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Ms Claire Marie Turner  
MBK Engineers  
455 University Avenue, Suite 100  
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**Subject: Review of Western Pacific Interceptor Canal 65 and 90 Percent Design Packages**

Dear Ms. Turner:

At your request in your letters dated January 30, 2015 and August 7, 2015, the Independent Expert Panel (Panel) reviewed the Western Pacific Interceptor Canal (WPIC) 65 and 90 Percent Design Packages, placed our comments on the Excel spread sheets (that you included with your letters) and e-mailed back our review comments. Prior to your issue of these two packages, the Panel had reviewed the following documents:

- *Technical Memorandum on 200-Year Design Water Surface Elevations in the Western Pacific Interceptor Canal*, by MBK dated May 14, 2014, reviewed by the panel in Spring 2014
- *Geotechnical Data Report, Western Pacific Interceptor Canal West Levee and Bear River North Levee, 200-Year Urban Levee Compliance*, by HDR Inc. dated May 30, 2014, reviewed by the panel in Spring 2014
- *Draft Geotechnical Alternatives Analysis, 200-Year Urban Levee Criteria Compliance Determination*, by HDR Inc. dated August 6, 2014, reviewed by the Panel in Fall 2014, comments provided in its letter dated November 17, 2014.
- *Draft Geotechnical Basis of Design, 200-Year Urban Levee Criteria Compliance Determination*, dated December 10, 2014, reviewed by the Panel in December 2014, and comments provided in its letter dated in January 19, 2015.

In your letter of August 7, 2015, that accompanied the 90 percent design package, you requested that the Panel respond to the seven questions listed below. The Panel had provided responses to questions 1 through 5 in its review letter dated November 17, 2014, of the Draft Geotechnical Alternatives Report. In its review letter dated January 19, 2015, of the Draft Geotechnical Basis of Design Report, the Panel provided responses to the same set of seven questions posed below.

The Panel notes that Section 6.0 of the Basis of Design Report that accompanied the 90 percent design package indicates that “Engineering designs completed for the 90% submittal are based on direction from TRLIA staff and recommendations cited in the Geotechnical Basis of Design Report.” Thus comments provided by the Panel and responses to questions included its letter to TRLIA dated January 19, 2015 are relevant to the 90 percent design package.

In the following we reiterate and update our earlier responses, based on our review comments on the 65 and 90 percent design packages (already transmitted to you earlier in Excel spreadsheets format) and assuming satisfactory resolution of our comments on the 90 percent design package.

1. Do existing technical analyses and evaluations use appropriate models and techniques?

The Panel has concluded that analyses and evaluations presented by the design team have used reasonable and appropriate models and are consistent with criteria and guidelines of the California Department of Water Resources (DWR) Urban Levee Design Criteria (ULDC, dated May 2012).

2. Do existing technical analyses and evaluations use appropriate assumptions?

Seepage and stability analyses for the various reaches were based on profiles developed using field investigations at the various reaches, and the Panel considers the assumptions used in developing these profiles reasonable and appropriate. Parameters used in the analyses were developed based laboratory testing of levee embankments and foundation soils, as well as parameters based on published materials for similar soils and from other similar projects in the vicinity. In addition, the hydraulic model with its associated data, assumptions and parameter inputs reflecting these assumptions are appropriate and relevant to this project.

3. Is the quality and quantity of the surveys, investigations, and engineering for the design sufficient to support the models and assumptions made for determining the hazards?

The amount of geotechnical investigations and engineering analyses presented to support the design of the proposed remediation measures appear adequate and reasonable. At certain instances where the results of analyses provided design values that were close to acceptable criteria, sensitivity analyses were performed to provide better confidence in the results of the analyses. The hydraulic model used to provide water surface elevations had appropriate levels of conservatism to assure realistic results without being over-conservative.

4. Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?

The analyses presented support the designed remediation measures. A section of the Alternatives Analysis report was devoted to a comparison of the results of the TRLIA Design Team with analyses performed for DWR's Urban Levee Evaluations (ULE) project. The basis for the similarities and differences between the current TRLIA design studies and the ULE results at similar reaches were presented and explained. The Panel understands that the TRLIA Design Team met with DWR's ULE team to resolve any outstanding differences between the two studies, and implemented conservative design measures to address differences in the results of the analyses. The use of conservative parameters and sensitivity analyses to support the design are judged to be reasonable measures to address uncertainty.

5. Do the project features adequately address redundancy, resiliency, or robustness with an emphasis on interfaces between structures, materials, members, and project phases?

The remediation features selected by the TRLIA Design Team include soil-cement-bentonite and soil-bentonite cutoff walls to address potential through seepage concerns; seepage "drain" berms to collect and contain seepage at the toe of the levee; a stability berm to address potential slope stability concerns, with overlap between the berm and cutoff walls. The following features were stated in the Basis of Design Report to provide resiliency and robustness:

- The station limits defining the extent of retrofits, were extended 100 feet upstream and downstream for every remediation for the purposes of redundancy with other levee features.
- The cutoff wall elevations have been revised to reflect a conversion from NGVD29 to NAVD88 of +2.3 feet.
- The drained berm was extended through Reach 4C based on DWR review comments.
- The drained berm is approximately 2 feet thick but varies in order to provide proper grades along the access road. The sand layer is 1 foot thick in all locations.

- The hydraulic model water surface elevations were increased per ULDC requirements for design purposes, thus adding additional robustness to the project.

6. From a public safety perspective, is the proposed alternative reasonably appropriate or are there other alternatives that should be considered?

The several alternatives proposed in the design levee improvements are judged reasonable and appropriate.

7. Do the project features and/or components effectively work as a system?

The proposed remediation components are, in our judgement, designed to work effectively as a system.

Respectfully submitted,



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Member of the Panel



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