RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT SAMPLING AND ANALYSIS PLAN (FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN) FOR THE FIELD INVESTIGATION OF LEAD SHOT AT INSTALLATION RESTORATION SITE 27 CLIPPER COVE SKEET RANGE, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the regulatory agencies on the "Draft Sampling and Analysis Plan [SAP] (Field Sampling Plan/ Quality Assurance Project Plan) for the Field Investigation of Lead Shot at Installation Restoration [IR] Site 27, Clipper Cove Skeet Range, Naval Station Treasure Island" dated May, 2007. The Navy received comments from: (1) U.S. Environmental Protection Agency (EPA) on June 13, 2007, (2) Department of Toxic Substances Control (DTSC) on June 13, 2007, (3) San Francisco Bay Regional Water Quality Control Board (Water Board) on June 11, 2007, and (4) on behalf of Treasure Island Development Authority Geomatrix Consultants, Inc. (Geomatrix) and Maxon Consulting (Maxon), on June 22, 2007.

The Navy's responses to the comments received are organized into six sections according to each reviewer that submitted comments and are presented below.

RESPONSES TO COMMENTS FROM CHRISTINE KATIN, REMEDIAL PROJECT MANAGER, EPA

Specific Comments

1. **Comment:** **A missing reference was noted previously. The Navy agreed to provide the complete reference for "Richman, S.E., and J.R. Lovvorn. 2003 'Relative Foraging Value to Lesser Scaup Ducks of Native and Exotic Clams from San Francisco Bay.' Volume 14. Number 4. Pages 1217-1231. November." The publication information (Ecological Applications) is still absent from the citations on pages 9 and 60. Please correct the omission.**

   Response: The reference for "Richman and Lovvorn 2003" has been revised in Table 3 and Section 5 to read as follows: "Richman, S.E. and J.R. Lovvorn. 2003. "Relative Foraging Value to Lesser Scaup Ducks of Native and Exotic Clams from San Francisco Bay." *Ecological Applications*. Volume 14. Number 4. Pages 1217-1231. November."

RESPONSES TO COMMENTS FROM JAMES M. POLISINI, STAFF TOXICOLOGIST, DTSC

General Comments

1. **Comment:** **The Draft Sampling and Analysis Plan appears to fulfill the interagency discussions regarding collection of lead shot and lead sediment concentration sufficient to allow the evaluation of the potential ecological hazard for diving ducks utilizing the nearshore environment of IR Site 27, the Former Skeet Range.**

   Response: Comment noted.

Specific Comments

1. **Comment:** **The Data Quality Objectives (DQO) table (Table 3, Step 1) states the Navy is conducting a Feasibility Study (FS) to study remedial alternatives for reducing potential risk to diving ducks. The document outlines, and is titled, a Sampling and Analysis Plan (SAP). While the results of the activities outlined in the SAP may support a referenced FS Report (Section 2.1.5, page 32), the methodology outlined in this document will not produce a FS. Please correct or expand the reference to the FS in the DQO table.**

   Response: Step 1 in Table 3 has been revised to read as follows: "The Navy is conducting a feasibility study (FS) to evaluate remedial alternatives at Installation Restoration (IR) Site 27, the Clipper Cove Skeet Range, at former Naval Station Treasure Island. The remedial alternatives are focused on reducing potential risk to diving ducks from ingestion of lead shot in sediment, which was identified in the offshore sediment remedial investigation report (Tetra Tech 2001). This SAP was developed to provide additional data for evaluating remedial alternatives and finalize the current FS (Tetra Tech 2004)."

2. **Comment:** **Weighing each sediment core sample 'to the nearest 0.5 kilogram' (Section 2.1.1, page 31, third bulleted item) will not provide sufficient accuracy. Please record the sample weight to the nearest gram, if practical, prior to adding site water for sieving.**

   Response: The third bullet of Section 2.1.1 has been revised to read as follows, "The core will be divided into 6-inch intervals (0-6, 6-12, 12-18, and 18-24 inches) with the initial 0-6 inch interval further

subdivided into two 3-inch sections (0-3 and 3-6 inches), placed in 1-gallon Ziploc® bag and weighed to the nearest 0.1 grams."

3. **Comment:** **Please more completely describe the method by which sediment core samples 'with the exception of the 0-3 and 3-6 inch sample' (i.e., 6-12, 12-18, and 18-24 inch samples) will be 'homogenized in the Ziploc® bag' (Section 2.1.1, page 31, fourth bulleted item).**

   Response: The fourth bullet of Section 2.1.1 has been revised to read as follows: "With the exception of the 0-3 and 3-6 inch sample interval all other sample intervals (6-12, 12-18, and 18-24 inch) will be homogenized in a 1-gallon freezer Ziploc® bag by hand blending, kneading, and mixing to disperse the sediments evenly."

4. **Comment:** **The detailed description of sediment core sampling (Section 2.2.1, page 32) states that 'As discussed in Section 2.1.1, the sediment core will be extruded'. The referenced section (Section 2.1.1) does not specifically mention extrusion of the sediment core. Please include this step as a bulleted item in Section 2.1.1.**

   Response: The first bullet of Section 2.1.1 has been revised to read as follows: "The core tube liner will be extruded from the core sampler by pushing it through and away from the outer core, the inner liner will then be cut open and the sediments photographed, and the length of sediment collected will be recorded to the nearest 0.1 foot."

5. **Comment:** **HERD recommends that core tube liners be used to maintain any vertical differences in sediment cores (i.e., limit sediment adherence to the coring tube) and aid in extrusion of the core once collected (Section 2.1.1, page 31).**

   Response: Please refer to the response to specific comment 4 above.

6. **Comment:** **Photographs of each core, once extruded, are indicated earlier in the document (DQO Table 3, page 9, step 7; Section 1.6.1, page 22), but should be clearly indicated in the description of sediment core handling (2.1.1, page 31).**

   Response: Please refer to the response to specific comment 4 above.

7. **Comment:** **In addition to recording the horizontal location of the sampling (Section 2.2.1, page 33), the depth to the sediment water interface should be recorded for both the sediment core samples and the surface grab samples (Section 2.2.2, page 33). The depths for each core sample should be reported to some commonly-corrected depth (e.g., surveyed shore location or feet below Mean Sea Level).**

Response: Sections 2.2.1 and 2.2.2 have been revised to include the following paragraph:

> Before sampling at each predetermined sample location (Figure 3), the depth from the water surface to sediment will be recorded to the nearest 0.25 feet in the field log book. This water column measurement will be used to determine the appropriate depth to advance the sample core. The final depth of the sample core plus the water column depth will be compared with the tide height at the time of sample collection to estimate the depth of sample collection in reference to mean lower low water (MLLW).

8. **Comment:** **A description of the quantity of sediment collected with the coring device (i.e., 24 ounces) is placed in the text section discussing sediment grab sample collection (Section 2.2.2, page 33). Please either transfer this sediment core discussion to Section 2.2.1 or indicate that 24 ounces of the grab sample will also be submitted for grain size and Total Organic Carbon (TOC) analysis.**

Response: The fourth sentence of Section 2.1.2 has been revised to read as follows: "A minimum of 24 ounces of the grab sample will be containerized for grain size and TOC analysis at an off-site laboratory."

RESPONSES TO COMMENTS FROM HENRY WONG, REMEDIAL PROJECT MANAGER, DTSC

Specific Comments

1. **Comment:** **Section 1.6.5: The SAP states that "...the FS will be *finalized*" when the Navy has obtained sufficient data to meet the data quality objectives. Please replace the phase with "...the FS will be *prepared for BCT review*." Following the Base Realignment and Closure Cleanup Team (BCT) review and adequate revision on the feasibility study report, DTSC will approve the feasibility study report.**

   Response: Section 1.6.5 has been revised to read as follows: "If sufficient data are obtained to meet DQOs, data gathered from this sediment investigation will be summarized for BCT discussion prior to finalizing the FS."

2. **Comment:** **Section 3.2: As stated in the SAP's objective, the Navy will gather sediment data for identifying Site 27 remedial alternatives. Hence, the SAP is essentially a remedial investigation workplan. Upon implementation of the SAP, the Navy should prepare a remedial investigation report to document the results. Please revise Section 3.2 to describe that the Navy will prepare a report for BCT review. DTSC intends to issue a letter concluding that the Navy has gathered sufficient data and is ready to commence the feasibility study.**

   Response: The Navy is conducting the investigation of lead shot to support the feasibility study (FS) and the findings in the remedial investigation report. The FS was put on hold pending this investigation, as discussed at the January 2006 BCT (Navy 2006a) meeting and November 2006 technical meeting to discuss the Site 27 DQOs (Navy 2006b). The Navy will provide a statistical summary of lead shot recordings as well as a figure to present the lead shot counts at each sample location and depth. This data will be presented for BCT discussion prior to completing the FS. However, no additional report will be produced.

RESPONSE TO COMMENTS FROM GSU, DTSC

Specific Comments

1. **Comment:** **Section 1.3.1 – Data Quality Objectives: GSU questions the decision rule (Step 5) that states that a grid that is found to contain more than one lead shot will be addressed in the feasibility study (FS). The grid is an arbitrary mechanism that is used to facilitate sampling design. A majority of the proposed samples are placed at the corners of a grid and do not necessarily represent the entire grid in which they are located. GSU requests that the Navy consider revising the decision rule to indicate that the data will be evaluated spatially to determine the areas that appear to contain greater quantities of lead shot for inclusion in the FS.**

   Response: DQO development included obtaining regulatory agency input and concurrence. A DQO project scoping meeting was held on November 30, 2006 (meeting minutes from the November 30, 2006 project scoping session are provided as Appendix E in the SAP). Based on discussions at the November 30, 2006 meeting, draft DQOs were developed and submitted to the BCT for review January 30, 2007. DQOs were then revised again based on BCT comments on the draft DQOs, which were received in February 2007. Revised draft DQOs were submitted to the BCT on March 8, 2007. BCT comments on the March 8, 2007 version of the DQOs were incorporated into the draft SAP, submitted May 10, 2007. As noted in the above response to Henry Wong comment number 2, data gathered during the sediment investigation will be summarized for BCT discussion prior to finalizing the FS. The DQOs as presented in Table 3 of the draft SAP have not been revised.

2. **Comment:** **Section 1.6.5 – Reports Generated: This section states that data gathered from this sediment investigation will be summarized and the FS will be finalized if sufficient data is obtained to meet the data quality objectives (DQOs). The objective of the sampling (as stated in the DQOs, Step 2) is to determine whether lead shot is present in sufficient quantities to pose a risk to diving ducks within 150 feet of the shoreline. Please clarify the decision logic that will be used to determine whether sufficient data has been obtained to meet this objective.**

Response: If field conditions allow for the proposed sampling design to be executed as described in the final SAP, then the Navy will conclude that the data are sufficient to meet the stated DQOs provided in Table 3. Please see response to Henry Wong, DTSC, specific comment 1 (page 5).

3. **Comment:** **Section 2.7.1 – Calibration of Field Equipment: Please identify the types of field equipment, in addition to the analytical balance, that will require calibration. Please explain the difference between the Daily Equipment Calibration Log and the Field Equipment Calibration Log that are included in Appendix C.**

Response: Section 2.7.1 has been revised to read as follows: "The analytical balance used to weigh samples and biota will be calibrated daily before and after field activities or sooner if the equipment is turned off. The calibration information will be maintained on the field instrument calibration log (see Appendix C). Calibration procedures for the analytical balance will be as specified in the manufacturers' instruction manual, which is to be maintained with the instrument for the duration of field activities."

Additionally, Appendix C will be revised to include only the Field Instrument Calibration Log.

RESPONSES TO COMMENTS FROM AGNES FARRES, PROJECT MANAGER, WATER BOARD

Specific Comments

1. **Comment:** **Section 1.1.6: This section presents the screening criteria for Site 27 as more than one lead shot present in any sampling grid. To provide a frame of reference for the screening criteria, provide information on the size and depth of each sampling grid. This comment also applies to Table 3, Step 7.**

   Response: The following has been added as the second sentence in Section 1.1.6: "As shown on Figure 3, sampling grids are 150 feet by 150 feet horizontally and will extend to 2 feet vertically."

   The following has been added as the second sentence of Step 7 in Table 3: "The sampling grids each measure 150 feet by 150 feet with sampling to be performed to a maximum depth of 2 feet."

2. **Comment:** **Section 1.2.1: During the sediment investigation, data on grain size, total organic carbon, and benthic biomass will be collected in the upper three inches. Explain the purpose of collecting this additional data (e.g. benthic biomass provides a food source resulting in suitable habitat for diving ducks).**

   Response: The third and fourth sentences of Section 1.2.1 have been revised to read as follows: "Benthic biomass refers to organisms that live within the sediment surface that could be available as forage for diving ducks. Total organic carbon and grain size data will be used to characterize the surface sediment where ducks may forage. These secondary data may be used in the FS to characterize the likelihood of ducks foraging in the area where they may be exposed to lead shot."

3. **Comment:** **Table 3, Step 3: Include a bullet for secondary data such as grain size, total organic carbon, and benthic biomass.**

   Response: The secondary data are not included in the decision rules in Step 3 because they are not direct inputs to the decision in this investigation. Step 3 in Table 3 has not been revised.

4. **Comment:** **Table 3, Step 5: This step identifies the following decision rule "If less than two lead shot are identified in all six inch intervals in a sampling grid then the sampling grid will not be addressed**

in the FS; otherwise, the sampling grid will be addressed in the FS". Specify the dimensions of the 6-inch sampling intervals. Also, the decision rule could be misinterpreted as less than two lead shot in each six-inch interval in a sampling grid. For clarity and consistency, the decision rule or screening criterion should be restated similarly throughout the report as "more than one lead shot present in any sampling grid".

Response: Step 5 in Table 3 has been revised to read as follows: "If more than one lead shot is present in any 6-inch sample interval from a grid, then the grid will be evaluated in the FS; otherwise the sampling grid will not be addressed in the FS (Navy 2007)."

5. **Comment: Table 3, References: Correct the 2nd reference to "San Francisco Regional Water Quality Control Board".**

Response: The San Francisco Regional Water Quality Control Board reference in Table 3 and Section 5 has been revised to read as follows: "San Francisco Bay Regional Water Quality Control Board. 1993. "Site Cleanup Requirements for Naval Station Treasure Island, Treasure Island Skeet Range." San Francisco Bay Region. Order 93-130."

RESPONSES TO COMMENTS FROM GARY FOOTE, PRINCIPAL GEOLOGIST, GEOMATRIX

1. **Comment:** **As you are aware, Geomatrix has previously raised questions about the Navy's conceptual model, whereby lead shot in Clipper Cove is believed to be covered by a cap of clean sediment (see Geomatrix comments on the Draft Remedial Investigation Report and Draft Feasibility Study Reports). Part of the basis for our concern has been the fact that lead shot was found in the upper one foot of sediment throughout Site 27 during the 1997 investigation. This Draft Site 27 SAP indicates that further investigation is required in the area within 150 feet of the shoreline because sediment erosion has occurred in this area and because lead shot was found in the upper 1 foot of the only sample location within this area (Section 1.1.2). We again wish to point out that lead shot also was found in the upper one foot in four of the nine samples collected in the area of sediment accumulation (beyond 150 feet from the shore) in the 1996 investigation. The source of sediment that was deposited in the area of sediment accumulation may have been lead-shot-affected sediment from the zone of erosion (within 150 feet of the shore), resulting in the presence of lead shot in the sediment that accumulated after the skeet range operations ceased. Pending the outcome of this investigation, it may be appropriate to further investigate the area of sediment accumulation beyond 150 feet from the shore.**

   Response: Comment noted. The Navy has concluded that sediments outside the area of investigation do not pose risk to ecological receptors and has, with concurrence from the BCT, initiated this investigation of lead shot based on the lack of sediment deposition within 150 feet of the shoreline (Navy 2005a, 2007b). Data gathered during the sediment investigation will be summarized for BCT discussion prior to finalizing the FS.

2. **Comment:** **If the Navy learns that lead shot is present in the upper two feet of sediment during this investigation, we recommend that borings be advanced deeper to ascertain the vertical extent of the lead shot. At a minimum, borings should be advanced to a depth of 2 feet below the depth interval containing lead shot. If lead shot is present in the sediment samples proposed in this study at sufficient quantities to require dredging as remediation, then the underlying sediments will not be sufficiently characterized, leaving the post dredging exposure unknown. Furthermore, even if dredging is not required for remediation purposes, the Navy has established that this is an**

area of sediment erosion. Deeper sediments will be exposed as a result of natural processes and ecological receptors will be exposed to these deeper sediments in the future. The Navy may wish to defer the collection of deeper samples until the currently proposed investigation is complete, however, we believe it is prudent to collect the deeper data during a single mobilization, using judgment based on result of the field screening for lead shot.

Response: The hydrographic data indicate that the area within 150 feet of the shoreline is in a steady state, with minimal erosion or deposition of sediment occurring (Navy 2005b). Diving ducks are not exposed to lead shot at sediment depths below two feet. Data gathered during the sediment investigation will be summarized for BCT discussion prior to finalizing the FS.

3. **Comment: The document should discuss the measures that will be taken if complete core is not recoverable at a sample location. Will the Navy repeat the sampling attempt until a complete core is recoverable? If a complete core can not be recovered, how will the sample depths be designated? For example, if only 12 inches of core are recovered in a 24-inch sample run, will the core be assumed to represent the upper 12 inches of the 24-inch sample run?**

Response: The following paragraph has been added to Section 2.2.1.

> Refusal is not anticipated while coring in Clipper Cove sediments; however if refusal is encountered, three attempts will be made within five feet horizontally from the original sample location. If coring at the original location was not successful, an additional three attempts will be made approximately 20 feet toward the center of the grid in the same manner. If refusal is encountered again after three attempts at this new location, the boring will be attempted another 20 feet toward the center of the grid, and three more attempts will be made to collect the core sample. A sample location will be abandoned within a section of the grid if the core is not retrieved after 9 attempts, as described above.

RESPONSES TO COMMENTS FROM CYNDA MAXON, MAXON CONSULTING

GENERAL COMMENTS:

1. **Comment:** **Section 1.0 – Project Description and Management: The project description is misleading and is not relevant to the rest of the document: "The purpose of this investigation is to verify findings reported by the Remedial Investigation Report (Tetra Tech 2001)...". If this is the case, a summary of those finding (e.g., displaying the distribution of lead shot) should be included to determine whether the sampling plan is truly building on previous findings. Subsequent selection of sample design, analytical method, and the whole section on measurement quality objectives (particularly representativeness, completeness, comparability in Section 1.3.2 have very few constraints if not dovetailed to the earlier studies, other than detection levels below Effects-Range Low values for residual lead. The sampling design is appropriate if it is based on an assumption that lead shot may exist within 150 feet of shoreline; but it is hard to determine whether it will confirm or amplify previous results.**

   Response: The third sentence in Section 1.0 has been revised to read as follows, "The purpose of this investigation is to provide additional data for evaluating remedial alternatives for the ongoing feasibility study (FS)."

2. **Comment:** **Section 1.3 – Quality Objectives and Criteria: The most important outcome of this field effort will be the number of retained lead shot in 6 inch cores, yet there is very little information on how this will be accomplished. The idea of performing this in real time, on a ship is ill-conceived and does not sound like careful operation. Either a detailed method or a standard operating procedure on lead shot measurement needs to be included in the SAP. In addition to a step-wise procedure, an adequate description of the differentiation of lead shot from all other debris larger than 1 millimeter needs to be included. Historical lead shot in sediment often appears "gravel-like" and bears little resemblance to unweathered lead shot. The geologist or designated field sampler should have previous experience in the identification of in situ lead shot; and a data quality objective (DQO) should be included for the identification and measurement of lead shot (in the field or laboratory). Since lead shot, like most other sediment chemical parameters, is usually measured in a laboratory under**

controlled conditions, rationale for the proposed deviation should be provided.

Response: Sections 2.1.1, 2.1.2, 2.2.1, and 2.2.2 have been revised to indicate that sediment grab samples and cores will be transported to the onshore area of Site 27 for processing. Additionally, these sections have been updated with the following sentence: "All material greater than 1 mm will be placed in a Ziploc® bag and labeled by sample identification for further potential lead shot count verification."

Cindi Rose from SulTech is scheduled to be on-site during initial field activities to assist with lead shot verification. Cindi has previous experience on lead shot identification on Navy projects. Additionally, all material greater than 1 mm will be reviewed for quality control purposes by Ms. Rose.

3. **Comment:** **The DQO section is quite detailed for residual lead – an ancillary measurement – but there is no quality assurance/quality control for the shot enumeration and no proposal for validation (Section 4.1.3). In addition, the proposed duplicates are for lab measurements, not the most critical field measurement (Section 2.5.1.1). Finally, even in the assessment and oversight section (especially Section 3.1.1), there is no explicit evaluation of the efficiency of the as yet-named geologist that will report the number of lead shot (Table 5). The priorities and level of detail given in this SAP are not aligned with the stated goal of determining lead shot distribution necessary to develop a remedial design. In addition, the method choice for grain size and lack of method descriptions for lead shot and biomass suggest that the consultant is inexperienced in collection and analysis of data of this type. A qualified and experienced Navy scientist should perform oversight of the field portion of this study to ensure that these critical data are collected and analyzed correctly.**

Response: Activities to be performed in the field include filtering sediment sample intervals to identify and record lead shot and biomass. Filtering and weighing all sample intervals will be performed by a team of two field staff with oversight performed by a State of California registered geologist. Additionally, all material greater than 1 mm will be placed in a Ziploc® bag and labeled by sample identification for further potential lead shot count verification. Because spiking of lead shot is not feasible, other types of quality control are not applicable to these field determinations. Benthic

biomass classifications will be determined by a benthic invertebrate taxonomist from TEG Oceanographic Services with over 20 years of experience performing this type of work.

Grain size analysis will be performed in accordance with American Society of Testing and Materials Standard Test Method D422-63(2002)e1 (ASTM 2002). This test method covers the quantitative determination of the distribution of particle sizes in soils. The distribution of particle sizes larger than 75 micrometers (retained on the No. 200 sieve) is determined by sieving, while the distribution of particle sizes smaller than 75 micrometers is determined by a sedimentation process, using a hydrometer to secure the necessary data. Table 9, Table 10, and the reference section of the SAP have been revised.

SPECIFIC COMMENTS:

1. **Comment:** **Include a graphic of the depositional depth and all shot data collected in Figure 3.**

   Response: Figure 2, "Lead Shot in Sediment at Clipper Cove Skeet Range, IR Site 27" and Figure 4, "Net Bathymetric Change from 2002 to 2005" are included as attachments to the response to comments.

2. **Comment:** **In the decision Rule Step 5 (Section 1.3.1), provide a reference for the use of the criterion of 2 shot per 6 inch core. Even though the criterion was agreed to in previous project meetings between the Navy, regulators, and concerned parties, rationale for its use should be documented in the SAP and subsequent report for prospective readers.**

   Response: Please see response to Water Board specific comment 4 (page 9). Additionally, the January 9, 2007, BCT meeting (Navy 2007a) in which the criterion for greater than one lead shot in any 6-inch sample interval from a grid is documented in Section 1.1.6.

3. **Comment:** **Decision Rule Step 6 is unclear. Since the criterion is fixed, and the measurements discrete in value, it is not possible to estimate error (particularly since there is no QC on lead shot measurement). However, estimates of the true lead shot concentration in the parcel as a whole can be estimated by assuming some shot distribution, perhaps a Poisson. Along the same lines in Section 1.3.2.1 (precision) it is argued that field spatial variability is not an objective of this project. Some**

confidence will have to be assigned to the guessed at 2 shot border of the site, so spatial variability will or should be addressed.

Response: Limits on decision errors are not specified for providing grid- or area-wide estimates of lead shot density, as this is not an objective of the sampling design. Counts of lead shot within individual cores and grids will be evaluated using conservative decision rules (no more than one lead shot in any sub-sample). This establishes a low threshold for identifying grids that will be investigated further in the FS and is designed to be environmentally protective. The distribution of lead shot across grids will be evaluated qualitatively to describe potential spatial patterns in shot density. A Poisson model would not be appropriate for estimating the mean shot density, as it relies on the assumption that counts are randomly distributed. A Poisson model could, however, be used as a test for aggregated patterns in shot density, although it is likely that a qualitative evaluation of shot density using box plots or another graphical technique would accomplish the same goal. In terms of cost-effectiveness and in the interest of improving the accuracy of statistical estimates, independent samples are preferred over QC field duplicates. The second paragraph of Section 1.3.2.1 has been revised to read as follows:

> Field sampling precision is evaluated by analyzing field duplicate samples. Small-scale spatial variability in chemical concentrations is commonly observed in solid matrices like soil and sediment. Therefore, collection of field QC duplicates for evaluating sampling precision has little value and will not be performed during this investigation.

4. **Comment:** **Table 8. Did something happen to the number of core intervals after sample 104? Shouldn't the next label be 108 instead of 106?**

Response: Table 8 has been revised as noted.

5. **Comment:** **Criteria for the acceptance of a suitable sediment sample for biomass data needs to be defined. This criterion is typically based on volume of sample collected relative to the type of grab. Also, the method associated DQOs for biomass data are missing.**

Response: The sediment sample for biomass data will be collected from the top 3 inches of the grab sample. The grab sampler volume should be sufficient to obtain the top 3 inches of sediment. A sample will be rejected if: (1) the sample appears to have been significantly disturbed, (2) the jaws of the sampler are obstructed, allowing sample to wash out, (3) the sample is uneven from side to side, or (4) the surface of the grab is pushed up against the flaps or doors of the sample, indicating possible loss of surface sediment due to overpenetration by the grab sampler. Section 2.2.2 of the SAP has been revised to describe these rejection criteria.

The biomass data are secondary data collected as described in Section 2.1.2 of the SAP (Please see the response to Comment 10 below).

6. **Comment: In the laboratory selection and oversight Section (2.4.1.3, last paragraph), state why a kickoff meeting will be held regardless of whether QA/QC requirements are consistent with the Statement of Work. What, if any, are the consequences of inconsistencies between the lab and SOW QA/QC?**

Response: A laboratory kickoff meeting is always held before a field effort involving sampling and analysis begins. This meeting is generally held via a conference call in order to go over the project matrices to be analyzed, precision and accuracy goals, and detection limit criteria applicable to the project. Although these goals may be consistent with the Tetra Tech laboratory SOW, they are specific to the project and are always provided with the purchase order, and any discrepancies or questions are discussed before the field effort begins.

7. **Comment: In Table 10 there are 80 primary sample locations, instead of the expected 120 (4x30 re Table 8). Explain the difference and correct the number of corresponding matrix spike and equipment rinsate numbers if it should be 120.**

Response: Table 10 has been revised to reflect 120 primary samples not sample locations as originally noted. The matrix spike sample quantity for lead analysis has been revised to 6.

8. **Comment: Section 1.6.3 and 1.6.4 describe full data packages and electronic data deliverable that are based on U.S. Environmental Protection Agency Contract Laboratory Program SOWs and reference EPA SW-846 quality control data, yet the only data for which this applies is residual lead.**

The SAP needs to describe the data packages and corresponding QC for lead shot, sediment physical characteristics, and biomass data at a similar level.

Response: Total organic carbon and particle size will be performed in a manner that supports SW-846 QC requirements where applicable and will be reported in a data package with electronic data deliverable from the laboratory.

Lead shot, sediment characteristics, and biomass data to be recorded in the field will be recorded in the project log book. During field activities, all lead shot and biomass data determinations will be recorded in a field book. Lithology data will be recorded on soil boring logs. The field book and soil boring logs will be peer-reviewed at each step, and the resulting field book pages and boring logs will be dated and signed by a State of California Registered Geologist.

9. **Comment:** **In Section 2.1.1 state the global positioning system (GPS) accuracy and the coordinate system that will be used to establish the sampling stations. Why isn't a differential GPS unit being used? What type of coring device will be used and how will sediment be extracted from the core barrel? This is critical information, since cores can compact, bleed (overfill) and/or push out sediment during collection. How will equipment be decontaminated in the sampling of residual lead? What is the purpose of weighing sediment to the nearest 0.5 kilogram (roughly 1 lb)? This gross measurement of wet weight will have little use in unit conversions of lead shot (e.g., lead shot/volume sediment or lead shot/kilogram sediment).**

Response: Sections 2.1.1 and 2.1.2 has been revised to include the following sentence, "A differential GPS will be used on the water to locate predetermined sample locations to the nearest 1-foot accuracy using the California Zone III State Plane Coordinates, North American Datum of 1983. The GPS data will be post-processed using the most current and closest base provider (eg. US. Coast Guard beacon)."

Please see response to Polisini, DTSC, specific comment 2, 4, and 7.

Section 2.2.3 includes procedures which specify that sampling equipment will be decontaminated prior to the initiation of sample collection activities and between each sampling location. Reusable

sampling equipment will be decontaminated by steam-cleaning using a portable steam cleaner, and an on-site source of potable water will be used for decontamination. Following steam-cleaning, the equipment will be rinsed with deionized water.

10. **Comment:** **It is not clear where and how biota will be "separated by major taxomonic group" and weighed on an analytical balance. The SAP suggests that amphipods comprise a major taxonomic biomass group – which would be a first for benthic macrofauna studies conducted in San Francisco Bay. Also, what is the accuracy of the balance (it would have to be pretty darned good to weigh amphipods)? The major taxonomic groups for biomass need to be defined (e.g., polychaeta, echinoderma, mollusca, crustacean, and combined other taxa). It is not practical to determine biomass for lower taxonomic levels (e.g., amphipods) in the laboratory, let alone the field. State whether wet weight biomass will be reported, and how biota will be preserved in the field.**

Response: The major taxonomic groups identified will depend upon the composition of the sample and will be noted in the field log and subsequent data tables. Although it is actually not difficult to determine the mass of amphipods in the laboratory, it may not be possible or practical to distinguish between smaller crustaceans in the field. Therefore, the SAP will be revised to indicate that higher order groups will be determined for each sample.

The second paragraph of Section 2.1.2 has been revised to read as follows:

> A minimum of 24 ounces of the grab sample will be containerized for grain size and TOC analysis at an off-site laboratory. The remaining grab sample will be sieved in a #10 sieve to separate the biota from the sediment. Excess water will be poured off or drawn from the sample with a paper towel prior to recording wet weight mass to the nearest 1 milligram. Biota collected will be separated by higher order taxonomic group (e.g., phylla mollusca, echinodermata, and subphylum crustacea) and weighed to the nearest 1 milligram. If practical, lower order, more specific taxonomic groups will be separated. Biomass collected will be photographed for each grab sample. Biomass samples will not be preserved.

11. **Comment:** **Section 2.3.5 (Sample Shipment) states that "enough ice will be added to maintain the sample temperature of below 4 degrees Celsius (C), plus or minus 2°C." It is possible to add "enough ice" to reduce the ambient temperature of SF Bay sediment (~12-22°C) to 4°C over a 1-2 day hold and transfer period. Instead the ambient temperature should be measured in a few of the field samples (taken at different depths) and shipped samples should be transported at or below that temperature. Temperature control is important for TOC only.**

Response: The first bullet of Section 2.3.5 has been revised to read as follows, "The sample cooler will be filled with bubble wrap, sample bottles, and packing material. Sufficient packing material will be used to prevent sample containers from breaking during shipment. Enough ice will be added to maintain the cooler temperature at 4°C, plus or minus 2°C."

12. **Comment:** **Method Detection Limit (Section 2.5.3.1). Since this study includes only "inorganic compounds and physical properties test methods", and the SAP states that these are exempt from method detection limit (MDL) reporting, this section should be removed. However, why is there no MDL requirement for residual lead?**

Response: The third sentence in Section 2.5.3.1 has been revised to read as follows, "The subcontractor laboratory will demonstrate the MDLs for all analyses except test methods for physical properties."

13. **Comment:** **Field Assessments (3.1.1). If lead shot is to be quantified in the field, an independent qualified scientist must be assigned to perform QC of the resulting data to achieve the same level of QC required for less important data (e.g., residual lead). Also, field oversight should be performed by the Navy. These are critical data.**

Response: Please see response to general comment 2 above.

14. **Comment:** **American Standard Test Methods E112-96 E2 or any method that produces an average grain size for an assumed unimodal distribution is not an appropriate method for grain size analysis of sediment, assuming that the data will be used to support interpretation of benthic invertebrate (e.g., biomass) or sediment chemical data. Standard sediment grain size methods, such as Plumb (1981) that produce a range of Phi**

sizes appropriate for the study area, and account for skewness, kurtosis, and bimodal distributions should be used.

Response: Please see response to general comment 3 above.

REFERENCES

American Society for Testing and Materials (ASTM). 2002. "D422-63(2002)e1 Standard Test Method for Particle-Size Analysis of Soils." ASTM International. November 10.

Tetra Tech EM Inc. (Tetra Tech). 2001. "Final Remedial Investigation, Offshore Sediments Operable Unit, Naval Station Treasure Island, San Francisco, California." December 28.

Tetra Tech. 2004. "Revised Draft Feasibility Study Clipper Cove Skeet Range, Naval Station Treasure Island, San Francisco, California." December 10.

U.S. Navy (Navy). 2005a. "Final Naval Station Treasure Island Remedial Project Managers and Base Realignment and Closure Cleanup Team Meeting Minutes." December 6-7.

Navy. 2005b. "Point Paper for Installation Restoration Site 27, Clipper Cove Skeet Range, Evaluation of Sediment Deposition – Revision 1." November 30.

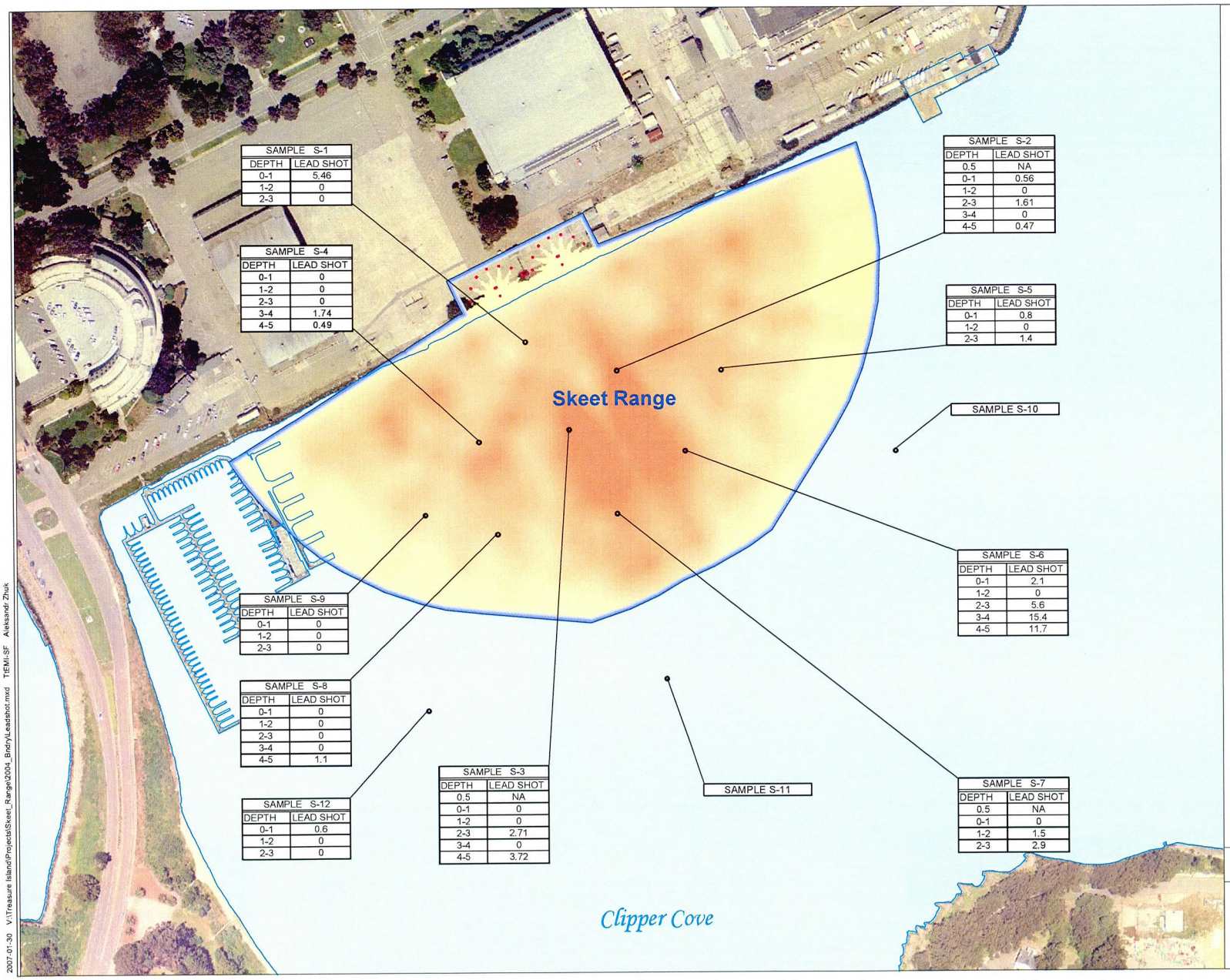
Navy. 2006a. "Final Naval Station Treasure Island Remedial Project Managers and Base Realignment and Closure Cleanup Team Meeting Minutes." January 10.

Navy. 2006b. "Draft Naval Station Treasure Island Data Quality Objectives Meeting for the Field Investigation for Lead Shot at Site 27 (Clipper Cove Skeet Range) Minutes." November 30.

Navy. 2007a. "Final Naval Station Treasure Island Remedial Project Managers and Base Realignment and Closure Cleanup Team Meeting Minutes." January 9.

Navy. 2007b. "Final Technical Memorandum to Determine a Field Screening Level for Lead Shot, Installation Restoration Site 27 Clipper Cove Skeet Range, Naval Station Treasure Island." January 30.

ATTACHMENTS



SAMPLE S-1	
DEPTH	LEAD SHOT
0-1	5.46
1-2	0
2-3	0

SAMPLE S-2	
DEPTH	LEAD SHOT
0.5	NA
0-1	0.56
1-2	0
2-3	1.61
3-4	0
4-5	0.47

SAMPLE S-3	
DEPTH	LEAD SHOT
0.5	NA
0-1	0
1-2	0
2-3	2.71
3-4	0
4-5	3.72

SAMPLE S-4	
DEPTH	LEAD SHOT
0-1	0
1-2	0
2-3	0
3-4	1.74
4-5	0.49

SAMPLE S-5	
DEPTH	LEAD SHOT
0-1	0.8
1-2	0
2-3	1.4

SAMPLE S-6	
DEPTH	LEAD SHOT
0-1	2.1
1-2	0
2-3	5.6
3-4	15.4
4-5	11.7

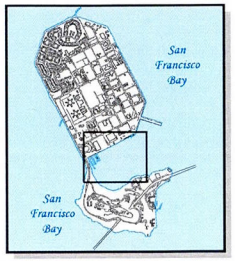
SAMPLE S-7	
DEPTH	LEAD SHOT
0.5	NA
0-1	0
1-2	1.5
2-3	2.9

SAMPLE S-8	
DEPTH	LEAD SHOT
0-1	0
1-2	0
2-3	0
3-4	0
4-5	1.1

SAMPLE S-9	
DEPTH	LEAD SHOT
0-1	0
1-2	0
2-3	0

SAMPLE S-12	
DEPTH	LEAD SHOT
0-1	0.6
1-2	0
2-3	0

AREA OF INTEREST



SHOOTING POSITION

SAMPLE LOCATIONS

SHORELINE

SKEET RANGE BOUNDARY

SHOT FALL DENSITY PROJECTIONS

HIGHEST

LOWEST

DEPTH IN FEET

SAMPLE LOCATION

LEAD SHOT ESTIMATE/ KILOGRAM SEDIMENT

NOTES: NA = NOT ANALYZED

N

200 0 200

Feet

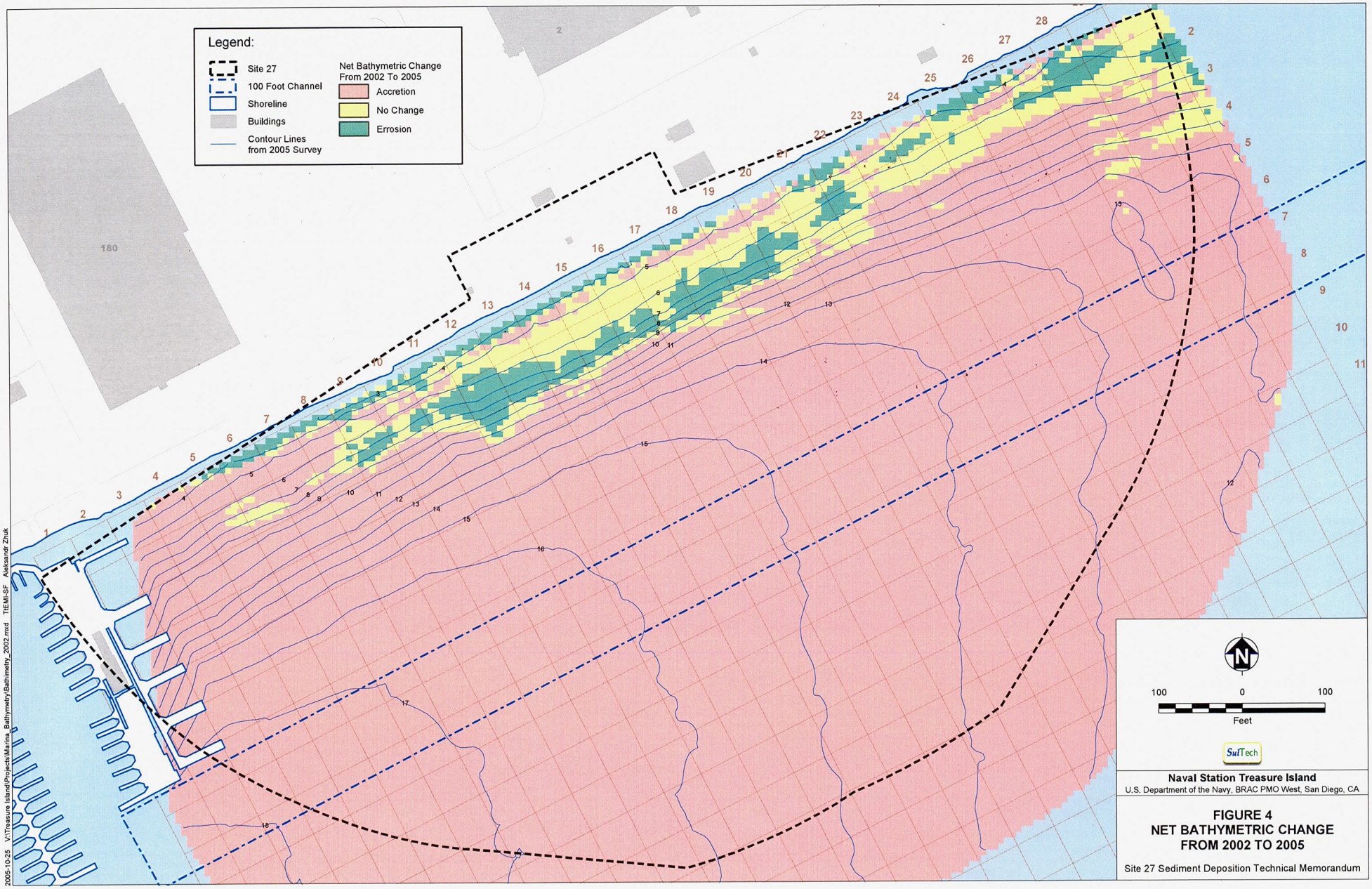
SulTech

Naval Station Treasure Island

U.S. Navy Southwest Division NAVFAC, San Diego

FIGURE 2
LEAD SHOT IN SEDIMENT AT THE CLIPPER COVE SKEET RANGE, IR SITE 27

2007-01-30 V:\Treasure Island\Projects\Skeet_Range\2004_Bndry\Leadshot.mxd TtEMI-SF Aleksandr Zhuk



Naval Station Treasure Island
U.S. Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 4
NET BATHYMETRIC CHANGE FROM 2002 TO 2005

Site 27 Sediment Deposition Technical Memorandum

2005-10-25 V:\Treasure Island\Projects\Marina_Bathymetry\Bathimetry_2002.mxd TIEMI-SF Aleksandr Zhuk

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Southwest Division
1220 Pacific Highway, Bldg 127
San Diego, CA 92132-5190

DATE: 10/12/2007
CTO: 0043
LOCATION: NAVSTA Treasure Island, San Francisco, Califo

FROM:

Steven Bradley, Contract Manager

DOCUMENT TITLE AND DATE:

Responses to Regulatory Agency Comments on the Draft Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan) for the Field Investigation of Lead Shot at Installation Restoration Site 27, Clipper Cove Skeet Range; Naval Station Treasure Island, San Francisco, California

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