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November 17, 2008
File No. 82142

MARINA COAST WATER DISTRICT
2840 4th Avenue
Marina, California 93933

ATTENTION: Mr. James Derbin

SUBJECT: Geotechnical Review and Supplemental Geotechnical Recommendations for the Proposed D Zone Welded Steel Water Storage Tank, Marina Coast Water District in Marina, California

Dear Mr. Derbin:

As requested, we have performed a review and evaluation of the existing geotechnical and seismic reports for the project, and are providing our recommended modifications to our original geotechnical recommendations for the project. The proposed above grade flat-bottom welded steel water storage tank will be designed in accordance with American Water Works Association (AWWA) guidelines per current AWWA D-100-05.

Previous reports for the site include our geotechnical investigation report entitled, *"Revised Geotechnical Investigation Report Proposed East Garrison 'B' Zone Tanks, 'D' Zone Reservoirs, 'E' Zone Hydropneumatic Pump Station, and Transmission Mains Marina Coast Water District Marina, California,"* dated December 6, 2005, Project Number 59012, and our seismic hazard evaluation entitled, *"Seismic Hazard Evaluation Proposed Marina Coast Water District Tanks Monterey County, California,"* dated September 30, 2005, Project Number 59012.

Additional work at the site included earthwork observation and compaction testing performed from March 19, 2007 through February 8, 2008. Earthwork observation and testing was for construction of the keyway and backfill for the north slope, installation of the geogrid within the north fill slope, backfilling of the utility and storm drain trenches, construction of the pump station and pump house, grading for a portion of the new reservoir pad (to the west of the existing raised tank), and the installation of utility vaults. We provided observation and testing of the work, which mainly occurred to the north and west of, and on the western portions of, the tank location. Our observations are documented in Daily Field Reports which were submitted to the District during construction.

PROJECT DESCRIPTION

The current project consists of the construction of a 2.0 million gallon above grade flat-bottom welded steel water storage tank to be located at the "D" Zone. Zone "D" is located northwest of the intersection of Eucalyptus Cutoff and Eucalyptus Road within the former Ford Ord in Monterey, California. The tank is to be located in the eastern portion of the pad. The tank is to be an on-grade tank with a diameter of about 114 feet, and a height of about 27 feet. The typical foundation for this type of tank is a center interior column supported on a shallow footing, and a ring footing around the perimeter of the tank. The needed bearing pressures of the interior and ring footings are 2,300 and 3,000 pounds per square foot (psf), respectively. The bottom of the tank will have a finish elevation of about 481 feet based on the civil plans for the project. The tank is to be located about 20 feet laterally south of an approximate 20-foot high downward (below pad) slope with an inclination of 2:1 (horizontal to vertical). An approximate raised berm will be constructed to the east of the tank, and will be about 4 feet high.

PRIMARY GEOTECHNICAL CONSIDERATION

Based on the review of the planned project, and the results of our geotechnical investigation of December 6, 2005, the primary geotechnical considerations for the new water storage tank include: 1) the removal of the deleterious material resulting from the demolition of the existing tank; 2) removal and recompaction of loose sands that were encountered to a depth of approximately 15 feet below existing grade; and 3) stability of the fill slope to the north due to the weight of the tank.

We previously performed a slope stability analysis for the site in our December 6, 2005 investigation report. We also performed a slope stability analysis for the geogrid reinforced northern slope at the site. Based on these previous analyses, the minimum factors of safety for slope instability is 1.8 and 1.1 for static and seismic conditions, respectively. These values are greater than the typical minimum standard of care for factors of safety, and therefore the relationship of the tank to the slope is acceptable.

The recommendations presented in our December 6, 2005 report are applicable to this current project, with supplemental recommendations presented below. We have attached a copy of our December 6, 2005 report.

SUPPLEMENTAL RECOMMENDATIONS

Excavations and Backfill

The total depth of excavations for the proposed "D" Zone above grade water storage tank should extend at least 15 feet below existing grade to establish a firm subgrade. Deeper excavations may be needed for the removal of the foundations of the existing elevated steel tank. The excavation should extend horizontally at least 15 feet beyond

the proposed water storage tank perimeter. The excavation bottom should be properly prepared and can be raised to the design grade with engineered fill in accordance with our referenced geotechnical investigation report. The berm to the east of the tank site should not be constructed until the backfill of the overexcavation is completed. Note also that utility trenches should not be excavated through the geogrid reinforced portions of the northern slope.

Previous work performed at the site as documented in our daily field reports, included subgrade preparation and backfilling with engineered fill on the western portion of the proposed water storage tank pad, and construction of the northern fill slope and geogrid reinforcement. The remainder of the new water storage tank pad, including the area of the existing raised water tank, will require subexcavation, subgrade preparation and backfilling with engineered fill. Kleinfelder should check the horizontal limits and condition of the previously backfilled portion of the pad. The previously prepared portion of the pad, already meeting our recommendations, will not require additional preparation unless changed conditions are discovered during our site evaluation.

After demolition and removal of the existing raised water storage tank, the remaining areas of the proposed water storage tank pad will require subexcavation of the loose sands to a depth of approximately 15 feet below existing grade, scarification, moisture conditioning and compaction of the exposed subgrade, and then backfilling of the excavation to finished tank subgrade elevation with engineered fill as recommended in our original report. On-site sandy soils are suitable for use as engineered fill. Import fills should meet the recommendations in our referenced geotechnical report.

Excavations should be readily made with conventional excavation equipment, such as a backhoe or an excavator. Excavations should be constructed in accordance with OSHA and CAL-OSHA Safety Standards and local jurisdiction. The sides of the excavations may be constructed vertical or at a slope if sufficient area is available. Vertical temporary construction slopes must be properly shored and/or braced for stability and personnel protection. The recommendations for lateral pressures for shoring design presented in our original report are applicable to the new construction. Soils should be classified as Type C soils per OSHA Excavation Standards for determining non-vertical sloped excavations. Excavations should be located so that no existing structures are located above a plane projected 1½:1 (horizontal:vertical) upward from any point in the excavation, regardless of whether the trenches are shored or not. Safety in and around excavations is the responsibility of the underground contractors. Groundwater was not encountered during our subsurface exploration to a depth of 100 feet below existing grade; therefore, we do not anticipate that groundwater will be encountered at this site and the need for dewatering is not expected.

Foundations

New foundations for the proposed steel water storage tank will consist of a perimeter rig footing requiring an allowable soil bearing pressure of 3,000 pounds per square foot (including the weight of water) and interior column loads of 2,300 pounds per square foot (exclusive of the weight of water). Pressure on the subgrade due to water weight will be up to approximately 1700 pounds per square foot. These pressures are acceptable to the site, and can be increased by one-third for seismic purposes. The footings should be supported in engineered fill, should have a minimum width of 18 inches, and should be embedded at least 18 inches below lowest interior finished grade (top of interior tank slab-on-grade) or lowest adjacent exterior finished grade, whichever provides a deeper embedment.

Details of the interior column foundations were not made available to us at the time this letter was prepared. Depending on the final design, the interior column foundations may be supported on the interior tank floor, or the interior column foundations may be supported on the subgrade soils below the tank floor. Where the interior column foundations are supported on the interior tank floor, we assume that the tank floor will be underlain by a combined thickness of 15 inches of aggregate base and oiled sand (see section on "Tank Support" herein). In this case, the interior column footings should have a minimum dimension of 36 inches, and the aggregate base compacted to a minimum of 95 percent of ASTM D-1557. Where the interior column foundations are supported on the subgrade soils below the tank floor, the footings should have a minimum dimension of 24 inches and a minimum embedment of 12 inches below the bottom of the aggregate base.

Lateral Resistance

For the proposed water storage tank, an allowable coefficient of friction of 0.40 may be used between the supporting subgrade and the bottom of the perimeter and column foundations. For calculating passive resistance, an allowable equivalent fluid weight of 300 pounds per cubic foot may be assumed acting against the embedded face of the foundations.

Tank Support

For the proposed water storage tank, the originally proposed PVC liner has been eliminated, and the contractor is proposing to place an unspecified geotextile fabric under 12" of aggregate base, and 3" of oiled sand. We should evaluate the substituted material for acceptable coefficient of friction between the geotextile fabric and the aggregate base.

AWWA D100-05 Seismic

As part of our previous investigation, we performed a seismic hazard evaluation, the results of which are presented in our September 30, 2005 report. Based on the information provided to us, we understand that the seismic design for the proposed flat-bottom welded steel water storage tank will be based on American Water Works Association (AWWA) D100-05 standards for welded steel tanks. For the project site the Site Classification is D which is defined as a soil profile consisting of "stiff soil" with a shear wave velocity of 600 to 1,200 ft/s or an SPT N value of 15 to 50, or an undrained shear strength (Su) of 1,000 to 2,000 psf for the upper 100 feet. Based on Figure 7 of AWWA D100-05 titled "Mapped maximum considered earthquake spectral response acceleration, 5 percent damped, at 0.2-sec period S_S for Site Class B for Region 1," and Figure 8 titled "Mapped maximum considered earthquake spectral response acceleration, 5 percent damped, at 1-sec period S_1 for Site Class B for Region 1", the mapped values of S_S and S_1 are 1.283g and 0.555g respectively. The values for the short period site coefficient Fa, and long-period site coefficient Fv are 1.00 and 1.50, from Tables 26 and 27 of AWWA D100-05, respectively.

LIMITATIONS

The limitations presented in our geotechnical investigation report dated December 6, 2005 and our seismic hazard report dated September 30, 2005 is applicable to this letter. This letter should be only used in conjunction with the above referenced reports.

Additional Items

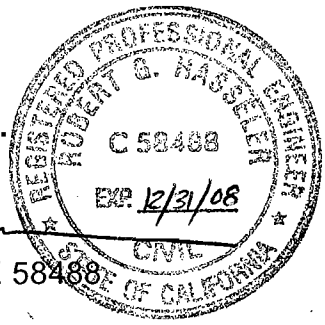
As noted in our report, Kleinfelder should be commissioned to review project plans and specifications before the start of construction, and to observe and test during earthwork and foundation construction. This will allow us to compare conditions exposed during construction with those encountered during our investigation and to present supplemental recommendations if warranted by different site conditions.

CLOSURE

If you have any questions regarding the information or recommendations presented in our report, please contact us at (831) 755-7900.

Sincerely,

KLEINFELDER WEST, INC.



Robert G. Hasseler, CE 58488
Project Engineer

REVIEWED BY:

FOR

Michael Majchrzak, PE, GE 555
Principal Geotechnical Engineer

cc: Addressee (6)

Attachment: December 6, 2005 Geotechnical Report