

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0073

**ADDENDUM TO THE
FINAL SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)
Revision 0
February 19, 2004**

**TIME-CRITICAL REMOVAL ACTION AT THE
MARINE CORPS FIRING RANGE AND HISTORIC OUTFALL 4S
AT THE FORMER
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA**

DCN: FWSD-RAC-04-1044



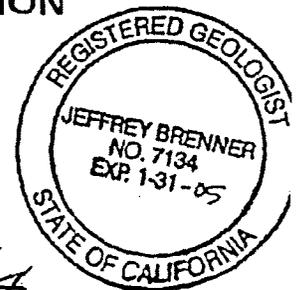
FOSTER WHEELER ENVIRONMENTAL CORPORATION

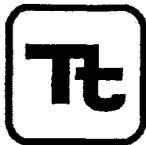
1230 Columbia Street, Suite 500
San Diego, CA 92101

J.R. Forz *Forz* 2/19/04
Vincent Richards, R.G., C.E.G. Date
Registered Geologist

Gerald Tamashiro 2/19/04
Gerald Tamashiro Date
Program Chemist

Narciso A. Ancog 2/19/04
Narciso A. Ancog Date
SWDIV Quality Assurance Officer





TETRA TECH FW, INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N68711-98-D-5713 (RAC III)

Document Control No. 04-1044

File Code: 5.0

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Ms. Beatrice Appling, 02R1.BA
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: 02/24/04
CTO: 0073
LOCATION: Mare Island

FROM:

Neil Hart, Program Manager

DESCRIPTION: Addendum to the Final Sampling and Analysis Plan
(Field Sampling Plan and Quality Assurance Project Plan), Rev. 0, 02/19/04

TYPE: [] Contract/Deliverable [x] CTO Deliverable [] Notification
[] Other

VERSION: Final REVISION #: 0
(e.g. Draft, Draft Final, Final, etc.)

ADMIN RECORD: Yes [] No [x] Category [] Confidential []
(PM to Identify)

SCHEDULED DELIVERY DATE: 02/24/04 ACTUAL DELIVERY DATE: 02/24/04

NUMBER OF COPIES SUBMITTED: 0/1C/2E Copy of SAP to N. Ancog [x]

COPIES TO: (Include Name, Navy Mail Code, and Number of Copies)

NAVY:

TtFW:

OTHER: (Distributed by TtFW)

D. Godsey (06CMDG) 0/1E

K. Weingardt

I. Amadea - SF Bay ROICC

B. Alhajar(06CM.BA)1C/1E

R. Rose

N. Ancog(03EN2.NA)1C/1E

L. Bercik

Basic Contract File (02R1)

C. Young

1C

M. Schneider

D. SILVA (ENR.DS) 3C/3E 8/4/05

Date/Time Received
02/24/04 11:00

N00221_003562
MARE ISLAND
SSIC NO. 5090.3

SAMPLING AND ANALYSIS PLAN IS APPENDIX A OF:

DRAFT
PROJECT WORK PLAN
MARINE CORPS FIRING RANGE AND HISTORIC OUTFALL 4S
REVISION 1

DATED 18 JULY 2003

THIS RECORD IS ENTERED IN THE DATABASE AND FILED AS

RECORD NO. N00221_000630

1.0 INTRODUCTION

This Addendum to the Sampling and Analysis Plan (SAP) was prepared by Tetra Tech FW, Inc. (TtFW), formerly Foster Wheeler Environmental Corporation (FWENC), to support additional sampling activities at the former Marine Corps Firing Range (MCFR) located at the Former Mare Island Naval Shipyard (referred to as Mare Island), Vallejo, California. This addendum was prepared on behalf of the Department of the Navy (DON) under Southwest Division Naval Facilities Engineering Command (SWDIV) Remedial Action Contract (RAC) No. N68711-98-D-5713, Contract Task Order (CTO) No. 0073. The preparation of the Work Plan (FWENC, 2003) was awarded under CTO No. 0064; however, the execution of the work was awarded under CTO No. 0073. This addendum complies with the requirements of revising the SAP when a scope or regulation change occurs during the course of the work in conjunction with *Environmental Work Instruction (EWI) #2, 3EN2.2, Review, Approval, Revision, and Amendment of Sampling and Analysis Plans (SAPs)* (SWDIV, 2001).

This addendum includes only changes to the sections of the SAP that require modification relevant to additional sampling activities such as sampling strategy and procedures. The sample packaging and handling procedures are provided in the original SAP as contained in Appendix A in the *Draft Project Work Plan, Revision 1, Marine Corps Firing Range and Historic Outfall 4S at the Former Mare Island Naval Shipyard, Vallejo, California*, DCN: FWSD-RAC-03-3146 (FWENC, 2003).

The baseline plan for this project was to use a wet screening process to remove bullets and bullet fragments from impacted soil at the MCFR. In accordance with the Work Plan (FWENC, 2003), a wet screen plant was mobilized to the site and began processing soil through the plant to assess the effectiveness of this technology on the site soils. The results of these efforts have demonstrated that the wet screen plant technology is not effective for handling site soils due to the very high silt and clay contents of the site soils. After discussions with the DON, a revised approach to handling the soils at the site was developed. Instead of excavating the entire area at the MCFR and using the wet screen plant to process the soil, it was determined that the most cost-effective approach to manage this removal action was to avoid excavation of soil that is below the site target cleanup goals (TCGs). Therefore, the original sampling approach has been revised from conducting confirmation soil sampling after excavation of the entire area to conducting site characterization sampling prior to excavation to determine which areas are above the TCGs. Subsequently, only the areas above the TCGs will be excavated, thereby minimizing the amount of soil to be sent for off-site disposal.

1.1 OBJECTIVES

Additional text:

- Collecting site characterization soil samples at the MCFR via a grid cell system to assess whether a removal action is required based on the TCGs. TCGs established are as follows: antimony – 31 milligrams per kilogram (mg/kg), copper – 3,100 mg/kg, and lead – 200 mg/kg.
- Collecting site characterization soil samples in portions of the North and Central Pistol Range berms at the MCFR after trenching at 100-foot intervals (where previous berms were built under the existing berms) to assess whether a removal action is required based on the TCGs.

3.0 MAPS

Additional text:

- Figure 1 Proposed Site Characterization Sampling Locations

4.0 SAMPLING STRATEGY

4.1 SOIL SAMPLING

The second paragraph will be replaced with the following text:

Site characterization soil samples will be collected at the MCFR to assess whether the area has been impacted by past operations. The area will be divided into 50-foot by 50-foot grids (see Figure 1). Low-risk and high-risk areas have also been identified in Figure 1 as to the probability for site contamination based on past sampling and historic knowledge of the site. In addition, a portion of the North and Central Pistol Range berms as identified in Figure 1 will be trenched at 100-foot intervals prior to sampling to identify the portion of the old berm that was theorized to be covered over by a new berm. The trenches will be inspected for visible evidence of the old berm and bullet fragments and then sampled.

Low-risk areas include primarily the range floors, sidewalls, and backs of berms. Soil samples will be collected at two depths [zero to 6 inches below ground surface (bgs) and 12 to 18 inches bgs] from the center of each 50-foot grid. All samples will be analyzed for lead, antimony, and copper, and these results will be compared against the TCGs listed in Section 1.1. For additional site information purposes, every fifth sample (or 20 percent of the total) collected for lead, antimony, and copper analysis will also be analyzed for the entire list of Title 22 metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). These analyses were added at the request of the regulatory agencies, although TCGs have not been established for these analytes.

In the high-risk areas (primarily the face of the impact berms), the sampling approach will differ recognizing that these areas are known to be contaminated (based on historic sampling in these areas), but the exact extent of contamination has not been fully established. Soil samples will be collected at four depths (zero to 6 inches, 12 to 18 inches, 24 to 30 inches, and 36 to 42 inches bgs) from the center of each 50-foot grid. Analysis of the soil samples for lead, antimony, and copper will proceed sequentially (from shallow to deep), and the deeper samples will only be analyzed if the shallow sample exceeds the TCGs. In addition, the zero to 6-inch sample from every fifth grid location will also be analyzed for the entire list of Title 22 metals, VOCs, SVOCs including PAHs, and PCBs at the request of the regulatory agencies, although TCGs have not been established for these analytes.

Grids in the low-risk area that are above the TCGs will potentially be excavated an additional 1-foot from the depth that was above the TCGs (based on overall evaluation of the site after all data has been assessed and soil disposition methodologies have been determined). If it is determined that the grids are to be excavated, confirmation soil samples would then be collected

from the floor in the center of each excavated grid to confirm that all soil above the TCGs has been removed. All samples would be analyzed for lead, antimony, and copper. Sample results above the TCGs would require over-excavation and resampling of the grid. At the request of the regulatory agencies, every fifth sample (or 20 percent of the total) collected for lead, antimony, and copper analysis will also be analyzed for the entire list of Title 22 metals, VOCs, SVOCs including PAHs, and PCBs, although TCGs have not been established for these analytes.

Grids in the high-risk area that are above the TCGs will be excavated to the top of the sampling interval where the results were below the TCGs, and those results will be used as confirmation sample results. If the deepest sampling interval (36 to 42 inches bgs) exceeds the TCGs, then the DON and regulatory agencies will be contacted to determine the course of further action.

In portions of the North and Central Pistol Range berms, trenches will be dug into the berms at 100-foot intervals. Three soil samples will be collected on one sidewall of each trench at the lower, middle, and upper third of the part of the trench where there is visible evidence of the old berm. If there is no visible evidence of the old berm, then three soil samples will be collected on one sidewall of each trench at the lower, middle, and upper third of the entire trench. All samples will be analyzed for lead, antimony, and copper, and these results will be compared against the TCGs listed in Section 1.1. Analytical results from the trench samples will be evaluated, and the DON and regulatory agencies will be contacted to determine the course of further action. At the request of the regulatory agencies, every fifth sample (or 20 percent of the total) collected for lead, antimony, and copper analysis will also be analyzed for the entire list of Title 22 metals, VOCs, SVOCs including PAHs, and PCBs, although TCGs have not been established for these analytes.

Sampling procedures for the collection of soil samples is detailed in Section 6.1.

6.0 FIELD METHODS AND SAMPLING PROCEDURES

6.1 SOIL SAMPLING PROCEDURES

The following will be added to Step No. 3:

3. For the MCFR area where samples will be collected at multiple depths (12 to 18 inches, 24 to 30 inches, and 36 to 42 inches bgs), a hand auger or similar device will be used after collection of the zero to 6-inch sample to access 12 inches bgs. The sampler will be driven again from 12 to 18 inches as described in Step 1. Additional depths will be accessed in the same manner. For the trench samples in the North and Central Pistol Range berms, the sampler will be used to collect the soil samples from one sidewall of each trench.

Step No. 8 will be added as follows:

8. Due to the possible nature of the samples containing bullet fragments, it may be necessary to request the laboratory to grind and/or homogenize a sample prior to analysis. This information will be provided to the laboratory based on field conditions during sampling.

8.0 QUALITY ASSURANCE OBJECTIVES

8.1 DATA QUALITY OBJECTIVES

Table 1 provides additional text to the summary of data quality objectives.

13.0 REFERENCES

Additional text:

Foster Wheeler Environmental Corporation (FWENC). 2003. *Draft Project Work Plan, Revision 1, Marine Corps Firing Range and Historic Outfall 4S at the Former Mare Island Naval Shipyard, Vallejo, California*. DCN: FWSD-RAC-03-3146. July.

Southwest Division Naval Facilities Engineering Command (SWDIV). 2001. *Environmental Work Instruction (EWI) #2, 3EN2.2, Review, Approval, Revision, and Amendment of Sampling and Analysis Plans (SAPs)*. November.

TABLES

TABLE A.8-1

SUMMARY OF DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Inputs to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
<p><u>Item No. 1 will be revised as follows:</u></p> <p>1. The primary objective of this project is to perform a TCRA at the MCFR to minimize any potential hazards associated with lead-contaminated soil and MEC and radiological items. Initial site characterization soil sampling will be performed via a grid cell system in low-risk and high-risk areas and in trenches in portions of the North and Central Pistol Range berms, as identified in Figure 1, to assess which areas are above the following TCGs: antimony – 31 mg/kg, copper – 3,100 mg/kg, and lead – 200 mg/kg.</p>	<p><u>Item No. 1 will be revised as follows:</u></p> <p>1a. Are the analytical results from the site characterization soil samples at the MCFR below the TCGs as listed in Table A.8-2?</p> <p>1b. Are the analytical results from the trench soil samples in portions of the North and Central Pistol Range berms below the TCGs as listed in Table A.8-2?</p> <p>1c. Are the analytical results from the confirmation soil samples at the MCFR below the TCGs as listed in Table A.8-2?</p>	<p>Modification not required.</p>	<p><u>Additional text:</u></p> <p>Figure 1 illustrates the proposed sampling locations for the site characterization soil sampling at the MCFR.</p> <p><u>Item No. 1 will be revised as follows:</u></p> <p>1a. Site characterization soil samples will be collected from the center of each grid at the MCFR. Two soil samples will be collected from the low-risk areas identified in Figure 1 at zero to 6 inches and 12 to 18 inches bgs. Samples will be analyzed for lead, antimony, and copper. Four soil samples will be collected from the high-risk areas identified in Figure 1 at zero to 6 inches, 12 to 18 inches, 24 to 30 inches, and 36 to 42 inches bgs. Analysis of the soil samples for lead, antimony, and copper will proceed sequentially (from shallow to deep), and the deeper samples will only be analyzed if the shallow sample exceeds the TCGs.</p>	<p><u>Item Nos. 1a and 1b will be revised as follows:</u></p> <p>1a. If the results of the site characterization soil samples at the MCFR in the low-risk area are above the TCG for lead, antimony, or copper, then the grid in question may potentially be excavated an additional 1 foot from the depth that was above the TCGs (based on overall evaluation of the site after all data have been assessed and soil disposition methodologies have been determined). If the results from the high-risk area are above the TCGs, then the grid will be excavated to the depth that is below the TCG, and the result for that sample depth will be used as the confirmation result for that grid. If the deepest sampling interval (36 to 42 inches bgs) exceeds the TCGs, then the DON and regulatory agencies will be contacted to determine</p>	<p>Modification not required.</p>	<p><u>Item No. 1 will be revised as follows:</u></p> <p>1a. Site characterization soil samples will be collected from the center of each grid. Two soil samples will be collected from the low-risk areas identified in Figure 1 at zero to 6 inches and 12 to 18 inches bgs. Samples will be analyzed for lead, antimony, and copper. Four soil samples will be collected from the high-risk areas identified in Figure 1 at zero to 6 inches, 12 to 18 inches, 24 to 30 inches, and 36 to 42 inches bgs. Analysis of the soil samples for lead, antimony, and copper will proceed sequentially (from shallow to deep), and the deeper samples will only be analyzed if the shallow sample exceeds the TCGs.</p> <p>For additional site information, see</p>

TABLE A.8-1

SUMMARY OF DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Inputs to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
			<p>For additional site information, 20 percent of the samples from the low-risk area and every fifth grid location (at the zero to 6-inch sample depth) in the high-risk area will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs.</p> <p>1b. Trenches will be dug at 100-foot intervals. Evidence of the old berm will be identified, and three soil samples will be collected from one of the sidewalls in the lower, middle, and upper portion of the old berm. If the old berm cannot be identified, then three soil samples will be collected in the lower, middle, and upper portion of one of the sidewalls of the entire trench. Samples will be analyzed for lead, antimony, and copper. For additional site information, twenty percent of the samples will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs.</p> <p>1c. Confirmation soil</p>	<p>the course of further action. If the results in the low-risk or high-risk area are below the TCGs, then no further action will be required.</p> <p>1b. If the results of the trench samples are above the TCGs, then the DON and regulatory agencies will be contacted to determine the course of further action. If the results are below the TCGs, then no further action is required.</p> <p>1c. If the results of confirmation soil samples collected at the MCFR in the low-risk area are above the TCG for lead, antimony, or copper, then the area in question will be over-excavated and resampled. If the results are below the TCGs, then backfill operations may commence.</p>		<p>information, 20 percent of the samples from the low-risk area and every fifth grid location (at the zero to 6 inch sample depth) in the high-risk area will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs.</p> <p>1b. Three soil samples will be collected from one of the sidewalls in each trench from the lower, middle, and upper portion of the identified old berm or the entire trench (if the old berm is not identified). Samples will be analyzed for lead, antimony, and copper. For additional site information, 20 percent of the samples will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs.</p> <p>1c. A confirmation soil sample will be</p>

TABLE A.8-1

SUMMARY OF DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Inputs to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
			<p>samples will be collected after excavation of each grid in the low-risk area that was above the TCGs. Samples will be analyzed for lead, antimony, and copper. For additional site information, twenty percent of the samples will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs. In the high-risk area, analytical results that are below the TCGs at the deeper level would serve to bound the depths of the excavation, and those results will be used as confirmation sample results.</p>			<p>collected from the center of each grid in the excavated areas of the MCFR in the low-risk area. Samples will be analyzed for lead, antimony, and copper. For additional site information, 20 percent of the samples will also be analyzed for Title 22 metals, VOCs, SVOCs including PAHs, and PCBs.</p>

Notes:

- bgs - below ground surface
- DON - Department of the Navy
- MCFR - Marine Corps Firing Range
- MEC - munitions and explosives of concern
- mg/kg - milligrams per kilogram
- PAH - polynuclear aromatic hydrocarbon
- PCB - polychlorinated biphenyl
- SVOC - semivolatile organic compound
- TCG - target cleanup goal
- TCRA - time-critical removal action
- VOC - volatile organic compound

FIGURES

DRAWING NO:
0410441.DWG

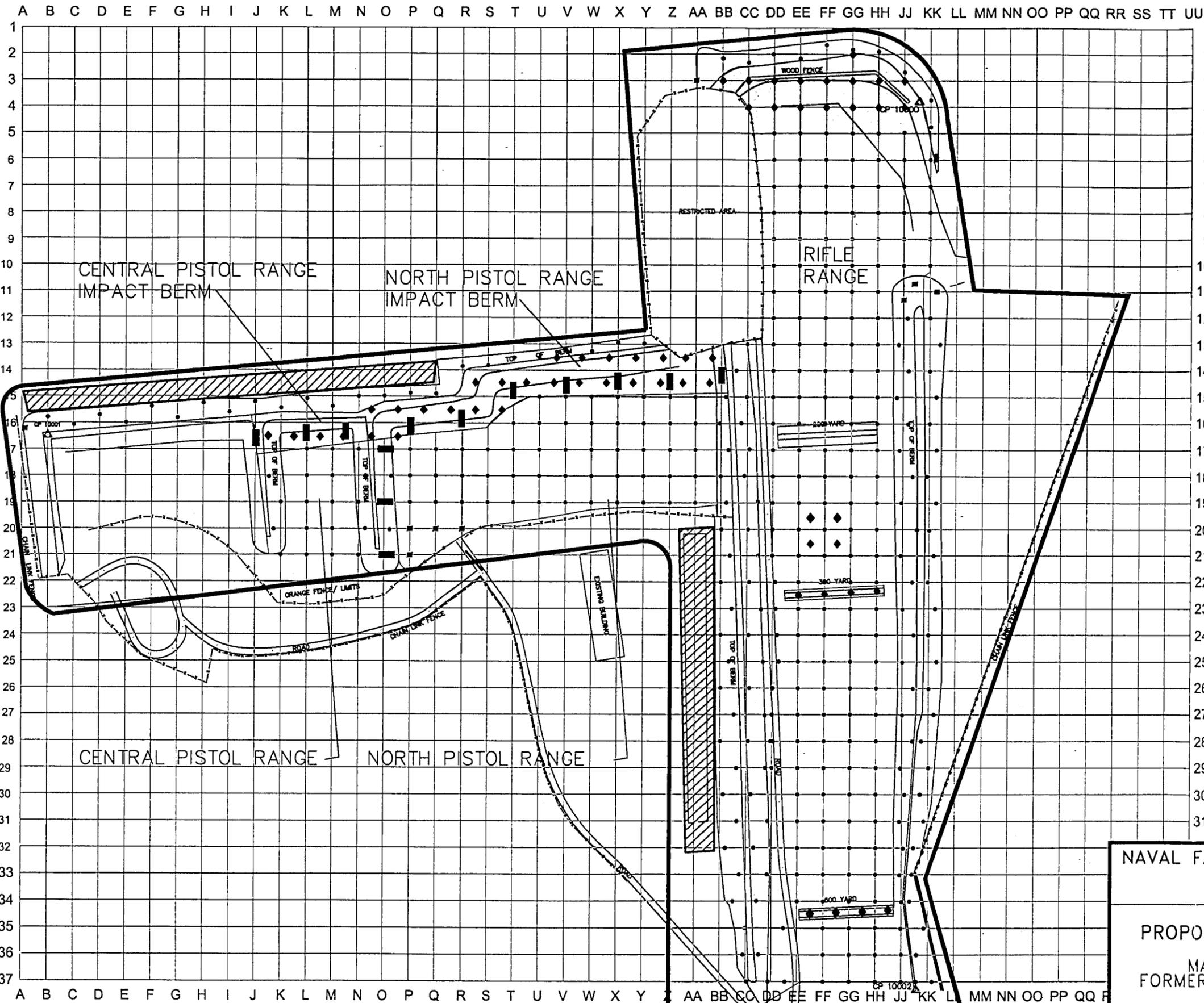
DCN: FWSD-RAC-04-1044
CTO: 0073

APPROVED BY: KW

CHECKED BY: LB
REV: REVISION 1

DRAWN BY: KLD
DATE: 02/04/04

C:\103-031.DWG
PLOT/UPDATE: DEC 08 2003 15:17:15



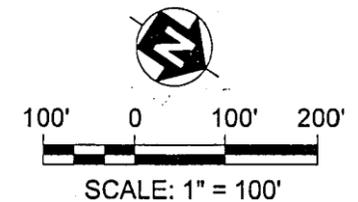
LEGEND

-  LOW-RISK AREA
-  HIGH-RISK AREA
-  POTENTIAL HABITAT AREA
-  LOW-RISK SAMPLE LOCATIONS
-  HIGH-RISK SAMPLE LOCATIONS
-  SAMPLING NOT POSSIBLE DUE TO EXISTING AND/OR CHANGING FIELD CONDITIONS
-  TRENCHES-THREE (3) SAMPLES
-  MARINE CORPS FIRING RANGE (MCFR)

NOTES:
LOW-RISK SAMPLE LOCATIONS
SAMPLED AT TWO (2) DEPTHS 0-6"
AND 12"-18"bgs

HIGH-RISK SAMPLE LOCATIONS
SAMPLED AT FOUR (4) DEPTHS 0-6",
12"-18", 24"-30", AND 36"-42"bgs

RIFLE RANGE HAS FIRING LINES
AT 500, 300, AND 200 YARDS FROM
THE TARGET BERM



NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST DIVISION
SAN DIEGO, CA

FIGURE 1
PROPOSED SITE CHARACTERIZATION
SAMPLING LOCATIONS
MARINE CORPS FIRING RANGE
FORMER MARE ISLAND NAVAL SHIPYARD
VALLEJO, CA

