

CONTRACT NO. <b>N62472-03-D-0022</b>	CONTRACT TASK ORDER NO. <b>0005</b>	ACTIVITY LOCATION <b>Portsmouth Naval Shipyard - Kittery, ME</b>
PROJECT TITLE: <b>DRMO Shoreline Stabilization</b>		
FROM: <b>Tetra Tech EC, Inc.: Program QC Manager Thomas Kelly On Behalf of: AHTNA Government Services Corporation</b>		DATE December 2, 2005
TO: <b>J. Briggs (CD-Copy and 1 Hard Copy)</b>		DATE December 2, 2005

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ITEM NO.	SUBMITTAL DESCRIPTION	PREPARED/ SUBMITTED BY	APPROVED	DISAPPROVED	REMARKS
1	SD-08, Statements; Draft Action Memorandum for Site 29 Shoreline Stabilization	Helene Ropars			

**DEPARTMENT OF THE NAVY  
ENGINEERING FIELD ACTIVITY, NORTHEAST  
REMEDIAL ACTION CONTRACT (RAC)  
CONTRACT NO. N62472-03-D-0022  
CONTRACT TASK ORDER NO. 0005**

**DRAFT ACTION MEMORANDUM  
FOR  
SITE 29 SHORELINE STABILIZATION  
AT  
PORTSMOUTH NAVAL SHIPYARD  
KITTERY, MAINE**

**December 2, 2005**

**Prepared for:**

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**Revision**  
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## ACRONYMS AND ABBREVIATIONS

AM	Action Memorandum
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
GCL	Geosynthetic Clay Liner
HIs	Hazard Indices
IRP	Installation Restoration Program
MEDEP	Maine Department of Environmental Protection
mg/kg	Milligrams per Kilogram
NCP	National Contingency Plan
NPL	National Priority List
NRPA	Natural Resources Protection Act
OU	Operable Unit
PNS	Portsmouth Naval Shipyard
TtEC	Tetra Tech EC, Inc.
µg/L	Micrograms per Liter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

## **1.0 PURPOSE**

The purpose of this Action Memorandum (AM) is to document the need to perform a Time Critical Removal Action at the Site 29 shoreline at the Portsmouth Naval Shipyard (PNS), Kittery, Maine. This work is being undertaken by the Navy using its lead agency authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

This AM identifies the removal action to address significant erosion along the shoreline of the Piscataqua River adjacent to the Site 29 Salvage Area and for the selection of the removal action alternative. In the fall of 1999, a major portion of the shoreline was stabilized. The remaining section of the Site 29 shoreline that was not stabilized in 1999 is now beginning to show similar signs of erosion. Under this removal action, the remaining portion of the shoreline will be similarly stabilized. This AM explains the rationale for performing the work to remove debris from the shoreline slope, regrading the embankment rock, placing stone and geotextile layers to stabilize slope, replacing the fence, and restoring the Site 29 shoreline.

## **2.0 SITE CONDITIONS AND BACKGROUND**

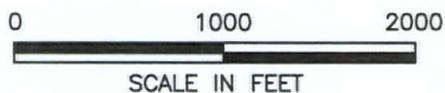
### **2.1 Site Description**

PNS is located on the northern side of the Piscataqua River in the Town of Kittery, Maine as shown in Figure 1. The shipyard, established in 1800, was primarily used to design, construct, repair, and overhaul submarines during the 1900s. The first government-built submarine was designed and constructed there during World War I. Currently, the shipyard is only involved in the repair and overhaul of submarines. The entire facility consists of approximately 278 acres; about 90 acres are filled land. The facility contains 376 buildings that are densely clustered to two thirds of the site.

Site 29 is located on the southern shoreline of PNS as shown in Figure 1. The area has been identified as Site 29 of the PNS's Installation Restoration Program (IRP). The area consists of approximately 2 acres of filled land, which is currently used as a temporary storage area for used materials prior to off-site recycling or disposal. It was previously used to store refuse, including lead and nickel-cadmium battery elements, motors, typewriters, paper products, and scrap metal prior to off-site recycling or disposal. Former uses of this area have resulted in high contamination levels of lead. In 1993, approximately one half of the scrap yard was paved and the other half was covered with a Geosynthetic Clay Liner (GCL) cap with 12 inches of soil cover. The GCL cap was tied into a new concrete curb approximately 5 feet from the shoreline of the adjacent Piscataqua River.

#### **2.1.1 Removal Site Evaluation**

The Site 29 shoreline formerly was covered with embankment rock (large riprap) and keel blocks at a steep slope of approximately 2H:1V (2 feet horizontally to 1 foot vertically), extending approximately 30 vertical feet below the low tide level. In June 1999, an inspection had revealed that the riprap and keel blocks had deteriorated and moved down the slope leaving unprotected soil exposed with no protection from erosion. In the fall of 1999, improvements were made to a large section of the Site 29 shoreline and included removal of existing curb and fence, removal of keel blocks and other debris from shoreline slope, regrading of embankment rock, placement of stone and geotextile layers to stabilize slope and replacement of the curb and fence. Approximately 100 linear feet of shoreline was not repaired at that time. The focus of this scope is to permanently repair this section of shoreline. On July 1, 2005 the exposed soil was covered with hydromulch as an interim erosion control measure.



U.S. Navy RAC  
Portsmouth Naval Shipyard  
Kittery, Maine

Figure 1  
Site Location Map



TETRA TECH EC, INC.

Source: U.S.G.S. Topographic Maps (7.5 Minute)  
Portsmouth, NH-ME Quadrangle, 1956, Photorevised 1993.

### 2.1.2 Physical Location

The PNS is located on the Piscataqua River, a tidal estuary that forms a boundary between Maine and New Hampshire. The total area of the facility is approximately 278 acres, 90 of which are filled tidal flats. Site 29 is located on the southern end of Seavey Island. Site 29 is approximately 2 acres and served as a temporary storage area for refuse prior to disposal. Refuse stored at Site 29 included lead and nickel-cadmium battery elements, paper products, and scrap metal. Most of Site 29 is situated on filled land. Approximately half of the surface of Site 29 is covered by asphalt, the other half is covered with a GCL cap with 12 inches of soil cover.

The revetment site is located on the southern shoreline of the PNS adjacent to the Site 29 Salvage Yard. The existing embankment is currently protected by embankment rock. The area has been identified as Site 29 in the PNS's IRP. Site 29, consisting of approximately 2 acres of filled land, encompasses a former open burning area, a former industrial incinerator, and an ash disposal area as well as operations at building 298 (NMCI computer services) and building 310 (hose handling facility).

### 2.1.3 Site Characteristics

During an inspection of the PNS shoreline in June 1999, significant erosion was discovered along the shoreline of the Piscataqua River adjacent to the Site 29 Salvage Area. The existing embankment rock had sloughed exposing lead contaminated soil from the Site 29 area to potential erosion from the river. To protect human health and the environment from a release of lead contamination, an emergency removal action under CERCLA was implemented. In the fall of 1999, Tetra Tech EC, Inc. (TtEC) (then Foster Wheeler Environmental Corporation) stabilized the shoreline by reshaping the existing embankment rock and added additional shoreline protection materials to form a barrier between the Site 29 soil and the river.

Former uses of this area have resulted in high contamination levels of lead. Site investigations have indicated the presence of soil contamination, principally lead at elevated levels. Other chemicals (cadmium, copper, and zinc) may also exceed CERCLA's unacceptable risk level of  $1 \times 10^{-4}$  and the State of Maine's risk guideline of  $1 \times 10^{-5}$ . A site-specific risk assessment including all data available from the site has been performed and is documented in "Revised OU2 Risk Assessment" dated November 2000.

### 2.1.4 Release or Threatened Release of Hazardous Substances, Pollutants, or Contaminants

Suspected soil contamination, principally lead at elevated levels, exists at the Site 29 Area. Deteriorated revetment along the slope has resulted in unprotected soil exposed with no protection from erosion. The total amount of contaminated soil released into the local environment from this slope deterioration is unknown. On July 1, 2005 the exposed soil was covered with hydromulch as an interim erosion control measure.

### 2.1.5 National Priority List Status

Effective May 31, 1994, the PNS was listed on the National Priority List (NPL). The Site 29 Salvage Area was identified as a site on the NPL for PNS. Site investigations have indicated the presence of soil contamination, principally lead at elevated levels. In the fall of 1999, the shoreline was stabilized by reshaping the existing embankment rock and adding additional shoreline protection materials to form a barrier between the Site 29 soil and the river.

### 2.1.6 Maps, Pictures and Other Graphic Representation

A typical section and stabilization plan from the Site 29 Shoreline Stabilization are presented in Figures 2 and 3.

## 2.2 Other Removal Actions to Date

### 2.2.1 Previous Removal Actions

In 1993, approximately one half of the scrap yard was paved and the other half was covered with a GCL cap with 12 inches of soil cover. The GCL cap was tied into a new concrete curb approximately 5 feet from the shoreline of the adjacent Piscataqua River. The Site 29 shoreline formerly was covered with embankment rock (large riprap) and keel blocks at a steep slope of approximately 2H:1V (2 feet horizontally to 1 foot vertically), extending approximately 30 vertical feet below the low tide level. In June 1999, an inspection had revealed that the riprap and keel blocks had deteriorated and moved down the slope leaving unprotected soil exposed with no protection from erosion. On September 30, 1999, the exposed soil was covered with hydromulch as an interim erosion control measure. In the fall of 1999, improvements were made to a large section of the Site 29 shoreline and included removal of existing curb and fence, removal of keel blocks and other debris from shoreline slope, regrading of embankment rock, placement of stone and geotextile layers to stabilize slope, and replacement of the curb and fence.

### 2.2.2 Current Removal Actions

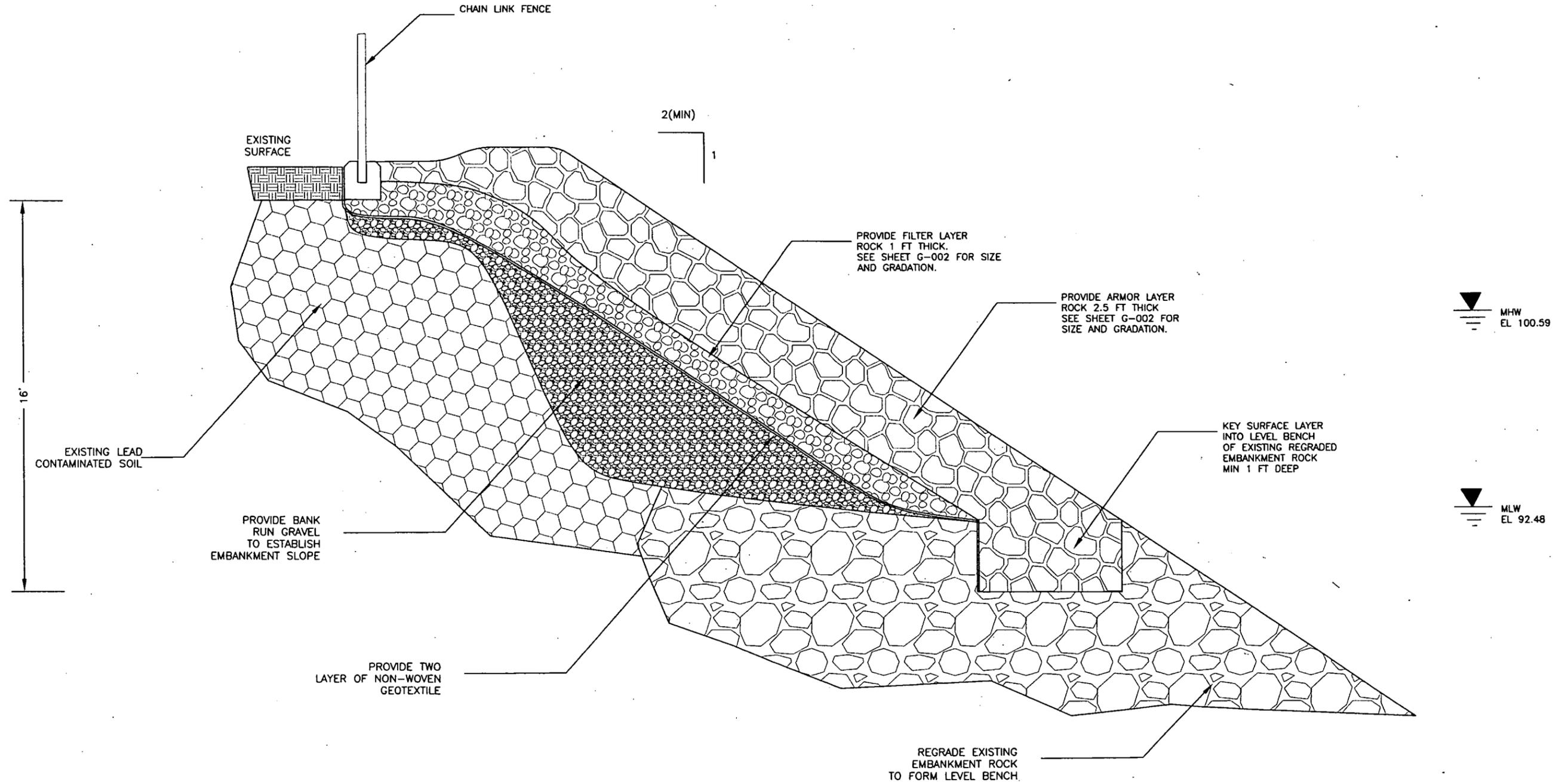
The objective of this removal action is to stabilize the remaining section of the Site 29 shoreline in order to minimize additional soil erosion and migration of chemicals into the Piscataqua River. The remaining section of shoreline is approximately 100 linear feet and extends from the previous shoreline stabilized in 1999 to the seawall and is adjacent to the paved area. The stabilization design provides for filtering by using multiple layers of increasingly larger materials. Any debris on the shoreline will be removed and disposed. The existing embankment rock, much of which has fallen to the bottom of the slope, will be regraded. Layers of soil/gravel, geotextile, intermediate filter rock, and surface rock will be placed to stabilize the slope. Specific aspects of the work are discussed in a Project Work Plan.

## 2.3 State and Local Authorities' Role

This work is being undertaken by the Navy as a Time Critical Removal Action using its lead agency authority under CERCLA. The State regulatory Agency, Maine Department of Environmental Protection (MEDEP), as well as the United States Environmental Protection Agency (USEPA) are part of the team that oversees investigations and cleanup activities performed at PNS.

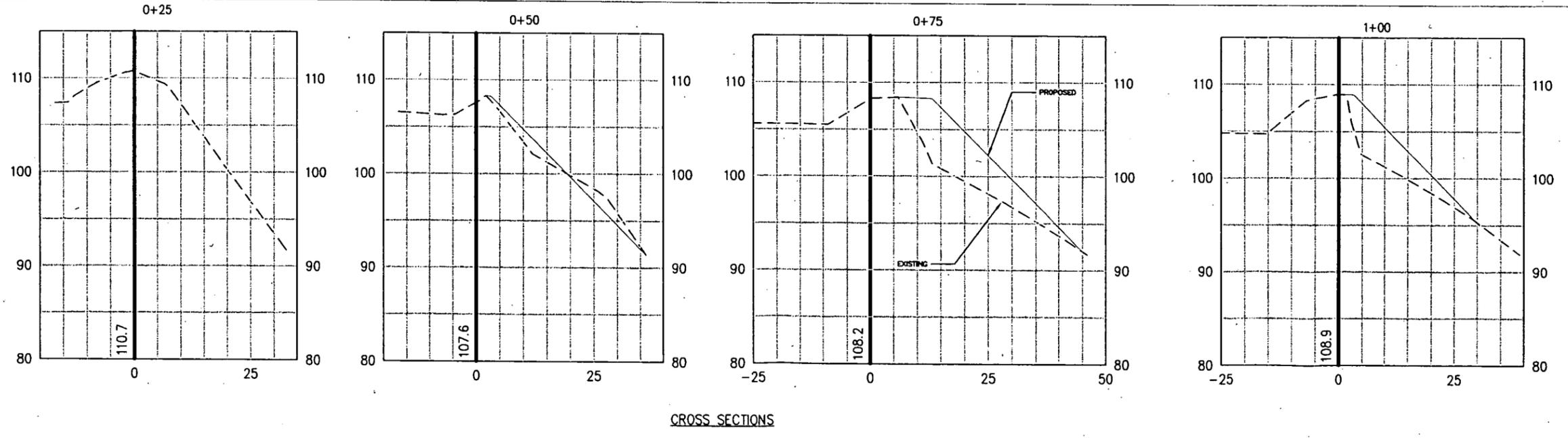
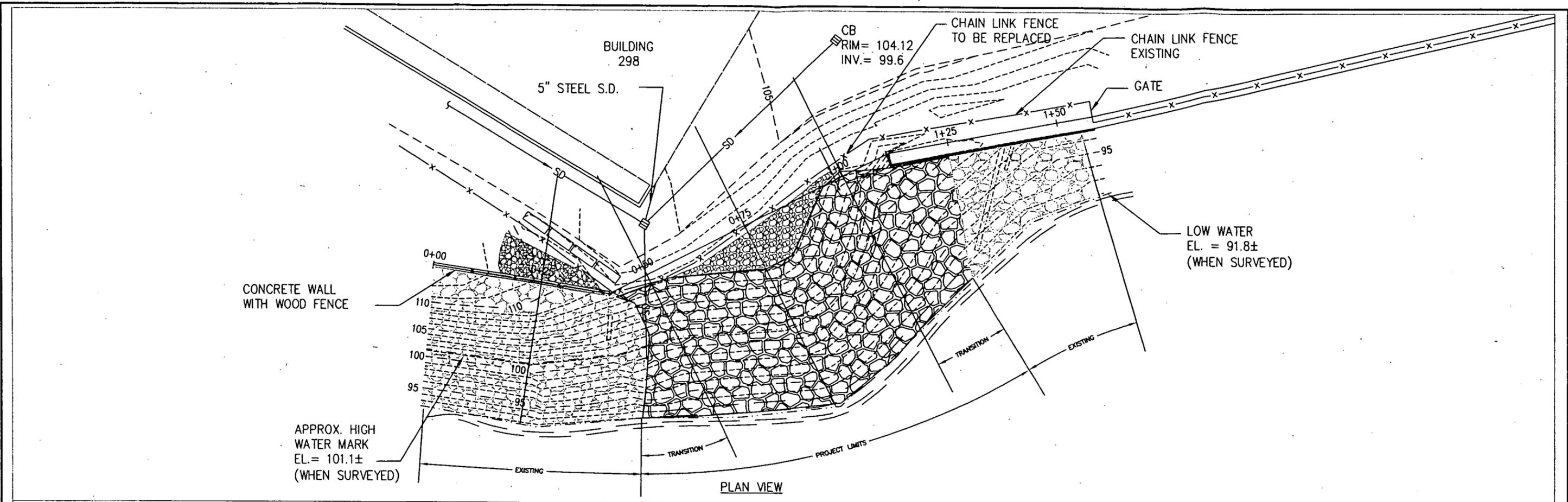
### 2.3.1 Potential for Continued State and Local Response

No state or local response removal actions are anticipated other than continued oversight of site cleanup activities under CERCLA. The Navy will provide the necessary funding and support for the removal action at PNS under its responsibility.



U.S. Navy RAC Portsmouth Naval Shipyard Kittery, Maine	
Figure 2 Typical Section	
	<b>TETRA TECH EC, INC.</b>

NOT TO SCALE



U.S. Navy RAC  
 Portsmouth Naval Shipyard  
 Kittery, Maine

Figure 3  
 Stabilization Plan

**TETRA TECH EC, INC.**

### 3.0 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

Site investigations have indicated the presence of soil contamination, principally lead at elevated levels. Other chemicals (cadmium, copper, and zinc) may also exceed CERCLA's unacceptable risk level of  $1 \times 10^{-4}$  and the State of Maine's risk guideline of  $1 \times 10^{-5}$ . A site-specific risk assessment including all data available from the site has been performed and is documented in "Revised OU2 Risk Assessment" dated November 2000.

#### 3.1 Threats to Public Health or Welfare

The primary contaminants of concern are metals and include beryllium, chromium and lead that may be present in the impacted soils. The Site-Specific Health and Safety Plan lists the potential site contaminants and significant physical and chemical data, health effects, and exposure limits.

The revised human health risk assessment for Operable Unit (OU) 2 was performed to characterize the potential risks to likely human receptors under current and future land use. Under current land use, potential populations exposed to contaminated media at the Site 29 Impact Area include persons who may work at the Site 29 Impact Area (occupational workers), construction workers potentially exposed to surface and subsurface soils, and recreational users. Military residents reside in the vicinity of the Site 29 Impact Area; however, access in most areas is restricted and/or limited. However, military residents (average tour of duty is usually 3 years with a maximum time at a facility of 4 years) are currently living at quarters in the Site 29 Impact Area. Therefore, under current land use, potential populations exposed to contaminated media at the Site 29 Impact Area include military persons residing at quarters, persons who may work at the site (occupational workers), construction workers potentially exposed to surface and subsurface soils, and recreational users.

Quantitative estimates of noncarcinogenic and carcinogenic risk for receptors potentially exposed to environmental media at the Site 29 Impact Area and qualitative and quantitative evaluation of exposure to lead in environmental media at the Site 29 Impact Area were summarized in the risk assessment.

Cancer risk estimates for all potential receptors exposed to soil (0 to 1 foot and 0 to 2 foot intervals) are within the USEPA target risk range. The cancer risk estimates for residents (adult + child) (military or hypothetical future resident) slightly exceed the State of Maine risk guideline. Potential carcinogenic risks for construction workers, occupational workers, and recreational users are less than the State of Maine risk guideline. The primary contributor to the carcinogenic risk is arsenic.

Hazard Indices (HIs) (calculated on a target organ/effect basis) for construction workers, occupational workers, recreational users, military residents, future adult residents, and future child residents are less than 1 indicating that adverse noncarcinogenic health effects are not anticipated. It should be noted that approximately 95 percent of the carcinogenic risk estimated for the Site 29 Impact Area is from exposure to arsenic which was detected in background soil samples collected for PNS.

The representative lead concentration in soil from 0 to 1 foot and 0 to 2 feet at the Site 29 Impact Area are 309 milligrams per kilogram (mg/kg) and 254 mg/kg, respectively. Exposure by adult worker and recreational users to average lead concentrations in surface soil is predicted to result in central estimate blood lead levels that are less than 10 micrograms per liter ( $\mu\text{g/L}$ ).

Noncarcinogenic risks (calculated on a target organ/effect basis) for all potential receptors from exposure to soil are acceptable. Carcinogenic risks for all receptors are less than USEPA and State of Maine risk guideline, with the exception of the risk to residents which slightly exceed the State of Maine risk guideline. This exceedance is mainly due to exposure to arsenic. Potential risks associated with lead

exposure are not expected to be a concern for a resident or any other receptor evaluated for the Site 29 Impact Area.

### **3.2 Threats to Environment**

If not stabilized, the contaminated soils would most likely continue to deteriorate and may release metals into the adjacent waters. Any releases to the adjacent waters may impact indigenous plant and marine life, principally from the arsenic and lead contamination as identified above. To protect the environment from a release of contamination, this removal action is being implemented. The measure serves to protect the Site 29 embankment soil from further erosion.

## **4.0 ENDANGERMENT DETERMINATION**

The actual or threatened releases of contaminated soils from the Site 29 shoreline could have presented a substantial endangerment to public health or welfare, or the environment, if not addressed by implementing the time-critical removal action discussed in this AM.

## **5.0 REMOVAL ACTION DESCRIPTION AND ESTIMATED COSTS**

### **5.1 Description of Removal Action**

The scope of work for this project includes removal of the existing fence along the Site 29 shoreline, removal and disposal of debris from the shoreline, regrading of the existing embankment rock, stabilizing the slope with gravel, geotextile, and stone layers, and replacement of the fence. All necessary supervision, labor, equipment, and materials required to perform the stabilization activities will be provided in accordance with applicable regulations. Upon completion of the stabilization activities, any impacted areas will be restored to their original condition.

#### **5.1.1 Removal Action Components**

The following major activities will be performed under this removal action:

- Install erosion and sedimentation control measures.
- Remove existing fence.
- Regrade existing embankment rock to form a level bench.
- Cover existing soil surface with bank run gravel.
- Lay geotextile along slope. Overlap seams 12 inches and lay seams perpendicular to slope.
- Place filter layer rock over geotextile.
- Place armor rock layer.
- Replace fence.
- Perform post-construction survey.
- Perform site cleanup and restoration.
- Demobilize resources.

#### **5.1.2 Contribution to Remedial Performance**

This removal action is consistent with the overall objectives of the PNS restoration project. The stabilization of the remaining shoreline completes the restoration of the Site 29 Area. This action will minimize future additional soil erosion and migration of chemicals into the Piscataqua River. The



- (i) "Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;"
- (ii) "Actual or potential contamination of drinking water supplies of sensitive ecosystems;"
- (iv) "High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;"

Therefore, the removal action is recommended for the Site 29 Area.

## 9.0 REFERENCES

Foster Wheeler Environmental Corporation, Removal Action Work Plan for DRMO Shoreline Stabilization at Portsmouth Naval Shipyard, Kittery, Maine. September 1999.

Tetra Tech EC, Inc., Final Time Critical Removal Action Work Plan for DRMO Shoreline Stabilization at Portsmouth Naval Shipyard, Kittery, Maine. October 2005.

United States Environmental Protection Agency (USEPA), Superfund Removal Procedures, Action Memorandum Guidance, OSWER Directive. December 1990.