TETRA TECH

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December 22, 2008

Project Number G00632

Mr. Robert Lim, Remedial Project Manager
USEPA Region I
1 Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

Mr. Paul Kulpa, Project Manager
Office of Waste Management
Rhode Island Department of Environmental Management
235 Promenade St.
Providence, Rhode Island 02908-5767

Reference: CLEAN Contract No. N62472-03-D-0057
Contract Task Order (CTO) No. 065

Subject: Submittal for 100% Design
Replacement Stone Revetment at Old Fire Fighting Training Area (Site 09)
Naval Station Newport, Newport, Rhode Island

Dear Mr. Lim, Mr. Kulpa:

Enclosed for your records are two (2) copies of the completed 100% design submittal for the Replacement Stone Revetment at the Old Fire Fighting Training Area (OFFTA) at Naval Station Newport.

Also enclosed for your records is a summary of the resolution to comments on the 90% submittal that were agreed to during the conference call held December 9, 2008.

This submittal is being transmitted as both paper copy and Adobe® portable document format (PDF) on disk as requested.

Should you have any questions or comments please feel free to contact me at 978-474-8434.

Very truly yours,

Stephen S. Parker, LSP
Senior Project Manager

Enclosures

c: K. Anderson, CRMC (w/encl. – 1)
G. Kemp, Gannett Fleming (w/encl. – 1)
K. Finkelstein, NOAA (w/encl. – 1)
G. Glenn, TtNUS (w/o encl.)
W. Johnson, NAVFAC (w/encl. – 2)
C. Mueller, NAVFAC (w/encl. – 2)
File G00632-3.2 (w/o encl.)/G00632-8.0 (w/encl. - 1)
S. Parker, TtNUS (w/ encl. - 2)
T. Sword, Agviq (w/encl. – 2)
J. Trepanowski, TtNUS (w/o encl.)
D. Witt, TtNUS (w/encl. - 1)
AR – c/o G. Wagner, TtNUS (w/encl. – 1)

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Summary of Resolutions to US EPA Comments
On the Responses to Comments on the 90% Revetment Design
For the Old Fire Fighting Training Area, Naval Station Newport, Newport Rhode Island
As discussed during the December 9, 2008 conference call

The conference call was held on December 9, 2008 at 2 pm. The call was attended by the following people:

Winoma Johnson, Navy RPM
Robert Lim, USEPA RPM
Greg Kemp, USEPA Technical Reviewer, Gannett Fleming
Jim Forelli, Tetra Tech
Tim Smith, Tetra Tech
Dan Witt, Tetra Tech

The comments on the response to comments on the 90% revetment design were discussed in order of the comments starting from the beginning. Each comment is listed below followed by the resolution to the comment.

1. p. 4-6, §4.2.1: The information presented in the table in this text section reflects the initial calculations and is not consistent with the final gradation tables presented on page 4 of 6 of the Revetment Stone Gradation calculations in Appendix D. Please edit this table to present the final gradation requirements, which are more critical than the initial sizing calculations. It is recognized that the appendix calculations should remain as is to document the design process but the information in the text should be consistent with the specifications and explain the adjustment made for consistency and clarity.

Resolution: TtNUS will revise the table in the text to present the same data as in specification.

Note that there is an inconsistency with the stone specified in Section 353119, ¶2.2: a range for the D50 diameters should also be provided because the weight and specific gravity ranges are not consistent with the single diameters presented. As Navy has indicated, it is the weight that is the primary design factor. This needs to be corrected. The specific gravity range specified is appropriate for granite (although the Coastal Resources Management Council requires a minimum specific gravity of 2.64) and the weight ranges were established by the calculations; therefore the diameter should be flexible to fit within the specified specific gravity and weight restrictions.

Resolution: The weight ranges determined in the gradation calculations will be added to the specifications.

2. p. 4-11, §4.2.6: EPA will want to review the sampling methodology and decision rule before accepting the final design.

Resolution: TtNUS will provide the sampling decision rule and an outline of the confirmatory sampling in the 100% design. Any comments on the confirmatory sampling will be resolved during the development of the contractor's work plan.

6. Table 3-5: The response is accepted; however, please also make the appropriate edits to the analytical method in the specifications (Specification 31230000.0020, sect 1.6) - it is anticipated that EPA Method 8015B will be used rather than 418.1 and 8020 and that TPH (DRO+GRO) must be less than 50 ppm and GRO must be less than 1 ppm.

Resloution: The analytical methods will be changed in the specification as requested.

7c. Appendix B, § B, Drawing C-9: To avoid misunderstanding during construction a note should be added to this detail indicating that the culvert connection shown is not for construction and refer the reader to the culvert connection detail to be used for construction. If the concrete encasement is meant to penetrate the rip rap and geotextile it should be shown that way in the appropriate detail.

Resolution: The culvert connection shown on Section A-A' on Sheet C-9 will be shown farther to the right so that the connection does not intersect the geotextile underlying the revetment. This change will make the detail consistent with the plan sheet and eliminate any confusion with the geotextile.

9. Appendix D: a. Calculations – Project Datums:

1. Further review of the referenced drawings reveals that the DiOrio drawing in Appendix A, attachment A.4 and the design drawings in Appendix B use the same benchmark elevations (e.g., the elevation of Mark #5320 is 9.75 for each). Both sets of drawings are also based on Navy mean low water. However, because NGVD 1929 is 1.6 feet higher than Navy mean low water in the DiOrio drawing and 1.8 feet higher than Navy mean low water in the design drawings, the benchmark elevations should not be the same. Because DiOrio established these elevations it appears that the benchmark elevations in the design drawings should be revised. Please review and correct as appropriate.

Resolution: TtNUS will review the benchmark elevations listed on the project drawings and Diorio's drawing in Appendix A and correct the benchmark elevations as appropriate.

2. Also please confirm that the water table elevations observed in the monitoring wells and used to establish the water table elevations for design have been properly corrected based on the revised Navy mean low water elevation. To avoid future confusion, EPA would prefer that this discrepancy in the Navy mean low water between the DiOrio drawing and the design drawings be recognized in the revetment design document perhaps by adding a note to the title page for Appendix A, Attachment A.4.

Resolution: TtNUS will review the water table elevations and add a note to the title page to Appendix A, Attachment A.4 to document the discrepancy between the mean low water elevation used in the Diorio drawing and in the project drawings.

f. Veneer Stability of Riprap Revetment, OFFTA:

Regarding the two solutions to the quadratic equation, the response is not adequate. Because there are two positive real solutions, justification for arbitrarily choosing the greater one must be provided. 0.29 is also a viable solution and indicates an inadequate safety factor.

Resolution: TtNUS indicated that subsequent versions of the reference used for the equations to check the veneer stability only show the greater solution to the quadratic equation.

In addition, TtNUS indicated an infinite slope stability analysis (not taking into the account of the buttressing of the soils at the bottom) and therefore a more conservative analysis yielded a factor of safety well above the lesser solution to the quadratic equation. The infinite slope analysis is simple and can be solved directly without the quadratic equation. The infinite slope analysis results in a FS that is less that the FS generated by the greater solution but greater than the lower solution, therefore the greater solution is the correct

solution. EPA indicated that if the designer was comfortable with the using the greater result they would not comment further on this topic.

COMMENTS ON NEW ATTACHMENTS PROVIDED WITH NAVY'S RESPONSES:

1. Supplemental Global Stability with Construction Loads Calculations:

a. The Approach discussion states that "during construction" critical sections were analyzed; however, the Analysis discussion states that "end of construction" critical sections were analyzed. Review of the STABL program outputs provided indicates that the "during construction" critical sections were the ones evaluated. Please correct the inconsistency in the text.

Resolution: The Analysis discussion of the calculation will be corrected to state the 'during construction' critical sections were analyzed.

b. The Analysis discussion states that the factor of safety under the recommended surcharge load conditions is 1.1 which is identical to the factor of safety without consideration of a surcharge load for the eastern critical section. Therefore, it appears that the recommended surcharge load conditions do not significantly impact the global stability suggesting that it would not matter if a larger crane pad were used by the contractor. Therefore, the presumption that the portions of the slope not affected by the surcharge load would have a greater factor of safety would not necessarily to be correct.

Resolution: TtNUS will revise the text of the calculation to indicate that the surcharge load did not significantly impact the global stability of the slope for the eastern critical section. Because the surcharge load did not significantly impact the factor of safety, a larger crane pad would not increase the factor of safety in this case. In addition, areas of the eastern critical slope not affected by the surcharge load would not have a higher factor of safety than the surcharged area.

Furthermore, this is a borderline safety factor which also relies on effective dewatering along the bank and working face throughout the construction period and assumes that the subsurface materials have been adequately and correctly characterized. There is an inherent risk in working with a factor of safety this low. The design documents should make the risks and risk factors clear for the Contractor. The existing discussion in Sections 4.2.6 and 4.3 do not make this clear and appear only to discuss removal of water from the excavation.

Resolution: The Navy indicated that the construction contractor is already under contract to the Navy for this project and has been reviewing the design. The construction contractor is aware of the stability issues. In addition, the construction contractor is part of a joint venture with CH2M Hill who could advise the on stability issues during the planning and construction of this project.

TtNUS indicated that the Navy and TtNUS have discussed the dewatering requirements with the contractor and he is aware of the requirements and prepared to meet them. TtNUS agreed to add additional text to sections 4.2.6 and 4.3 to more clearly discuss the implications of the stability analysis and the limitations of the stability analysis.

c. Regarding the calculations on pages 4-5, several concerns were identified:

1. It is not apparent how this work would be conducted by the Contractor but it appears that it might be necessary to locate the excavator along the slope in order to conduct the work because

of the long reach required to operate only from the top of the bank. (A 1.5 CY bucket and soil load alone would weigh approximately 3 tons.) It is not apparent what impact this would have on the stability calculations if this were required. If the Contractor intends to do this, supporting stability calculations should be provided.

Resolution: TtNUS indicated that based on discussions with the contractor, the contractor intends on excavating from the top of the slope. TtNUS indicated that they would consider placing a restriction in the specifications that they contractor could not operate equipment on the cut face, however, upon further review this requirement will not be included in the specification because the contractor may be able to operate small equipment on the slope, which has not evaluated.

2. If excavation is conducted only from the top of the bank, the required reach (50 to 60 feet) would require that a much larger counter-weight be used to balance the overturning moment created by the weight of the excavator arm, bucket, and load. (A 1.5 CY bucket and soil load alone would weigh approximately 3 tons.) That requirement would apparently invalidate the Supplemental Global Stability calculations provided. Furthermore, the load distribution would likely shift even more to the front of the excavator depending on the counterweight used. If this issue is not addressed further in the design, it should be addressed in the Contractor's work plan.

Resolution: TtNUS indicated that based on discussions with the contractor that they intend on using a 60,000 lb excavator, however, TtNUS indicated that they looked at a 68,000 lb excavator to account for additional counter weight, longer boom and stick for the excavator, and soil in the bucket. TtNUS indicated that the factor of safety decreased by approximately 0.01 when using a 68,000 lb excavator versus and 60,000 excavator. The EPA indicated that as long as the designer was comfortable with the analysis they would not comment further on this issue.

3. In addition to the excavator surcharge load, dump trucks will presumably be loaded on and travel on the haul road. A 30 ton dump truck would have a loaded weight of over 100,000 pounds in addition to the surcharge due to the excavator. This condition should be considered and addressed in the global stability discussion and/or calculations. Limits on the truck capacity may be warranted.

Resolution: TtNUS indicated that they would show the haul road moved to 20 feet from the edge of the cut slope.

d. How practical is it to maintain the water table elevation at least one foot lower than the top of the excavation? Has an estimate of the groundwater dewatering requirements been made to evaluate this? How will the removed groundwater be managed?

Resolution: This issue was discussed with the contractor and he is aware of the requirements and is prepared to limit the size of the excavation and employ additional pumps to achieve the required water table elevation. The EPA indicated that the main purpose of this comment was to bring these difficulties to the Navy's attention to ensure that they were considered.

e. Is there any concern about failure of the seaward cut slope at mean high water conditions?

Resolution: TtNUS indicated that the contractor has experience with port-a-dams and is comfortable with the details as shown. It was also noted that the seaward cut slope dimensions were typical as provided from the port-a-dam vendor. The EPA indicated that the main purpose of this comment was to bring these difficulties to the Navy's attention to ensure that they were considered.

2. Supplemental Global Stability with Wave Loads Calculations:

a. As a point of consistency, it is noted that in these calculations and in the design wave calculations referenced (ref. 2) a mean high water (MWH) elevation of 4.03 was used and a mean low water (MLW) elevation of 0.5 was used. Both of these values are inconsistent with the correct values based on the adjustment to the Navy mean low water from 1.6 to 1.8 feet below NGVD 1929. The design plans use 4.22 for MHW and 0.76 for MLW. It is presumed that these corrections would not have a significant impact on the conclusions of this analysis. Please confirm.

Resolution: TtNUS indicated that the factors of safety for this analysis were all greater that 2.0 (ranging from 2.3 to 3.8) and that it was unlikely that this small elevation change will have a significant effect on the stability under the wave load conditions. TtNUS will confirm this and add a note in the calculation.