



**TETRA TECH**

C-NAVY-03-09-3087W

Project Number 112G00632

March 11, 2009

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Mr. Ken Anderson  
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Subject: Response to Comments,  
100% Design Report, Replacement Stone Revetment, Site 09  
Naval Station Newport, Newport RI

Dear Mr. Kulpa and Mr. Anderson:

On behalf of Ms. Winoma Johnson, NAVFAC, I am providing to you the Navy's response to comments from RIDEM and RICRMC letters dated 2/2/09 on the 100% design for the Replacement Stone Revetment, which is part of the interim removal action at Site 09, NAVSTA Newport. This material was originally transmitted via electronic mail on March 5, 2009.

If you have any questions, please do not hesitate to contact me at 978-474-8434.

Very truly yours,

Stephen S. Parker, LSP  
Project Manager

SSP/lh

Enclosures

c: J. Forrelli, TtNUS (w/encl.)  
W. Johnson, NAVFAC (2, w/encl.)  
R. Lim, USEPA, (2, w/enc.)  
C. Mueller, NAVSTA (2, w/encl.)  
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**Navy Response To RIDEM:  
Evaluation of Response to Comments on the**

**90% Submission**

**Stone Revetment Design  
and Comments on the**

**100 % Submission**

**Stone Revetment Design**

**Old Fire-Fighting Training Area**

**NETC**

**1. General Comment**

Installation of the revetment will entail the removal of contaminated soils. This will necessitate the submission of a sampling and analysis plan, a soil management plan, a storm water management plan and a dust control plan. The 90 % Design implies that these documents will be submitted as part of the contractor's preconstruction plans. Please be advised that these primary documents are subject to review and approval by the regulatory agencies. Therefore, please either submit these documents as part of the 90 % design for review and approval, or note in the 90 % Design they will be submitted as primary documents to the regulatory agencies for review and approval.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed.*

**1. General Comment**

The proposal calls for the installation of a stone revetment along an area of contaminated shoreline. Installation of the revetment in this area will not allow for subsequent remedial actions. Therefore, all soils above the Rhode Island Site Remediation Residential Direct Exposure Standards and contaminated sediments at and in the vicinity of the revetment must be removed prior to the installation of the revetment. In regards to the soils/sediments in the vicinity of the revetment the extent of the soils/sediments to be removed must be of sufficient width and depth, such that any subsequent removal action can occur without compromising the revetment and/or require the installation of sheet piling or other techniques to protect the revetment.

*RIDEM Evaluation of Navy Response:*

*The Navy acknowledges that there is a risk at the site in the sediments; however the source of the observed contamination is uncertain as it may be due to the storm drains. As noted in past correspondence the Office of Waste Management has a number of concerns with the Navy's position that the source of the contamination is the storm water drains. The recent investigations/removal*

actions conducted at the site has demonstrated that these concerns are well founded. Two oil water separators, which discharge onto the beach in the vicinity of the storm water drain were found. These structures, as well as the discharge pipes, still contained petroleum contaminated soils and sludges and they can account for the observed contamination in the sediments. Another source for the observed contamination on the beach is the heavily contaminated soils and free product which was found in test pits immediately adjacent to the beach and/or immediately adjacent to the storm water discharge pipes. Contaminants from these sources would either migrate directly onto the beach or preferentially through the soils around the discharge pipe and/or the pipe itself.

The forensic study was based upon the assumption that only marine diesel would have been used at the site. A review of the engineering plans and other historical sources of information found during the investigation revealed that the ship mark up contained a ship boiler, an aircraft hanger, etc. A variety of fuels would have been used at these locations. In addition, the engineering plans of the underground storage tanks were clearly labeled as oil and gasoline providing further evidence of the use of multiple fuels.

As it is clear that contamination from the site has affected soils beneath the site and the adjacent sediment and as contaminated soil which exceeds regulations is present in and immediately adjacent to the proposed location of the revetment, it is the Office of Waste Management's position that the Navy take the prudent course and remove all contaminated soils and sediments at and immediately adjacent to the revetment.

Navy Response 3/4/09:

The RIDEM request for removal of "all" contaminated soils / sediments has been discussed at length, and was the reason for the Tiger Team review and meeting held in 2006, which RIDEM attended. The Navy is following the recommendations that came out of that meeting. The purpose of the revetment is to provide a replacement shoreline protection system, which is an interim action to prevent erosion of soil into Coasters Harbor. The final remedial action, which may include LUCs, will be evaluated as a part of the FS. Therefore, the revetment design documents do not need to be revised based on this comment.

## 2. General Comment

The work plan notes that a Portadam will be installed during the installation of the stone revetment. A review of the proposed limits of excavation identified in the 90% Design report and the extent of sediment contamination exceeding PRGs identified in the Feasibility Study reveals that extending the excavation at certain locations, beyond that outlined in the 90% Design Report, but still within the working limits of the Portadam system will allow for the removal of the

contaminated sediments exceeding PRGs. Addressing the contaminated sediments now will avoid the need to perform a dredging action as identified in the Feasibility Study, and allow for the removal of contaminated sediments under dry conditions. This will greatly reduced both the time and cost of the removal action and allow for this portion of the site to be addressed. Please revise the work plan to include removal of these sediments.

**RIDEM Evaluation of Navy Response:**

*The Navy refers to Comment 2 Response above and notes that there are restrictions due to the presence of eel grass beds. Please see RIDEM's evaluation above, and note that RIDEM is not proposing removing contaminated sediments from the eel grass beds.*

**Navy Response 3/4/09:**

Regarding removal of sediment, RIDEM is again referred to the response above (actually it is comment #1 in the 2/2/09 letter). RIDEM and Navy both agree no sediments should be removed that would impact the eelgrass beds, so this comment, as a separate item, should be considered resolved.

**3. General Comment**

The proposed excavation to install the revetment will extend into the water table. Contaminated groundwater, including free product exist at the site. It is recommended that the Navy employ crush stone in the backfill in the water table and the smear zone along with PVC stand pipes. This will allow for, if needed, removal of contaminated groundwater and/or injection of oxygen or oxidants to avoid contamination of the revetment and the newly installed clean beach sand.

**RIDEM Evaluation of Navy Response:**

*The response focuses on recovery wells, and not on injection. In terms of the recovery trench, please show the engineering calculation and/or explain why a recovery trench upgradient of the revetment cannot be installed. Also, please address the concerns with respect to injection of air, oxidants, etc to address contamination present in the water table.*

**Navy Response 3/4/09:**

Placement of recovery trenches and recovery wells were discussed with RIDEM during the comment / response cycle from the 90% document. Groundwater recovery trenches and wells would be part of the groundwater remedy which will be addressed in the Feasibility Study. Therefore, no revision to the revetment design documents are needed for this comment.

#### 4. General Comment

Please be advised that at all locations the toe of the revetment cannot extend onto the existing beach, (i.e. there must be no loss of the beach environment, be advised that the beach extends beyond the high tide mark). Further, in areas where the toe stabilization will be placed beneath the beach the Navy must create and maintain a beach, which has a minimal thickness of two feet, which is also similar in nature to what is or was at the site. Please clearly state these requirements in the document (Due to the information presented in the figures and the nature of the legends it is not clear where these requirements are being met at all locations).

#### *RIDEM Evaluation of Navy Response:*

*The Navy has stated that the size of the coastal beach will increase as depicted in the attached drawings. As such, it appears that the agencies are in agreement and that it is the intention of the Navy that there be no loss of the coastal beach.*

*Recently, representatives from RIDEM, RICRMC and the Navy inspected the beach adjacent to the Old Fire Fighter Training Area. During this inspection logistics associated with how to avoid accidentally filling in of the coastal beach were broached. It was recommended that the coastal features be staked with off sets to demarcate their location. These off sets would be inspected and approved by the regulatory agencies prior to construction of the revetment. This would insure that the revetment contractor did not accidentally fill in portions of the beach. If the above approach is agreeable to the Navy please include this provision in the 100 Design document.*

Navy Response 3/4/09: The Navy does not disagree with providing offset stakes for resource areas. However, since the comment is late, and the 100% design is already submitted, this request will be considered in the construction work plan, and discussed with the construction contractor.

#### 5. General Comment

One function of the revetment is to eliminate the migration of contaminated soils into the adjacent sediments. Considering the cost of the revetment it is strongly recommended that the Navy consider removing the contaminated soils at the site and install a simple, less costly, revetment.

#### *RIDEM Evaluation of Navy Response:*

*The Navy has indicated that the comment has been noted. Considering the size of the revetment with respect to other revetments located on the base and/or else where in the State the Office of Waste Management recommends that the Navy evaluate it's design to ascertain whether a smaller revetment can be installed in conjunction with soil removal.*

Navy Response 3/4/09: The 100% design for the Replacement Stone Revetment is based on parameters necessary for shoreline protection, and the Navy believes that the design and size is appropriate. RIDEM's recommendation has already been considered as part of the design process.

**6. Section 3.2, 2008 Geotechnical Investigation, Visual Survey Rocky Shore**  
**Page 3-4.**

The report notes that a visual survey was conducted of the rocky shore to ascertain the characteristics of the beach, (rock size, etc). A review of historical aerial photographs indicates that in the past this beach did not reflect the current composition. In addition, similarly located beaches elsewhere on the island and the base also do not reflect the aforementioned composition. The current beach conditions may be due to erosion of the mounds which were created when the fire fighter was dismantled and/or erosion of materials placed along the embankment. As the revetment will solve the erosion problem, the beach to be installed should reflect preerosion conditions, i.e. be similar in nature to other beaches located in the same environment. Please modify the document to state that the beach to be installed in this area will reflect preerosion conditions.

**RIDEM Evaluation of Navy Response:**

*Recently representatives from RIDEM, RICRMC and the Navy inspected the beach adjacent to the Old Fire Fighter Training Area. In regards to beach along the western end of the site it appears that the original beach contained stones 3-4 inches and smaller in size. There were also concrete, bricks, larger rocks and other material which appear to make up the original revetment (the revetment was in disrepair). The 90 % design document called for the removal of the concrete, brick, etc. and the reuse of existing stone on the beach provided that it was not contaminated. The agencies agreed that the concrete, brick and other debris, must be removed from the shoreline. In regards to the existing stone on the beach it could be reused, however, any new material brought onto the beach would have to be 3-4 inches in diameter or less. Further, the stone in the existing revetment could not be used on the beach.*

*In regards to the revetment, there was a proposal to incorporate existing revetment stone into the new revetment. It is not clear which existing revetment stone is proposed for reuse. That is, whether it is "newer" revetment stone south of the Jersey barriers which were recently brought to the site when the mounds were removed and is composed of granite, or the "older" revetment stone, a mixture of shale, granite and other rock types, which was installed when the Fire Fighter Training Area was created, or both. This needs to be specified in the document. Be advised that all stones must meet specification and regulatory approval is required.*

Navy Response 3/4/09: This is being addressed through response to CRMC comments dated 2/2/09. To clarify, the reused rocky shore material noted on the drawings and specifications is the material seaward (north) of the existing Jersey barrier and would only be used to refill the excavation in front of the new revetment. The re-used riprap material is the existing granite material landward (south) of the existing Jersey barrier and would be used to backfill the excavation on the landward side of the new revetment. Both of these materials would only include stone, and not brick, concrete, asphalt, tile, cinderblock, or other manmade materials. Stone reused at the site would have to be clean and sized properly for its use. The Navy sees no disagreement here, and will reuse appropriate materials as a part of the construction effort.

**7. Section 3.2; 2008 Geotechnical Investigation; Analytical Sample Results**  
**Page 3-4.**

The report references TPH results from samples collected at the beach. Please be advised that due to the wide variety of oils used at the site, tanks held both gasoline and heavy oils, two separate TPH test must be performed, such as GRO and DRO. Further, the test must be conducted such that the full range of petroleum products found at the site are analyzed, i.e. carbon range extends from light end to C 44. Please modify the table to reflect the particular TPH analysis performed. Also please be advised that in the future all TPH test must included low and high-end petroleum products.

**RIDEM Evaluation of Navy Response.**

*Response was not included in the package. Please insure that the 100 % Design addresses the above comment.*

Navy Response 3/4/09: The references to TPH results in the 90% design were clarified in the 100% submission. TPH sampling will be conducted using GRO C-5 to C-12 and DRO C9 to C-36 using method 8015B modified for extractable hydrocarbons by GC. This method is consistent with other work conducted at the site and conducted at NAVSTA under RIDEM rules and regulations. The design documents should not be revised based on this comment.

**8. Section 4.2.1, Structural Protection Requirements**  
**Page 4-6, General**

The stabilization for the toe trench of the revetment extends into the beach area. At McAllister Point Landfill a gravity wall was installed which did not extend into the

beach area. A gravity wall at this location was found sufficient even though the revetment height and size was considerably larger than that at the OFFTA. Further, the McAllister Point site is exposed to a greater wave fetch, and storm conditions. Considering the location of eel grass at the western end of the site, at a minimum the Design should consider a gravity wall at this location (it is also recommended that a gravity wall be considered at the eastern end of the site). Finally, please be advised that the Navy will have to maintain the beach environment above the proposed toe stabilization structure.

**RIDEM Evaluation of Navy Response:**

*The Navy has noted that the gravity wall at the McAllister Point Landfill extended into the intertidal area. It is acknowledged that at certain locations the gravity wall at McAllister Point Landfill extended into the beach because at high tide along a significant portion of the landfill there was no exposed beach and the water was a couple of feet deep at the toe (at these locations during low tide the exposed beach was only a few feet wide). The intent of the comment was to note that the McAllister Point Landfill revetment was significantly larger than that proposed at OFFTA, yet the gravity wall was smaller and did not extend out as far. Accordingly, the Navy should evaluate the design to ascertain if cost savings can be realized with a small toe, which would also avoid the long term problems of maintaining a beach over the toe.*

**Navy Response 3/4/09:** The revetment has been designed within parameters necessary for shoreline protection given its orientation, its location, the fetch and other physical features. In addition, a significant constraint is provided by the protection of the eelgrass near the west portion of the revetment. The following table summarizes some of the factors that result in the size of the revetment structure:

OFFTA Area	100 year Wave height (ft)	Revetment Slope (1)	Revetment Thickness (ft)	Scour Potential	Toe Thickness (2 times revetment thickness)	Toe Length (3 times wave height)
West Portion	4.33	2 Horizontal to 1 Vertical	3.5	Moderate to Severe (2, 3)	7 feet	13 feet
East Portion	2.1	2 Horizontal to 1 Vertical	2.0	Moderate to Severe (3)	4 feet	7 feet

- 1) The revetment slope was steepened in order to minimize the area of disturbance based on regulatory comments.
- 2) The scour potential was assumed to be moderate to severe based on the condition of the existing revetment and the erosion that has occurred at the site, requiring the installation of the "Jersey Barrier" as an interim measure.

3) The consequences of failure of the revetment system were deemed more critical since erosion of the site could allow for the migration of contaminants, therefore a conservative toe configuration was selected.

**9. Section 4.2.1, Structural Protection Requirements**

**Page 4-6, General**

The revetment as designed is larger and more complex than that found elsewhere at the base, (especially, at the western end of the site where the revetment is greater than thirty feet wide). It is not clear why a revetment of this nature is required. Considering the cost of the project and the potential impacts to the adjacent eel grass beds it is recommended that the Navy review the proposed design to ascertain if it can be reduced in magnitude.

*RIDEM Evaluation of Navy Response:*

*Comment was not addressed in the 90% Design Response. Please address comment.*

Navy Response 3/4/09:

The revetment has been designed within parameters necessary for shoreline protection given its orientation, its location, the fetch and other physical features. Other designed revetments at the base meet other specific requirements for their purposes. Much of the historic shorelines in the bay have erosion protection in place that are haphazard, un-designed structures that will fail in time.

**10. Section 4.2.1, Structural Protection Requirements**

**Page 4-6, Table**

This table notes that a nominal diameter stone of 1.68 feet has a weight of 779 lbs. Based on the last paragraph of page 4-5 it is noted that a stone has a density of 165 lb/ft<sup>3</sup>. Assuming a sphere which has a volume of  $\frac{4}{3}\pi r^3$  the weight of the stone would equal  $\frac{4}{3}(3.1415)(0.84ft^3)(165 lb/ft^3) = 409 lbs$ . This is significantly different than the 779 lbs stated. Please explain how this weight was obtained.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed.*

**11. Section 4.2.1, Structural Protection Requirements**

**Page 4-6, Table**

There appears to be a discrepancy between the diameters and the weights in this table and the Construction Specifications Section. Please review and correct as necessary.

*RIDEM Evaluation of Navy Response:*

*Comment was not addressed in the 90% Design Response. Please address comment.*

Navy Response 3/4/09: This section was revised for the 100% submittal. Weights and sizes were reviewed and revised as needed.

**12. Section 4.2.2, Excavation Requirements**

**Page 4-6**

Contaminated soil and sediment, which exceed regulatory requirements, is present within the footprint of the revetment. Accordingly, the 90 % Design must include a stipulation for the sampling and removing of any soils/ sediment, which exceed regulatory requirements. Please modify the document accordingly.

*RIDEM Evaluation of Navy Response:*

*Removal of the soils in question will be a relatively straight forward, inexpensive process during revetment construction. Removal after the revetment is install will be very costly. Further, alternate remedial techniques to address contamination in the vicinity of the revetment by comparison will be more complicated and difficult to implement. Therefore, either remove the soils at this location now or forego installation of the revetment until an alternative remedial action for these soils has been submitted to the regulatory agencies, approved by the regulatory agencies and a Record of Decision or equivalent State document has been signed by the Navy committing them to the approved remedial alternative. Finally, please be advised that as a cost savings measure the Navy may wish to evaluate storage and treatment of the removed soils at the Tank Farms or other locations on the base in lieu of off site disposal.*

Navy Response 3/4/09: The RIDEM request for removal of contaminated soils / sediments has been discussed at length, and was the reason for the Tiger Team review and meeting held in 2006, which RIDEM attended. The Navy is following the recommendations that came out of that meeting. The purpose of the revetment is to provide a replacement shoreline protection system, which is an interim action to prevent erosion of soil into Coasters Harbor. The final remedial action, which may include LUCs, will be evaluated as a part of the FS. Therefore, the revetment design documents do not need to be revised based on this comment.

### 13. Section 4.2.2, Excavation Requirements

Page 4-6

There are two-discharge pipes, which contain oil sludge on the beach and in the embankment where the revetment is to be installed. The Design must stipulate that the entire length of these pipes, and any other similar pipes, and any associated contaminated soils/sediments in the vicinity of the pipe will be removed.

*RIDEM Evaluation of Navy Response:*

*The Navy noted that the pipes in question were removed during the 2008 removal action. Please be advised that these pipes were left in place. The Office of Waste Management concurs that all pipes in the sediment and revetment area must be removed along with any contamination. The only pipes to be left in place are active stormwater discharge pipes. In order to avoid confusion in the field please modify the 100% Design to include a requirement to remove all non storm water pipes.*

Navy Response 3/4/09:

All pipes encountered in the excavation that are no longer in use will be removed from the construction area, and / or plugged as needed. This will include fragments of piping that were left from the soil removal action.

### 14. Section 4.2.3, Shoreline Stabilization

Page 4-7, Paragraph 1

To protect the geotextile the stone revetment provisions should be made to place the stones on this material rather than dropping the stones.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed,*

### 15. Section 5.5, Permanent Stabilization

Page 5-4,

Whatever grass seed mixture is selected, one of the requirements should be that it could withstand a salt-water environment.

*RIDEM Evaluation of Navy Response:*

*Navy has stated that the 100 % Design will be evaluated to insure that the grass seed mixture is tolerant of brackish conditions. As such the comment has been addressed.*

**16. Section 5.6 Stormwater Management Consideration**

**Page 5-5,**

The temporary storage structures will have an impermeable liner. Please state where the overflow will be pumped if the 110% capacity is exceeded.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed*

**17. Section 5.7, Inspection and Maintenance of Erosion and sediment Controls,**

**Third Bullet**

**Page 5-5,**

This bullet notes that seeded areas will be checked and reseeded if necessary. In the event of soil erosion please state if new soil, in addition to reseeded will take place (i.e. soil erodes prior to grass growing).

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed*

**18. Section 5.6, Response Procedures for Spill Mitigation**

**Page 5-6,**

Please note that if a spill occurs the regulators must also be notified.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed*

**19. Figure C-7**

In this figure and others a dashed line is used to depict the existing grade and the final grade. This does not allow one to distinguish between the two and ascertain whether regulatory requirements are being met. Please employ an alternate line scheme.

*RIDEM Evaluation of Navy Response:*

*Comment has been addressed*

**20. Figure**

Please produce an overhead figure clearly delineating the current toe of the existing revetment/end of embankment and the proposed toe/end of embankment. Also, this overhead figure should clearly delineate the portions

of the toe stabilization, which is to be placed under the beach. Without this information it is not possible to confirm that the revetment, as designed, will not extend beyond the existing fort print of the site.

**RIDEM Evaluation of Navy Response:**

*Comment has been addressed*

**Navy Response To RIDEM:  
Comments on the  
100 % Submission  
Stone Revetment Design  
Old Fire-Fighting Training Area  
NETC**

**1. Section 4.2.3, Confirmatory Sampling Stormwater Management Consideration  
Page 4-7,**

*The design document notes that the frequency, collection methods and analytical methods for the confirmatory samples will be specified in the contractors work plan. It is recommended that the frequency of samples, collection methods, etc. reflect that employed during the removal action. Please be advised that, whether these parameters are incorporated into the Design document, or the contractors work plan, regulatory approval is necessary.*

Navy Response 3/4/09: The comment is noted. Since the information requested is going to be in the construction work plan, no revision is required for the design document.

**2. Section 4.2.3, Confirmatory Sampling Stormwater Management Consideration  
Page 4-7,**

*The document has listed a clean up standard of 30,000 ppm for TPH. As noted in past correspondence, the 30,000 ppm proposal is not acceptable. Please be advised that once the revetment is installed that it will be difficult to remove contaminated soils. Therefore, the document must be modified to stipulate a remedial objective equivalent to either the residential or industrial commercial criteria. Further, the TPH standard requires compliance with regulatory limits for applicable parameters such as SVOCs and metals. Please modify the report accordingly.*

Navy Response 3/4/09: At the Tiger Team review and meeting held April 16, 2006, which RIDEM attended, the criteria for the 30,000 mg/kg action level was discussed and set. It was memorialized in the action memorandum dated January 15, 2007. RIDEM did not dispute this document, and thus the criteria is applicable. It was further noted at the Tiger Team meeting that remaining low concentrations of petroleum would be addressed through other means such as an ELUR. However, it is recognized that this will need to be selected after the FS is revised.

The Navy is continuing to follow the recommendations that came out of the Tiger Team meeting. Additional meetings are planned on the FS, at which further discussions on PRGs for the site can be held.

**3. Figures, 4-2,4-3,4-4, 4-5; Sheet 7**

*Figures 4-2, 4-3, 4-4, 4-5 in the main body of the 100 % Design show the reuse rip rap extending from the western end of the site to almost the central portion. Sheet C-7 seems to limit the rip rap to cross section A-A and B-B?, which is only a portion of the western end of the site. If this is the case the sheets do not correspond to the Figures in the main text.*

**Navy Response 3/4/09:** Sheet 7 shows cross sections at specific lines as shown on Sheet C-6. Figure 4-5 shows the extent to where the reused rocky shore material is planned for use. Both are correct, and there is no discrepancy.

**4. Figures, 4-2,4-3,4-4, 4-5; Sheet 7**

*The Design proposes to reuse existing rip rap at the site. Please specify which rip rap is proposed to be reused, i.e. the rip rap south of the Jersey barriers on the western end of the site, any suitable rip rap located anywhere on the site, etc. Be advised that the revetment stones must meet design specifications, as well as, regulatory approval.*

**Navy Response 3/4/09:** This is being addressed through response to CRMC comments dated 2/2/09. To clarify, the reused rocky shore material noted on the drawings and specifications is the material seaward (north) of the existing Jersey barrier and would only be used to refill the excavation in front of the new revetment. The re-used riprap material is the existing granite material landward (south) of the existing Jersey barrier and would be used to backfill the excavation on the on the landward side of the new revetment. Both of these materials would only include stone, and not brick, concrete, asphalt, tile, cinderblock, or other manmade materials. Stone reused at the site would have to be clean and sized properly for its use. The Navy sees no disagreement here, and will reuse appropriate materials as a part of the construction effort.

**Response to Comments by  
Coastal Resources Management Council on  
100% Design Submission dated 12-22-2008  
Replacement Stone Revetment at Old Fire Fighter Training Area (Site 09)  
Naval Station Newport, Newport, RI**

**Comments**

1. **Comment:** *In general, the revetment "toe" design is considered excessive and is not considered "as close as practicable" to the shoreline feature. The "Stone Revetment West" (Typical Section/Detail "2", sheet C-8) is not consistent with cover stone layer thickness calculated in "Shoreline Stabilization Calculation" (sheet 4 of 17, dated 4/29/08), but rather "includes only the toe portion of the revetment" (page 4-3 narrative, "Shoreline Stabilization Toe Configuration), which is sized from "Figure VI-5-50 Typical Seawall Toe designs where scour is foreseen" (Calculations, sheet 17 of 17).*

*The intent of the toe protection is to prevent scour from wave induced turbulence (at the base of a slope) eroding the bottom sediments which support the armor layer permitting displacement or slope failure. The selection of the largest toe design geometry, and substitution of this geometry for a conventional revetment slope results in excessive disturbance and elimination of coastal beach area.*

*Similarly, the "Stone Revetment East" (Detail "1", sheet C-8) includes an excessive toe design, considering the calculated design wave height of 2.1 feet (Calculations, sheet 2 of 17). The selected geometry (from sheet 17 of 17) appears applicable to above-beach-grade toe design, whereas a smaller geometry is appropriate for subgrade toe construction (sheet 17 of 17, column 1, row 2). This would also reduce overall coastal beach impacts.*

**Response:** The first comment concerns the toe configuration chosen for the revetment at OFFTA. The following paragraphs will clarify how the current toe configuration was chosen for this design. To do this it is helpful to revisit what was presented in the previous design submissions and the comment that were received on them.

The 30% design for this revetment was completed by incorporating the guidance contained in the *Design of Coastal Revetments, Seawalls and Bulkheads*, EM 1110-2-1614 (USCOE, 1995). The guidance for the toe configuration was based on Figure 2-4 of that guidance, configuration III (attached). It should be noted that this configuration is nearly identical to the toe configuration suggested in Comment No. 2 for the eastern portion of OFFTA. Figure 2-4 does not specify what elevation the toe is to be buried beneath so the source document for these figures was consulted (EM 1110-2-1601). That document indicates that for trench filled revetments riprap should be placed to the low water level (Page 3-10). This was interpreted to mean that the ground surface on Figure 2-4 was the mean low water line, therefore the toe was buried below the mean low water line in the 30% design.

Concerns were raised about the stability of the excavation while digging to this depth in the intertidal zone. In addition, there were comments raising concerns for excavating this much material in the intertidal zone. In order to alleviate these concerns, the toe configuration was changed in the 90% submission. The toe configuration was changed to a type that would not need to be buried to such a depth because it contains additional rock that will fall into the scour hole and protect the revetment if scour occurs. The tradeoff was that a larger toe configuration was used, however it required less excavation. It should be noted that in order to satisfy the RIDEM comments on the design, where an existing coastal beach exists the toe was still buried deep enough to be covered with two feet of beach material. On the western portion of OFFTA this requirement was not attempted to be met because this area is not a coastal beach, rather it is a rocky shoreline.

## West Revetment

On the western portion of the site, the larger toe was incorporated into the design; however, the thickness of this toe configuration was such that its thickness roughly corresponded to the height of the slope. The front face of the toe was pushed far up the shoreline so that only a small portion of the rocky shoreline will be excavated (10-15 feet width) and all of this area will be restored (see figures 4-2 and 4-3 in the basis of design). The bulk of the excavation will occur landward of the rocky shoreline so as to have as little impact on the shoreline and eelgrass as possible. The revetment configuration on the western portion of the site does not result in the elimination of rocky shoreline or coastal beach. Given the number of constraints imposed on this project, it is felt that the current configuration represents the best balance to achieve the goals of project including protection of the site from a 100-yr storm while minimizing the disturbance of the rocky shoreline and allowing for the buffer zones between the revetment and the eelgrass beds.

The attached detail of the west revetment from the 100% design has been colored to indicate the different parts of the revetment so that the following components can be identified:

- The yellow portion of the detail is the thickened toe, required because of the potential for the toe to be scoured by wave action. It is based on the detail from US Corps of Engineers Coastal Engineering Manual (CEM) noted above. The 13 foot dimension shown on the top of this section corresponds to roughly 3 times the design wave height. The thickness of the toe roughly corresponds to twice the revetment thickness. The CRMC Standard 300.7 (F) indicates that shoreline protection structures built on unconsolidated sediment shall extend to a depth equivalent to mean low water or to a depth as determined by the methods in the most recent version of the U.S. Army Corps of Engineers *Shore Protection Manual*. The *Shore Protection Manual* is the predecessor to the CEM manual. The depth of the toe is set at elevation zero which is just below the mean low water elevation of 0.76 feet and is therefore similar to the CRMC requirement.
- The orange part of the detail is the revetment itself with a thickness (3.5 feet) based on the design wave heights.
- The green section is provided to protect the backside of the revetment. Because it is anticipated that the revetment could be overtopped during a 100-year storm event, the back side of the revetment has been thickened to prevent undermining during a storm event.

It is acknowledged that the result is a large structure; however, all parts of the structure have been included for a specific purpose. It should also be noted that currently in this area there exists approximately 20 feet of riprap behind the "Jersey Barrier" plus rocks/rubble on the water ward side of the barrier; therefore the footprint of the proposed revetment will not be substantially larger than the existing conditions.

## East Revetment

The details for the toe of the revetment on the eastern half of the site also incorporates the larger toe configuration that does not need to be buried as deep to minimize the amount of beach to be excavated. However, in order to satisfy regulatory comments, the toe was still depressed sufficiently so that it could be covered with two feet of beach material. The revetment in this area was also pushed back to the landward so that disturbance of the existing beach would be minimized and there would be no net loss of beach. The end result is actually a gain in coastal beach in this area.

Using the toe configuration suggested for the eastern half of the site was investigated. The attached Sheet C-7 showing cross sections has been marked up in red to show how this configuration would look if the toe of the excavation is not lowered further. It should be noted that if this configuration was adopted, approximately 6 feet less of the beach (in width) would need to be excavated; however, the two foot of cover over the toe would no longer be achieved. If the toe were put in deeper to achieve the 2 foot of cover, additional excavation would be required. It is felt that the configuration for the toe presented in the 100% design for the eastern portion of the site should not be changed because the suggested toe would either not achieve the requested 2 foot of cover or would have to be lowered which would actually result in additional excavation of the beach.

2. **Comment:** Regarding Specification Section 2.2.1 ("Reused Rocky Shore Material") notation "when required, additional material shall be by weight gradation, 100 percent less than 36 inches, 0 to 50 percent less than 24 inches, and 0 to 15 percent less than 12 inches", this gradation of additional material appears inconsistent with the observed beach composition noted during the site inspection, and as characterized in Attachment A (A.1.1 Soil Pre-Design Investigation, Figures 4-2 through 4-5), which denotes the beach as "fill - fine to medium sand, silt, gravel, and rock fragments, mixed with varying amounts of construction-type debris including" asphalt, concrete, metal, brick, wood, and glass." This specified gradation should be revised to reflect the overall smaller gradation of the beach substrate.

**Response:** The intent of the reused rocky shore material is to reuse the rock material excavated for the revetment on the western side of the site and to use that material (if it is clean) to back fill on the water ward side of the revetment. If not enough material is available for the required backfilling, then the gradation in the specification would be used for any purchased material to be used in this area.

It was recognized that determining the existing gradation of the rocky shore material would be an important consideration in the design so that the material to be placed back on the shore would matched the existing. In order to accomplish this, a visual survey of the rocky shore material was made and documented in the Basis of Design report. The visual survey is discussed on Page 3-4 of the basis of design report and field logs from the survey can be found in appendix A.2.3. The visual survey consisted of laying out a 5 foot by 5 foot sample square at three different locations on the rocky shore and then counting the rocks within the square based on the size of the rocks. The gradation in the specification was based on those rock counts. It should be noted that the gradation is based on weight (so that a gradation with one large rock could account for 50% of the overall gradation by weight). The rock counts do indicate that the most common size of rock on the shoreline is in the 12" to 4" range, however, stones in the 24"-12" range are common.

RIDEM has indicated that they believe the existing rocky shore in this area consists of 3" to 4" stone and that the larger stones that are present in this area have fallen away from the existing revetment. While this could be argued, using smaller stone such as the 3"-4" stone in front of the revetment would not affect the integrity of the proposed revetment since the design has anticipated that the revetment toe could potentially fall into a scour hole if it were to form in this area. The Navy then proposes to change the gradation for any rocky shore material that needs to be brought on to site to have the following gradation (by weight); 100 percent less than 8", 0-50 percent less than 4" and 0-15 percent less than 2." This gradation would meet the requirements of RIDOT M.10.03.2 R-3 stone.

3. **Comment:** Regarding Specification 2.2.2. ("Reused Riprap"), does a sufficient volume of existing riprap exist (per sheet C-5, C-6) to satisfy the requirements per "Stone Revetment West" (sheet C-8) cross section? The design implies that no additional riprap will be imported for the proposed narrow band of riprap landward of the revetment. Please confirm.

**Response:** The volume of existing riprap available for reuse was double checked. The amount needed for reuse was estimated as 336 cubic yards. The limit of the existing riprap was captured during the survey of the site, however, the depth of the existing riprap is not known with certainty therefore, the quantity of the existing riprap is an estimate only. The area of the existing riprap is approximately 11,000 square feet so if it can be assumed that the thickness is at least 1 foot there would be more than 400 cubic yards. The existing riprap thickness is greater near the Jersey barrier so there may be more existing riprap available for reuse. Therefore it is anticipated that enough existing riprap exists on the site for reuse.

4. **Comment:** With regard to sheet T2, Note 8 – please include notation to require offset benchmark/stakes beyond the limit of disturbance that can be used (by regulatory staff, etc.) to verify new toe location.

**Response:** The contractor will be instructed to provide additional survey offset stakes and this will be documented in the contractors work plan. It should be noted, however that beyond the excavation, space will be limited between there and the port-a-dam for additional stakes.

**Comment:** It is noted that pursuant to CRMC Management Procedures Section 4.2.(6), the CRMC will require RIDEM approval to issue final concurrence with the consistency determination ("Removal Action Approval" or "Feasibility Study" minimum).

At this time, the CRMC does not concur with the 100% design consistency determination. Appeal rights exist pursuant to 15 CFR 930.64(e).

Pursuant to 15 CFR 930.41(b), an extension to the response time is requested to reconcile the above noted issues.

**Response:** The regulatory procedures are noted.

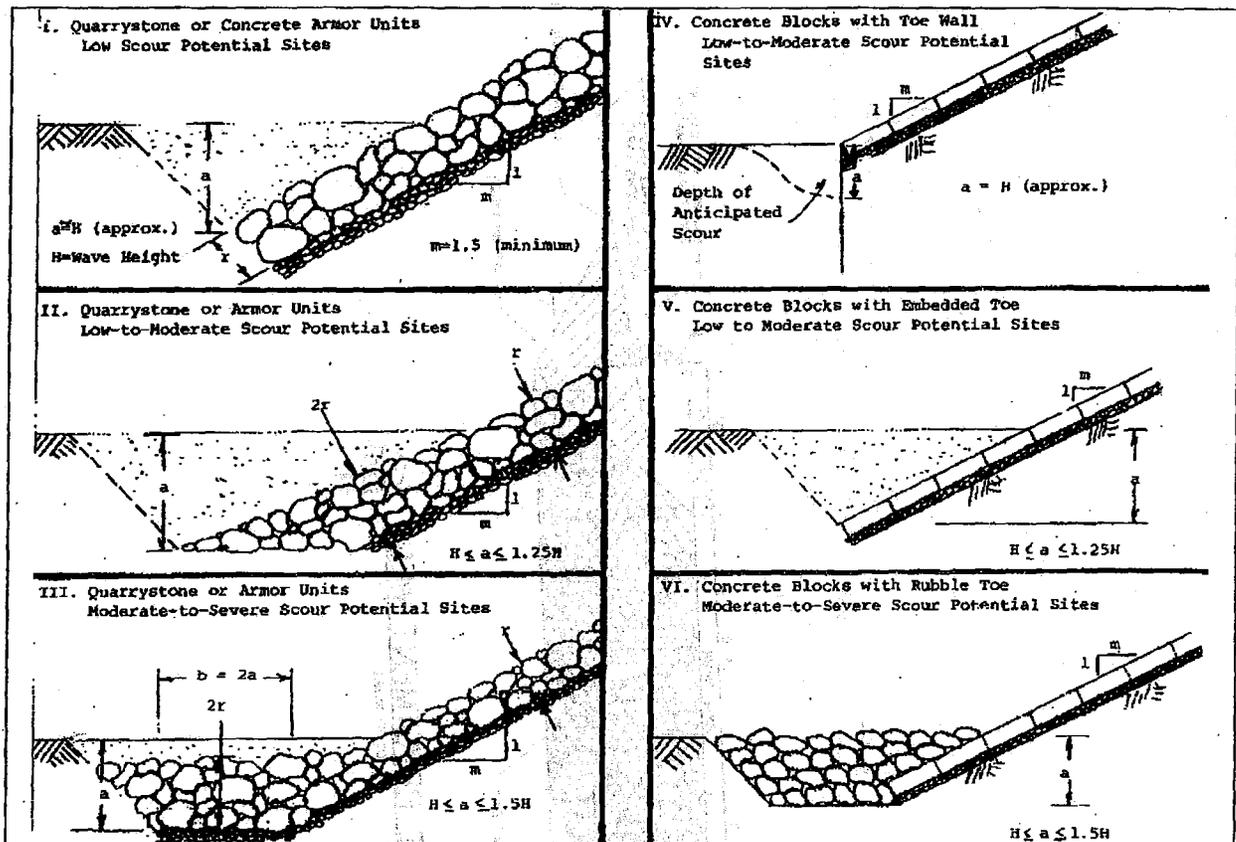


Figure 2-4. Revetment toe protection (Designs I through VI)

prevent surface water from causing erosion (gullies) beneath the riprap. In general form layers have the relation given in Equation 2-26:

$$\frac{d_{15\text{ upper}}}{d_{85\text{ under}}} < 4 \quad (2-26)$$

Specific design guidance for gravel and stone filters is contained in EM 1110-2-1901 and EM 1110-2-2300 (see also Ahrens 1981a), and guidance for cloth filters is contained in CW 02215. The requirements contained in these will be briefly summarized in the following paragraphs.

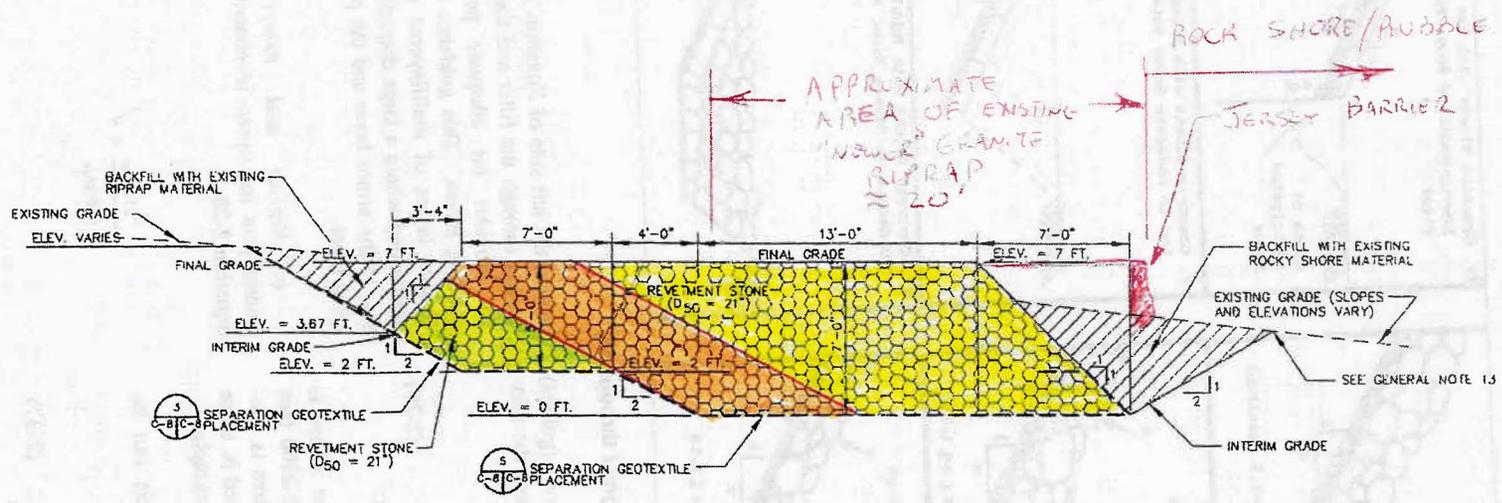
a. *Graded rock filters.* The filter criteria can be stated as:

$$\frac{d_{15\text{ filter}}}{d_{85\text{ soil}}} < 4 \text{ to } 5 < \frac{d_{15\text{ filter}}}{d_{15\text{ soil}}} \quad (2-27)$$

where the left side of Equation 2-27 is intended to prevent piping through the filter and the right side of Equation 2-27 provides for adequate permeability for structural bedding layers. This guidance also applies between successive layers of multilayered structures. Such designs are needed where a large disparity exists between the void size in the armor layer and the particle sizes in the underlying layer.

b. *Riprap and armor stone underlayers.* Underlayers for riprap revetments should be sized as in Equation 2-28,

$$\frac{d_{15\text{ armor}}}{d_{85\text{ filter}}} < 4 \quad (2-28)$$



**STONE REVETMENT WEST**  
NOT TO SCALE



**STONE REVEMENT REPLACEMENT DESIGN**

NAVAL FACILITIES ENGINEERING COMMAND - NAVAL AIR STATION  
 NEWPORT, RHODE ISLAND  
 NAVAL FACILITIES ENGINEERING COMMAND - NAVAL AIR STATION  
 NEWPORT, RHODE ISLAND

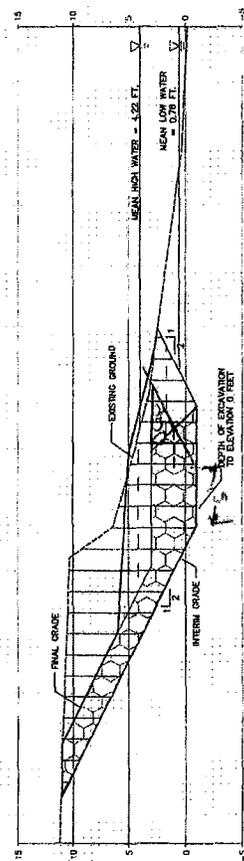
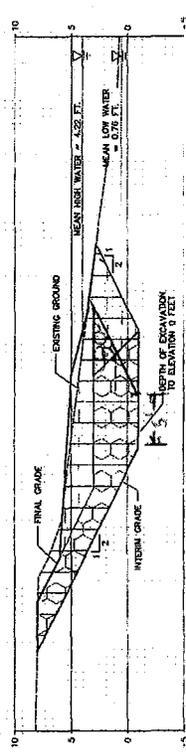
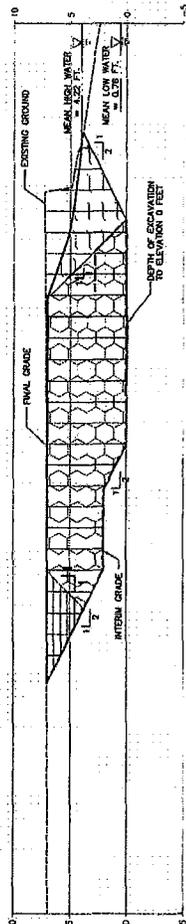
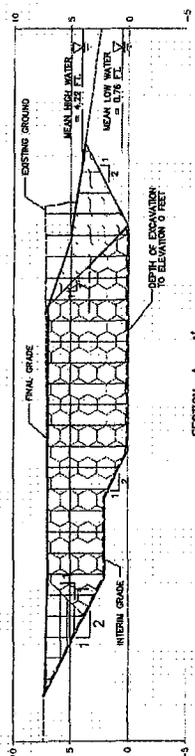
CROSS SECTIONS

NO.	REV.	DESCRIPTION

**NAFAC**

JAMES H. WOFFORD  
 7  
 No. 1-1-1-1000  
 1-1-1-1000  
 PROFESSIONAL ENGINEER

DATE: 12/1/50  
 DRAWN BY: J. H. WOFFORD  
 CHECKED BY: J. H. WOFFORD



- LEGEND:**
- SEE DRAWING T-4 FOR ORIGINAL LOGS.
  - EXISTING GROUND
  - FINAL GRADE
  - INTERMEDIATE GRADE
  - DEPTH OF EXCAVATION TO ELEVATION 0 FEET
  - MEAN HIGH WATER
  - MEAN LOW WATER
- NOTES:**
- 1) SEE DRAWING T-4 FOR ORIGINAL NOTES.
  - 2) DATE OF MEASUREMENTS FOR MEAN HIGH AND LOW WATER.

C-7