conducted a limit-equilibrium slope stability evaluation for the short-term (during construction) and long-term (post-construction) condition. For short short-term slope stability, a factor of safety of at least 1.3 is a typical design target. For long-term slope stability, a factor of safety of at least 1.5 is a typical design target. Factors of safety less than 1.0 imply that some movement or displacement of material could occur.

The short-term evaluation included construction surcharge loads. The long-term evaluation assumed some strength gain in the upper 3 feet of subgrade materials due to the loads applied by the ACBM and armor rock.

Results

The modeling software Slide 2018 was used for the limit-equilibrium evaluation. Both low-water and high-water conditions were modeled. The software code uses an optimized search routine that considers circular and non-circular surfaces to identify the surface with the lowest factor of safety. This includes surfaces passing through the top of the slope, through the face of the slope, and below the toe of the slope. Factors of safety were calculated using Spencer's method, which satisfies both force and moment equilibrium.

Based on this evaluation, the short-term factor of safety exceeds the target 1.3, and long-term factor of safety exceeds the target 1.5 for all conditions modeled.

Recommendations

To limit the potential for displacement of the existing cap near the top of the slope, Anchor QEA recommends that armor rock not extend down the slope. In addition, Anchor QEA recommends that construction surcharge loads be maintained at least 10 feet from the edge of the shelf and the construction equipment be staged on mats or similar load-spreading materials. The work plan prepared by GHD is consistent with these recommendations.