

**Work Plan No. A.09-01– TBT Internal Retrofit: Seismic Re-Analyses - Slope movement**

**2.2.1 PHASE 2A: Additional analyses**

The additional scope of work in Phase 2A is associated with completing the longitudinal (along the tube) slope stability analyses and providing input to SCS for global analyses. The additional scope also assumes 2 peer review meetings and incremental reporting. Specifically, the scope will include:

- Performing two-dimensional slope stability analyses in the Tube longitudinal direction using the 11 project ground motions and preparing input for the global analyses. Note that much of the longitudinal slope stability analyses has been performed using previously authorized budget that was remaining after completion of the originally authorized scope. Hence, the effort requested here is incremental and estimated needed to complete the longitudinal analyses. In addition to the baseline stratigraphy and properties (covered under the originally authorized budget) two additional sets of analyses will be conducted to explore sensitivity of the estimated displacements on different reasonable interpretations of the ground conditions as follows: a) sensitivity on the relative density of the Young Bay Sand unit, b) sensitivity on extend of the Young Bay Sand unit.
- Review of the lower bound and upper bound soil springs previously developed by Fugro and currently used in the global analyses and comment on the need for refinement or update in order to eliminate any potential conservatism. This review does not include development of updated springs. Its purpose is to explore whether any changes are needed in how the soil springs are defined for the global analyses.
- Providing geotechnical input to develop an approximate hazard curve on leakage. The subtasks for this item include: a) scaling three motions to rock uniform hazard spectra developed for two additional return periods (e.g., 475 and 2475 year return periods), b) perform longitudinal analyses in Zone 3 for one set of properties and for the six new ground motions. The displacement time histories for these analyses will be provided to SC Solutions to propagate through the global tube model to estimate axial tube strains and ultimately leakage (50 hours).
- Additional effort (incremental) for reporting associated with the tasks above (88 hours).
- Two additional peer review meetings (assume 4-hours per meeting with 4 Fugro staff attending) and limited effort to respond to new comments from the peer review panel (24 hours for meetings and 40 hours to address comments following first meeting and 100 hours to address comments following the second meeting and the meeting already planned in Phase 2b)
- Additional weekly progress meetings with the analyses team and BART (15 more weekly meetings as of January 29th and through the week of May 10) (64 hours)

**Prime: AECOM**

<b>Subconsultant</b>	<b>Amount</b>	<b>DBE (Y/N)</b>	<b>SBE (Y/N)</b>
SC Solutions	\$88,225	N	N
Fugro	\$216,594	N	N

**Total Work Plan Value: \$332,737**