Naval Facilities Engineering Systems Command Southwest
Base Realignment and Closure
Program Management Office West
San Diego, California

Final
Explanation of Significant Differences
Installation Restoration (IR) Sites 1 and 2
Former Long Beach Naval Station
Long Beach, California

June 2023

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Acronyms and Abbreviations

ALARA	as low as reasonably achievable
AOPC	area of potential concern
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BNI	Bechtel National Inc.
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
CRUP	Covenant to Restrict the Use of Property
DGI	Data Gaps Investigation
DTSC	California Department of Toxic Substances Control
ESD	Explanation of Significant Differences
FCR	Field Change Request
FFSRA	Federal Facility Site Remediation Agreement
FS	feasibility study
GWS	gamma walkover survey
HSC	Health and Safety Code
IAS	in situ air sparging
IC	institutional control
IR	Installation Restoration
LBNC	Long Beach Naval Complex
LBNS	Long Beach Naval Station
LBNSY	Long Beach Naval Shipyard
LIFOC	Lease in Furtherance of Conveyance
LLRO	low-level radioactive objects
LLRW	low-level radioactive waste
LUC	land use control
LUC RD	Land Use Control Remedial Design
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

OU	operable unit
POLB	Port of Long Beach
Ra	radium (radium-226 or ^{226}Ra)
RACR	Remedial Action Completion Report
RAO	remedial action objective
RI	remedial investigation
ROC	radionuclide of concern
ROD	record of decision
RWQCB	Regional Water Quality Control Board (Los Angeles Region)
SMP	Soil Management Plan
Sr	strontium (strontium-90 or ^{90}Sr)
SRA	Supplemental Radiological Assessment
SU	survey unit
SVE	soil vapor extraction
tit.	Title
U.S.C.	United States Code
VOC	volatile organic compound

Section 1 Introduction

This Explanation of Significant Differences (ESD) applies to the Final Record of Decision (ROD) signed in June 2000 for Installation Restoration (IR) Sites 1 and 2 (collectively, the Sites) at the former Long Beach Naval Station (LBNS) in Long Beach, California (Figure 1). This ESD is being prepared after the selected remedy in the ROD for the Sites was successfully implemented (Navy 2000a). A change in the remedy is documented in this ESD, to include Land Use Controls (LUCs) applicable to radionuclides of concern (ROCs) Radium-226 (^{226}Ra) and Strontium-90 (^{90}Sr) present in discrete objects and localized soil. The LUCs will be implemented to minimize the potential for exposure to residual low-level radiological contamination based on a release criterion for lifetime excess cancer risk of 5 x10^{-6} described in detail in Section 3.2.

1.1 Site Name and Location

IR Site 1, Mole Solid Waste Operation, and IR Site 2, Chemical Material and Waste Storage Area, are part of Operable Unit (OU) 1, located on a mole extending into Long Beach Harbor at the former LBNS (Figures 1 and 2).

1.2 Lead and Support Agencies

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Chapter 40 of the Code of Federal Regulations (CFR) (40 CFR) Part 300, et seq., govern identification, analysis, and remediation of hazardous substances. A Federal Facility Site Remediation Agreement (FFSRA) between the Department of Navy (Navy) and the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) was signed on July 17, 2000. The FFSRA documents how the Navy intends to meet its statutory obligations and implement CERCLA in partnership with DTSC and the Los Angeles Regional Water Quality Control Board (RWQCB) (Navy 2000b). The Navy is the lead agency for remedial actions at LBNS, and DTSC is the lead regulatory agency under the FFSRA.

1.3 Statement of Purpose

The purpose of this ESD is to document a significant change to the remedy for the Sites from the remedy selected in the June 2000 ROD to address chemicals (volatile organic compounds [VOCs] and metals) in soil and groundwater. The selected remedy in the June 2000 ROD was to reduce contaminant levels in groundwater, remove debris and soil, monitor groundwater contaminants, and LUCs, including restricting future land use to industrial use. The debris and soil removal was completed in February 2001 and groundwater treatment was completed in

August 2003 when chemical-specific performance objectives were met (Battelle 2007). LUCs involve institutional controls (ICs) that are changing to add a prohibition of intrusive activities without prior review and approval from the FFSRA signatories.

The change to the selected remedy is necessary because of the potential presence of low-level radioactive objects (LLROs) and localized radiologically contaminated soil, which was initially detected during routine health and safety screenings conducted during implementation of the excavation component of the remedial action that occurred between October 2000 and February 2001. After these detections, radiation surveys were conducted concurrently with excavation from November 2000 to May 2001 (Battelle and Foster Wheeler 2001) and a Supplemental Radiological Assessment (SRA) was conducted at the Sites in 2008 (Cabrera 2008, 2014). The surveys and assessment result in the need for institutional controls related to soil to apply to ROCs ^{226}Ra and ^{90}Sr to minimize the potential for future exposure to these low-level contaminants.

The Final ROD, signed June 9, 2000, presents the selected remedy for the Sites (Navy 2000a). The remedy documented in the ROD was selected in accordance with CERCLA, as amended by Superfund Amendments and Reauthorization Act of 1986, and the NCP. The change to the selected remedy is based on information catalogued in the Administrative Record file (40 CFR Section 300.825(a)(2)). This ESD updates the selected remedial actions and was prepared in accordance with Section 117(c) of CERCLA and 40 CFR Sections 300.435(c)(2)(i) and 300.825(a)(2) of the NCP.

The ROD specifies reducing contaminant levels in groundwater and removing debris and soil at the Sites (Navy 2000a). The four components to the remedy include implementing systems to treat groundwater; locate, remove, and dispose off-site cans, drums, and other debris identified; monitor groundwater during remedial action and after the remedy is complete; and implement LUCs in the form of ICs, including ICs that restrict future land use to industrial use.

The active remediation specified in the ROD was completed in 2007, as documented in the agency-concurred Final Remedial Action Completion Report (RACR) for Sites 1 and 2 (Battelle 2007). Ongoing activities documented in the RACR include ICs that will run with the land, such as preventing removal of soil without prior review and approval from DTSC. The ICs will be incorporated into the quitclaim deed as restrictive covenants and into a Covenant to Restrict the Use of Property (CRUP), between the Navy and DTSC, which will be executed and recorded concurrently with transfer of title to the property from federal ownership.

The Navy and DTSC, as the lead agencies, co-selected the IC requirements in this ESD.

1.4 Availability of Documents

This ESD will become part of the Administrative Record. The Administrative Record file is maintained at the Naval Facilities Engineering Systems Command, Southwest, in San Diego, California. The address is:

Naval Facilities Engineering Systems Command, Southwest
Ms. Diane Silva, Records Manager
Administrative Record
1220 Pacific Highway (Naval Base San Diego Building 3519)
San Diego, CA 92136
Business hours: 8:00 AM – 5:00 PM Monday – Friday
Telephone: (619) 556-1280
Email: diane.c.silva.civ@us.navy.mil

The ESD can also be accessed electronically at: www.bracpmo.navy.mil/LBNC

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Section 2 Site History, Contamination, and Selected Remedy

2.1 Site History

The Defense Base Closure and Realignment Act of 1990 provided the statutory authority for military facility closures. The LBNS was closed operationally on September 30, 1994, under the Base Realignment and Closure (BRAC) 1991 round of closures. The Long Beach Naval Shipyard (LBNSY) was closed operationally on September 30, 1997, under the 1995 round of closures (Navy 2000b). The two juxtaposed properties comprise the former Long Beach Naval Complex (LBNC)

The former LBNC lies on the south side of Terminal Island within the Los Angeles and Long Beach Harbor districts, 24 miles south of downtown Los Angeles. The former LBNC is bounded by oil fields and shipping/trucking container yards to the north, and east, the San Pedro Bay to the south, and the Los Angeles Harbor facility to the west (Bechtel National Inc. [BNI] 1996). The former LBNC overlies the Wilmington oil fields, which are still in production producing approximately 13 million barrels a year.

LBNS is located in the western portion of the LBNC in Long Beach, California (Figure 2). The former LBNS property consists of the following:

- The western portion of the LBNC, including the Navy Mole
- Most of the Long Beach Harbor West Basin and submerged perimeter lands
- The western and southern edges of Port of Long Beach (POLB)
- The strip of land bounded by Seaside Avenue and Ocean Boulevard to the south and Union Pacific Railroad tracks to the north (BNI 1996).

Beginning in the mid-1940s and continuing until the mid-1960s, solid waste disposal operations occurred within the boundaries of the Sites. Solid wastes managed or accumulated included empty wooden and cardboard boxes, construction and demolition debris, rags, and other shipyard trash, construction debris and other solid waste disposed of in a cut and fill operation in the Gull Park area of the Sites. This area was designated as areas of potential concern (AOPCs) 1 and 4. A map from 1950 was used to identify a 200- by 700-foot burn pit area where waste was burned as part of waste reduction efforts. This area was designated as AOPC 3. No evidence has been found that burn ash was disposed of outside the boundaries of the burn pit area. The types and quantities of liquid or chemical wastes disposed of during active disposal operations were not reported and therefore are unknown (Cabrera 2014).

Beginning in the mid-1960s until 1980, the LBNSY Public Works Department, production shops, and ships stored drums of chemical wastes on pallets in the area defined as IR Site 2. This area was designated as AOPCs 2 and 5. Noticeable leakage of liquid from damaged drums was reported, including releases of waste oils, acids, solvents, paints, and chromic acid. Total spillage of wastes to the ground surface was estimated to be less than 3,000 gallons (Navy 1983). Refer to Section 2.2 for detailed descriptions of the designated AOPCs.

The boundaries and other contemporary significant features, specifically the former Sea Launch area and Gull Park, are shown in Figure 3. The total area of the Sites is approximately 33 acres. IR Site 1 is approximately 2,600 feet long and Site 2 is approximately 3,200 feet long and extend the 500-foot width of the Mole. IR Site 1 covers the area on the Navy Mole extending approximately from Pier 15 on the west site boundary to the east end of the Navy Mole. IR Site 1 is located completely within the boundaries of IR Site 2, which covers the same general area, but extends from former Building 815 on the west boundary to the east end of the Mole. The Sites overlap but have different dimensions vertically (Navy 2000a). The Navy Mole is bounded by Long Beach Harbor and San Pedro Bay. Elevation is relatively flat and ranges from sea level to approximately 12 to 15 feet above mean sea level (Multi-Media Environmental Compliance Group 2019).

To facilitate economic reuse and redevelopment of former military facilities after closure, in August 1998, the Navy and the City of Long Beach entered into a Lease in Furtherance of Conveyance (LIFOC). Under the LIFOC, the POLB assumed custody of the City of Long Beach portion of former LBNC in advance of property transfer that includes Site 1 and 2 on the Mole. The POLB was able to begin redevelopment on a parallel track with the Navy's environmental cleanup actions (NAVFAC SW 2022)

From 2000 to 2019, the Navy executed several Public Benefit Conveyances that transferred all LBNC installation property, except 53 acres, to the City and Port of Los Angeles, and the City of Long Beach. The remaining 53 acres (located on the Mole) are expected to be transferred via Public Benefit Conveyance.

The Sites once contained many Navy buildings and recreational areas, including ballfields and a park, which have been demolished or converted to other uses. The eastern end of the Sites is known as Gull Park. The POLB maintains a bird sanctuary mitigation site there for a colony of black-crowned night herons protected under the Migratory Bird Treaty Act. Since the beginning of the POLB's control of the Sites via a LIFOC, the POLB has subleased the areas outside of Gull Park and the buildings thereon to various tenants.

Access to the Sites is limited by security provided by the POLB at the LBNS. Additional security is provided in some areas via chain-link fences with locked gates (Cabrera 2014).

2.2 Site Investigations and Contamination

As documented in the IR Sites 1 and 2 ROD, the Navy conducted numerous investigations at the Sites between 1983 and 1999. Based on the results of these investigations, remedial action was required for chemicals present in groundwater and soil.

As part of the Remedial Investigation (BNI 1996) and Feasibility Study (FS) (Battelle 1999) the Sites were divided into five AOPCs (Figure 4). The Sites overlap but have different dimensions vertically and are considered different AOPCs based on site history and contaminants of potential concern. AOPCs 1, 3, and 4 are related to IR Site 1. A geophysical survey was performed in AOPCs 1 and 4 (Figure 4) and in Areas I, II, and III (Figure 5), where geophysical anomalies were identified and correlated to the suspected burn pit and potential former cut-and-fill operations (BNI 1996). AOPCs 2 and 5 are related to IR Site 2 (BNI 1996).

The following descriptions delineate the AOPCs for the Sites:

- **AOPC 1**. Surface soils (0 to 1 foot below ground surface [bgs]) in Gull Park are considered to be within the same area of potential concern impacted by surface spills, dust suppression activities, shallow earthworks, and trench-and-fill activities, which may include cans, drums, and other debris. By 1962, this area was reportedly used as a pipe laydown area. By 1964, ball fields were established within the area; it is assumed that all waste disposal activities had ceased by this time (BNI, 1996).
- **AOPC 2**. Surface soils (0 to 1 foot bgs) in the Western Ballfield area immediately west of the Sea Launch Facility. This area was reportedly used for disposal of ship bilge water that may have contained organic and/or inorganic compounds and petroleum products. By 1964, the ball field was established, and disposal of bilge water is assumed to have ceased (BNI, 1996).
- **AOPC 3**. Subsurface soils (deeper than 1 foot bgs) and groundwater in AOPC 3 are considered to be within the same area of potential concern impacted by contamination related to burning of wastes in the Burn Pit Area from the early 1940s to the 1970s. (BNI, 1996). This AOPC also includes groundwater at IR Sites 1 and 2.
- **AOPC 4**. Subsurface soils (deeper than 1 foot bgs) in Gull Park are considered to be within an area of potential concern impacted by earthwork and trench-and-fill activities, which may include cans, drums, and other debris (BNI, 1996).
- **AOPC 5**. Consists of all subsurface soils that are not part of the other four AOPCs. The primary potential contaminant source at AOPC 5 was leakage from drums of liquid

wastes and raw chemicals from the LBNSY Public Works Department, production shops, and ships. Drums were stored in this area from the mid-1960s to the 1980s. In addition, a dark-colored (potentially stained) area was identified in a 1952 aerial photo that appears to have resulted from the flow of water or other liquid (BNI, 1996)

Radiation surveys were conducted from November 2000 to May 2001 concurrently with excavation, as documented in the Radiation Data Summary Report (Battelle and Foster Wheeler 2001). An SRA was conducted in 2008 (Cabrera 2008, 2014). The SRA surveyed for nine radionuclides of potential concern, including tritium, carbon-14, cesium-137, plutonium-239, plutonium-240, plutonium-241 and americium-241. The SRA confirmed that the only ROCs present at the Sites exceeding investigation levels were ^{226}Ra and ^{90}Sr (Cabrera, 2014).

The previously identified background reference area (western athletic fields), west of the Sea Launch area, was located in a portion of the Sites containing materials with various amounts of naturally occurring radioactive material (NORM). As a result of multiple materials with individual background activities, the reference area was determined to not be representative of the Sites and all conclusions based on this comparison were discarded. Figure 7 shows RAD anomalies for the Sites from the gamma walkover survey results describing the specific NORM activity for each labeled anomaly. The history of the Mole shows multiple sources of material used as fill at different times, each material with a different natural background and each material blended and incorporated into the existing site to varying degrees. There is no single value for natural background that represents conditions at this site. Therefore, a decision was made to base decisions on total radioactivity and not make any corrections for background when evaluating and interpreting site data.

Comments received from the California Department of Public Health (CDPH) in 2014 identified additional radiological data gaps for the Sites. Therefore, a Radiological Data Gaps Investigation (DGI) Work Plan was prepared to address the identified data gaps (Trevet 2017). The *Final Work Plan for Radiological Data Gaps Investigation at IR Sites 1 and 2* was issued in December 2017. Fieldwork for the DGI was conducted during three mobilizations between 2018 and 2020 to address and document resolving the data gaps identified in outdoor and indoor areas from the previous Supplemental Assessment. The RAOs of the DGI were to identify radiological anomalies in surface soil and to investigate and remediate the anomalies to a depth of 2 feet (ft.) bgs reducing potential total risks from exposure including background to ^{226}Ra and ^{90}Sr to levels as low as reasonably achievable (ALARA), with a goal of not exceeding a maximum total $5x10^{-6}$ risk of cancer incidence to industrial workers at the Sites (Trevet, 2017, 2020).

During the first mobilization in 2018, a 100-percent coverage gamma walkover survey (GWS) was conducted during which 117 locations were identified for further investigation. During

subsequent mobilizations in 2018 and 2020, 11 additional locations were identified; biased soil samples were collected, and LLROs and low-level radioactive waste (LLRW) soil was removed to depths of up to 2 ft. bgs. Final post-investigation GWS were then conducted at all 128 locations where excavations occurred since the previous full GWS in 2018, providing a final 100-percent GWS over all 33 survey units (SUs) at the Sites. Based on the 100 percent GWS, 94 LLROs and 24 cubic yards of LLRW soil to a depth of 2 feet bgs was removed and disposed of. A total of 795 surface soil samples collected from the top 30 cm (12 in.) of surface soil in 33 SUs were collected and analyzed.

Based on early data collected for the DGI, a field change request ([FCR] No. 4, attached as Appendix B) was provided to document a proposed restricted release criteria of 5×10^{-6} for the ROCs and allow for a LUC that prohibits intrusive activities without prior review and approval from the FFSRA signatories.

2.3 Description of Selected Remedy

The ROD documents the remedy selected to address soil and groundwater contamination at the Sites through a remedial strategy that uses a combination of treatment technologies in the form of groundwater treatment with in-situ air sparging (IAS) and soil vapor extraction (SVE), excavation and debris removal, long-term groundwater monitoring, and LUCs. The selected remedy supports industrial use of the Sites through implementation of LUCs in the form of ICs that are protective of long-term human health and the environment. The LUCs as documented in the 2000 IR Sites 1 and 2 ROD are listed below:

- Residential use is prohibited.
- Site operations shall be restricted to industrial uses consistent with the California Coastal Act and the Certified Port Master Plan for the Long Beach Harbor District.
- Industrial use shall not include a hospital for humans, school for persons under 21 years of age, day care center for children, or any permanently occupied human habitation other than those used for industrial purposes.
- Removal of soil from IR Sites 1 and 2 is prohibited, unless approved by the DTSC. Excavated soil and groundwater must be tested for hazardous substances and hazardous wastes.
- Construction and/or operations on the property shall not interfere with ongoing monitoring or assessment of work being conducted by or for federal, state, or local regulatory agencies, unless specifically approved by the appropriate lead agency.

- Removal and disposal of contaminated soil or groundwater shall be conducted in accordance with all applicable federal, state, and local regulations governing removal, transport, and disposal of hazardous substances and hazardous waste.
- Disturbance or use of existing groundwater wells is prohibited unless specifically approved by all regulatory agencies. No groundwater production wells may be installed for residential, municipal, agricultural, or industrial use. Monitoring and other test wells are not subject to this provision, including borings for the purpose of testing wells, wells for monitoring the quality of groundwater, and borings to define geology.
- Groundwater shall not be used for drinking water without the expressed authorization of the RWQCB.

The selected remedy complies with the statutory cleanup requirements in CERCLA by assuring protection of human health and the environment and satisfying applicable or relevant and appropriate requirements (ARARs).

Remedial actions were implemented for chemicals (volatile organic compounds (VOCs) and metals) in soil and groundwater after the ROD was finalized in 2000. The remedial actions included two separate phases: Phase I for removal of soil and debris, and Phase II for groundwater remediation.

The Phase I soil excavation and debris removal, completed in February 2001, included off-site disposal of contaminated soil, waste drums, and debris buried in shallow areas, and resulted in the removal of potential sources of groundwater contamination. The excavation was backfilled and compacted, with backfill consisting of a crushed aggregate base, clean site soil, and clean imported soil, to meet required compaction standards. The site was rough graded to provide proper drainage for runoff and to prevent ponding and restored to a condition consistent with surrounding areas. The report titled *Final Phase I Remedial Action, Soil and Debris Removal for Installation Restoration Sites 1 and 2* (Battelle 2006) documented that the first phase of remedial action had been completed. Refer to Section 3.1 for details of subsequent actions taken to address any remaining LLROs and contaminated soil after completion of the Phase I soil excavation.

After the excavation and debris removal phase, Phase II IAS/SVE was implemented to remediate groundwater within an approximate 1.4-acre area on the northeastern portion of what is now Gull Park (Battelle 2007). After the chemical-specific performance objectives had been met, the IAS and SVE systems were shut down in August 2003 and were removed in 2007.

A Final RACR was completed for remediation of soil and groundwater at the Sites once Remedial Action Objectives (RAOs) were achieved (Battelle 2007). Long-term management for

the Sites post-remediation include maintenance of LUCs and five-year reviews (Navy 2000a). Three five-year reviews have been completed, as listed below.

- Final Five-Year Review Report, Installation Restoration Sites 1-6A and 8-14, December 2009 (Navy 2009)
- Final Five-Year Review Report, Installation Restoration Sites 1 through 6A and 8 through 14, December 2014 (Navy 2014)
- Final Five-Year Review Report, Installation Restoration Sites 1 through 6A and 8 through 14, December 2019 (Navy 2019)

To ensure the protectiveness of the remedy that addresses ROCs for the Sites, a revised Data Gaps Investigation, Remedial Action Completion Report will be prepared according to DTSC and CDPH comments and will document the attainment of the new cleanup goals. In addition, a Land Use Control Remedial Design (LUC RD) Report will be published documenting the ICs that will be implemented for the Sites.

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Section 3 ESD Basis and Description of Significant Differences

3.1 ESD Basis

The basis for the ESD is the identification of LLROs containing ^{226}Ra in excavations during the Phase I remedial action. A radiation survey was conducted concurrently with excavation from November 2000 through May 2001, and a Radiation Data Summary Report for the Sites described actions taken to address these LLROs (Battelle 2001). The Navy agreed to conduct a post-ROD radiological investigation once the RAOs for the chemical impacts had been achieved. In 2007, the chemical RAOs were achieved, as documented in the agency concurred Final RACR for IR Sites 1 and 2 (Battelle 2007).

An SRA was conducted post-remediation in 2008 and documented in a 2014 SRA report. The SRA was conducted in accessible outdoor areas and included gamma walkover surveys, collection of systematic soil samples, investigation of locations above project investigation levels (z-scores), and removal of 22 LLROs for disposal. The ROCs identified during the assessment were ^{226}Ra and ^{90}Sr (Cabrera 2008, 2014).

3.2 Description of Significant Differences

The changes to the selected remedy documented in the IR Sites 1 and 2 ROD set forth in this ESD are significant changes but do not fundamentally alter the selected remedy. In accordance with NCP Section 300.435(c)(2)(i) and CERCLA Section 117(c), significant changes can be documented through an ESD. This ESD documents the change in remedy from ICs prohibiting subsurface intrusive activities without prior review and approval from DTSC. The significant difference to the remedy documented by this ESD includes the addition of radiological contaminants ^{26}Ra and ^{90}Sr to the list of COCs and the addition of an IC that prohibits intrusive activity without prior review and approval from the FFSRA signatories. The significant change to reflect the presence of ROCs involves the industrial worker exposure scenario based on the following remedial goal:

> "Maintain the industrial worker exposure scenario defined in the ROD to prevent or minimize potential exposure to ROCs at concentrations that exceed the remediation goal of 5 x 10^{-6} (including background radiation) to levels that are as low as reasonably achievable (ALARA)."

Soil sample data sets from the 2008 investigation and the 2018/2019 investigation were combined, and total dose and total risk were calculated for each survey unit (SU). The source term for the dose and risk calculations to evaluate compliance with the release criteria of 5 x10^{-6}

risk of cancer incidence (morbidity) was the 95% upper confidence level based on all soil sample results from systematic and bias locations. This analysis of risk to industrial workers identified 21 locations that contribute significantly to risk exceeding 5×10^{-6} in each SU. Therefore, localized excavations were completed to remove both objects and surrounding volumes of soil at the 21 locations that potentially contribute to exposures for industrial workers to further reduce the potential exposure to industrial workers. In combination with land use controls, the additional soil removal will assist in maintaining radiation exposure at the site ALARA (Navy 2020). This release criterion is documented in FCR No. 4 included in this ESD as Appendix B.

The IC boundaries are the boundaries of the Sites shown on Figure 6. The ICs apply to ^{226}Ra and ^{90}Sr associated with the surface and subsurface soil and potential for discrete items with ^{226}Ra and ^{90}Sr activity to be present within the soil. All low-level radioactive material identified has been associated with equipment such as gauges, dials, and bridge and deck markers common in shipboard and shipyard equipment. Based on the discovery of radioactive material during site remediation work and the potential sources of radiological contamination identified, the single suspected significant mechanism of release of radioactive material at the Sites is inadvertent disposal as part of solid waste operations (Cabrera 2014). All other components of the ROD were successfully implemented, and there is no other change to the remedy.

Current land use at the Sites is industrial, including industrial and office buildings with parking, industrial yard space, railway, and open space (Gull Park). Primary activities in the area are industrial, associated with the POLB and its tenants. The Reuse Plan developed by the Local Redevelopment Authority of the City of Long Beach designates that future use of the land will remain industrial. The DON developed its assumptions about future land use based on the Reuse Plan of the LRA (City of Long Beach, 1995), which calls for industrial use of IR Sites 1 and 2; and the restrictions associated with the public benefit conveyance from the United States to the Port of Long Beach, which allows only port-related uses of the property conveyed. The remedy selected in the 2000 ROD allows IR Sites 1 and 2 to be available for the reasonably anticipated future land use.

Land use controls are a component of the selected remedy for IR Sites 1 and 2. The objectives of land use controls are to ensure that industrial use of the land at IR Sites 1 and 2 is maintained and to prevent residential use. A soil management plan (SMP) and a site health and safety plan are required to protect industrial workers from contaminants left on site.

In addition, the United States will retain the right to enter and inspect the property to ensure the viability of the selected land use controls or to perform any additional remedial response actions. In the deed transferring the property, the State of California also will be given such right to enter and inspect the property.

The existing LUCs from the 2000 ROD are protective of human health (industrial workers), public health, and the environment. ROCs require that an additional IC, which will be protective of workers involved with intrusive activities, be added to the ESD.

- Intrusive activities and other actions that may expose ROC and COC contaminated soil at the site are prohibited without prior review and approval of a SMP by the FFSRA signatories. Prohibited intrusive activities may include but are not limited to excavation; construction of roads, utilities, structures; demolition of hardscape; demolition of building foundation; movement of soil from below ground surface to the surface; and any other actions that expose potentially ROC and COC contaminated soil. The SMP must include procedures necessary to protect workers and the environment from potential residual ROCs and COCs and ensure proper management of contaminated soil, radioactive, and hazardous waste. The SMP must be approved before the start of any intrusive activities.

Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or other means, the Navy shall retain ultimate responsibility for the CERCLA remedy and enforcement of the ICs described in this ESD in accordance with the approved forthcoming LUC RD. Should the ICs fail, the Navy shall ensure that appropriate actions are taken to reestablish protectiveness. Further details for implementing, monitoring, and enforcing the ICs will be described in the forthcoming LUC RD.

The forthcoming LUC RD will include the following:

- Requirement for annual inspections of the Sites to evaluate the integrity of LUCs.
- Annual inspection results reported to appropriate agencies and organizations.
- Map identifying where the ICs will be implemented.
- Requirement for CERCLA Five-Year Reviews to assure that the selected remedy is still protective of human health and the environment.
- Frequency and requirements for periodic monitoring or visual inspections, in addition to annual inspections.
- Reporting results from monitoring or inspections.
- Notification procedures to the regulators for planned property conveyance, corrective action required, or response to actions inconsistent with the ICs.
- Consultation with DTSC and RWQCB, regarding wording for land use restrictions and parties to be provided copies of the deed language once executed.

3.3 Estimated Costs

Based on the DGI/RACR currently in development, approximate costs to perform the remedial action conducted during the Supplemental Assessment and DGI are provided in Table 3-1. Operations and maintenance costs for conducting Five Year Reviews and monitoring ICs is also provided.

Table 3-1. Estimated Project Costs for Revision to Selected Remedy

Project Element	Cost
Project Management	$103,206
Planning Documents	$103,582
Mobilization, site preparation	$114,236
Gamma Walkover Surveys	$91,707
Field Work (collect samples, excavations, and remediation of LLROs and LLRW soil; waste inspections)	$1,368,351 (2008-2014) $1,034,255 (2018-2020)
Waste Disposal Costs	$121,122
Reports (including the RACR, ESD, and LUC RD)	$172,895
Five Year Reviews (6 over 30 years)	$506,880
Institutional Controls (30 years)	$316,800
Total	**$3,933,033**

Notes:
ESD – Explanation of Significant Differences
LLRO – low-level radioactive object
LLRW – low-level radiological waste
LUC RD – land use control/remedial design
RACR – Remedial Action Completion Report

Section 4 Statutory Determinations

The Navy's primary responsibility in regard to CERCLA is to achieve statutory requirements for protection of human health and the environment. Section 121 of CERCLA establishes several statutory requirements and preferences. The ARARs for Sites 1 and 2 were approved in the Final Feasibility Study dated February 1999 and did not include an evaluation of an alternative to address ROCs or address State laws and regulations promulgated after this date. The selected remedy, as changed pursuant to this ESD, remains protective of human health and the environment, continues to comply with Federal and State requirements that are ARARs to the remedial action, and is cost-effective. This ESD adds radiological contaminants ^{226}Ra and ^{90}Sr to the COCs and adds an IC that prohibits intrusive activities without approval from the FFSRA signatories. The change is necessary to prevent exposure to potential radiological contaminants during intrusive activities. The modified remedy satisfies Section 121 of CERCLA.

Three ARARs for LUCs related to ROCs were not identified in the ROD (Navy 2000a). The substantive provisions were determined to be ARARs. The three ARARs are:

- California Code of Regulations (CCR) title (tit.) 22, Section 67391.1(a) and (e)(1) provides for a land-use covenant to be executed and recorded when remedial actions are taken, and hazardous substances will remain at the property at concentrations that are not suitable for unrestricted use of the land. Although not applicable to federal actions, these substantive provisions were determined to be relevant and appropriate.
- California Health and Safety Code (HSC) Section 25355.5 (a)(1)(c) provides for execution and reporting of a written instrument that imposes and easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land. Although not applicable to this federal project, these substantive provisions were determined to be relevant and appropriate.
- CFR tit. 10 Section 20.1403(a), (b), and (e) provides criteria that in order to release a site under restricted use, a cost-benefit analysis is required to show the release criteria proposed for restricted use is ALARA. Although these license criteria are not applicable to the Sites, the criteria for restricted use was determined to be relevant and appropriate. The risk assessment completed after the remedial action to address LLROs and contaminated soil at the Sites demonstrates that conditions are protective of human health and the environment with ICs implemented that limit land use to industrial use and prevent intrusive activities without prior written approval from the FFSRA signatories. Therefore, the remedy change that adds ROCs ^{226}Ra and ^{90}Sr to the CoCs and an IC to prevent intrusive activities with continued five-year reviews at the Sites remains protective of human health and the environment and continues to comply with ARARs

identified in the IR Sites 1 and 2 ROD, as revised by this ESD, in accordance with CERCLA Section 121(d)(2) and NCP Sections 300.430(f)(1)(ii)(B)(1) and (2). Refer to Appendix A for a summary table of the ARARs added for this ESD.

Section 5 Public Participation

This ESD will become a part of the Administrative Record File for IR Sites 1 and 2 in accordance with NCP Sections 300.435 (c)(2)(i)(A) and 300.825 (a)(2). The public can access this ESD by contacting Diane Silva, the Administrative Records Manager, at (619) 556-1280, or by e-mail at diane.c.silva.civ@us.navy.mil. In addition, the public can access the ESD through the BRAC PMO Website: www.bracpmo.navy.mil/LBNC.

Following regulatory agency review, a notice of availability and a brief description of the ESD will be published in the *Long Beach Press-Telegram*, a major local newspaper of general circulation as required by NCP Section 300.435(c)(2)(i)(B).

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Section 6 Authorizing Signatures

This signature sheet documents the Navy's and DTSC's co-selection of the institutional controls for ROCs specified in the Explanation of Significant Differences for IR Sites 1 and 2 at LBNC. It also documents the concurrence of the Los Angeles Regional Water Quality Control Board. The respective parties may sign this sheet in counterparts.

David Darrow Digitally signed by David Darrow — June 28, 2023

Signature — Date

David C. Darrow
Base Realignment and Closure Environmental Coordinator
Base Realignment and Closure Program Management Office West
Department of the Navy

July 3, 2023

Signature — Date

A. Edward Morelan, P.G., C.E.G.
Branch Chief
Site Mitigation and Restoration Program
California Environmental Protection Agency
Department of Toxic Substances Control

Hugh Marley Digitally signed by Hugh Marley Date: 2023.08.08 13:35:19 -07'00' — 8/8/2023

Signature — Date

for
Susana Arrendondo
Executive Officer
Los Angeles Regional Water Quality Control Board

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Figures

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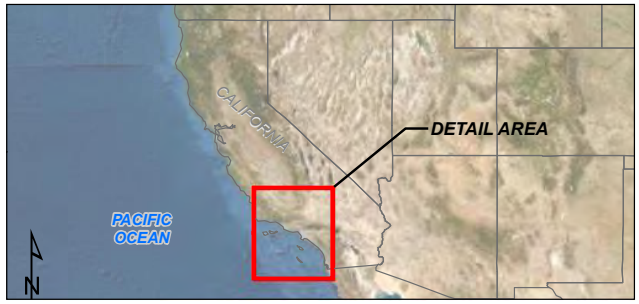

LEGEND

- INTERSTATE HIGHWAY
- CALIFORNIA COUNTY BOUNDARY
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:

N

GRAPHIC SCALE

0 40 MILES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

SAN DIEGO, CALIFORNIA

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 1

LONG BEACH NAVAL COMPLEX
SITE VICINITY MAP

DATE: JUNE 2023

DCN: TRBW-0202-4354-0019

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LEGEND

- HIGHWAY
- BUILDINGS
- IR SITE 1
- IR SITE 2
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:
IR - INSTALLATION RESTORATION

GRAPHIC SCALE
0 1,000 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA
NAVFAC

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 2

IR SITES 1 AND 2
SITE LOCATION MAP

DATE: JUNE 2023
DCN: TRBW-0202-4354-0019

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LEGEND

- HIGHWAY
- FORMER SEA LAUNCH AREA
- BUILDINGS
- IR SITE 1
- IR SITE 2
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:
IR - INSTALLATION RESTORATION

GRAPHIC SCALE
0 300 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 3

IR SITES 1 AND 2

DATE: JUNE 2023
DCN: TRBW-0202-4354-0019

9/22/2022 N:\GIS_Projects\Long Beach\Figs_ESD_9-29\Fig3_IrSites_9-22.mxd

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LEGEND

- HIGHWAY
- AREA OF POTENTIAL CONCERN (AOPC)
- FORMER SEA LAUNCH AREA
- BUILDINGS
- IR SITE 1
- IR SITE 2
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:
IR - INSTALLATION RESTORATION

GRAPHIC SCALE
0 300 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA
NAVFAC

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 4

AREAS OF POTENTIAL CONCERN (AOPC)

DATE: JUNE 2023
DCN: TRBW-0202-4354-0019

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LEGEND

- HIGHWAY
- GEOPHYSICAL ANOMALY
- GEOPHYSICAL SURVEY AREA
- FORMER SEA LAUNCH AREA
- BUILDINGS
- IR SITE 1
- IR SITE 2
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:
IR - INSTALLATION RESTORATION

GRAPHIC SCALE
0 200 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA
NAVFAC Naval Facilities Engineering Systems Command

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 5

GEOPHYSICAL ANOMALY AREAS

DATE: JUNE 2023 DCN: TRBW-0202-4354-0019

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LEGEND

- HIGHWAY
- AREA REQUIRING INSTITUTIONAL CONTROL
- FORMER SEA LAUNCH AREA
- BUILDINGS
- IR SITE 1
- IR SITE 2
- FORMER LONG BEACH NAVAL COMPLEX BOUNDARY

NOTES:
IR - INSTALLATION RESTORATION

GRAPHIC SCALE
0 300 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES FORMER
LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 6

IR SITES 1 AND 2
AREA REQUIRING INSTITUTIONAL CONTROLS

DATE: JUNE 2023
DCN: TRBW-0202-4354-0019

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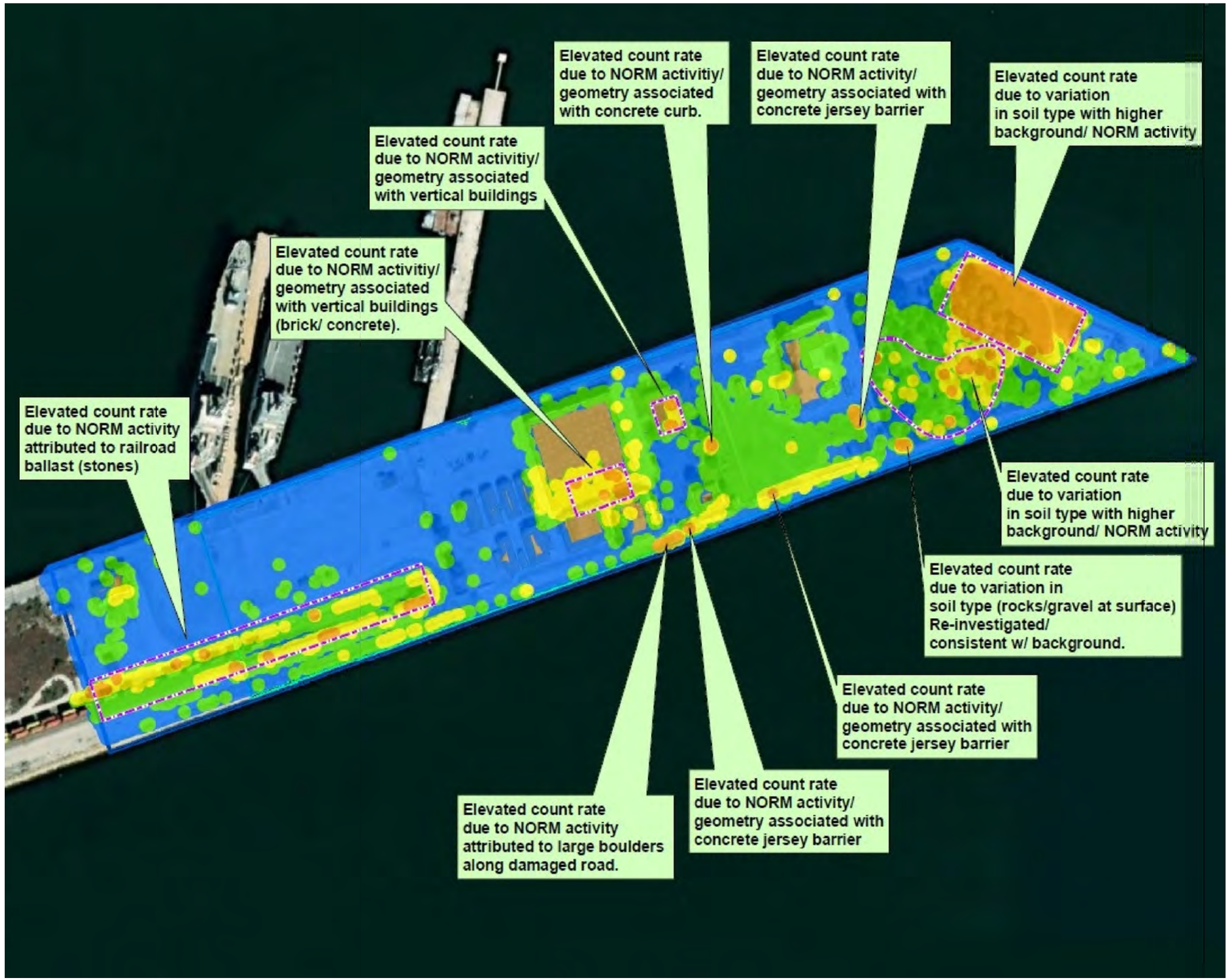

LEGEND

- Other Rad Anomalies

IR Site Boundary

- IR Site 1
- IR Site 2
- Buildings

GWS Results

(Z-Score)

- ≤ 1.0
- 1.0 - 1.9
- 2.0 - 2.9
- ≥ 3.0

NOTES:
GWS - GAMMA WALKOVER SURVEY
NORM - NATURALLY OCCURING RADIOACTIVE MATERIAL
IR - INSTALLATION RESTORATION
RAD - RADIOLOGICAL

GRAPHIC SCALE
0 400 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
SAN DIEGO, CALIFORNIA
NAVFAC

DRAFT LONG BEACH NAVAL STATION SITES 1 AND 2
EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER LONG BEACH NAVAL COMPLEX,
LONG BEACH, CALIFORNIA

FIGURE 7

GAMMA WALKOVER SURVEY RESULTS
OTHER RAD ANOMALIES

DATE: JUNE 2023
DCN: TRBW-0202-4354-0019

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Appendix A: Federal and State Land Use Control ARARs

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Appendix A
Federal and State Land Use Control (LUC) ARARs

Requirement	Prerequisite	Citation	ARAR Determination	Comments
LAND USE CONTROLS				
California Environmental Protection Agency, Department of Toxic Substances Control				
Provides for a land use covenant imposing appropriate limitations on land use shall be executed and recorded when facility closure, corrective action, remedial or removal action, or other response actions are undertaken; and hazardous materials, hazardous wastes, or constituents, or hazardous substances will remain at the property at levels that are not suitable for unrestricted use of the land.	Transfer of property from the Navy to a non-federal agency.	Cal. Code Regs. tit. 22 Section 67391.1	Relevant and Appropriate	Relevant and appropriate for the implementation of ICs for soil at IR Sites 1 and 2. Cal. Code Regs. tit. 22 Section 67391.1 provides for a land use covenant to be executed and recorded when remedial actions are taken and hazardous substances will remain at the property at concentrations that are unsuitable for unrestricted use of the land.
Provides a process to be used to enter into agreements that impose an easement, covenant, restriction, servitude, or combination thereof upon present and future uses of the property	Transfer of property from the Navy to a non-federal agency.	Cal. Health and Safety Code Section 25355.5(a)(1)(c)	Relevant and Appropriate	Relevant and appropriate for implementation of ICs for soil at IR Sites 1 and 2. This section is an ARAR because the Sites are federal land that will be transferred to a non-federal agency. Generally, Section 25355.5(a)(1)(c) provides for execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land. The Navy will comply with the substantive requirements of this statute by incorporating CERCLA use restrictions into the deed of conveyance in the form of restrictive covenants under the authority of Cal. Civ. Code section 1471 and into the Environmental Restriction Covenant and Agreement. The covenants will be recorded with the deed and run with the land.

Requirement	Prerequisite	Citation	ARAR Determination	Comments
California Department of Public Health				
Provides criteria for license termination under restricted conditions.	Existing NRC-licensed radioactive contaminated site.	Code of Federal Regulations (CFR) tit. 10 Section 20.1403(a), (b) and (e).	Relevant and Appropriate	NRC licensing not applicable because sites are being remediated under CERCLA and are not licensed. However, the following substantive provisions are relevant and appropriate: "A site will be considered acceptable for license termination under restricted conditions if: (a) The licensee can demonstrate further reductions in residual radioactivity were not being made because the residual levels associated with restricted conditions are ALARA; (b) The licensee has made provisions for legally enforceable ICs that provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem per year; (e) Residual radioactivity at the site has been reduced so that if the ICs were no longer in effect, there is reasonable assurance that the TEDE form residual radioactivity distinguishable from background to the average member of the critical group is ALARA and would not exceed either: (1) 100 mrem (1 mSv) per year; or (2) 500 mrem (5 mSv) per year provided that the licensee (i) Demonstrate that further reductions in residual radioactivity necessary to comply with the 100 mrem per year (1mSv per year) of paragraph (e)(1) of this section are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm

Requirement	Prerequisite	Citation	ARAR Determination	Comments
				(ii) Makes provisions for durable ICs” The substantive provisions of this statute indicate that in order to release a site under restricted use, a cost-benefit analysis is required to show the release criteria proposed for restricted use is ALARA.

Acronyms and Abbreviations
ALARA – as low as reasonably achievable
ARAR – applicable or relevant and appropriate requirement
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
IC – Institutional Control
IR – Installation Restoration
mrem – millirem
mSv – millisievert
NRC – Nuclear Regulatory Commission
TEDE – total effective dose equivalent
tit. – Title

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Appendix B: Field Change Request Number 4

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NAVFAC SW FIELD CHANGE REQUEST FORM

Contract No.:	**CTO No.:**	**Field Change Request Form No.:**
N62473-16-C-2005	N/A	4

Location: Long Beach Naval Complex

Date: 7/6/2020

Document Title:
Work Plan, Radiological Data Gaps Investigation
Installation Restoration (IR) Sites 1 and 2

NIRIS Document #:
TRVT-2005-0000-0007

RE: Section No.: Section 6.1, 8.4, and 8.5 Title Localized Excavation, Estimating Dose to Industrial Workers, and Estimating Risk to Industrial Workers

Specification Section _____ Title _____

Other _____

Description (items involved, submit sketch, if applicable)

Soil sample data sets from the 2008 investigation and the 2018/2019 investigation were combined, and total dose and total risk were calculated for each survey unit (SU) using the methodology provided in Worksheet #37 of the approved SAP. The source term for the dose and risk calculations to evaluate compliance with the release criteria of 5.0×10^{-6} risk of cancer incidence (morbidity) was the 95% upper confidence level based on all soil sample results from systematic and bias locations. This analysis of risk to industrial workers identified 21 locations (see attached list and figures) that contribute significantly to risk exceeding 5.0×10^{-6} in each SU (see SAP Worksheet #11 [Section 11.3]). Therefore, localized excavations are planned to remove both objects and surrounding volumes of soil at 21 locations that potentially contribute to exposures for industrial workers. This will further reduce the potential exposure to industrial workers. In combination with land use controls, the additional soil removal will assist in maintaining radiation exposure at the site as low as reasonably achievable (ALARA).

Reason for Change

Section 6.1 of the Work Plan states soil excavations will be performed using either hand tools or a mini-excavator digging 1 foot in all directions from the radioactive object. This change allows for additional investigation of these areas and additional soil removal to ensure exposures to industrial workers at the site do not exceed 5×10^{-6} risk.
Section 8.4 of the Work Plan states that dose and risk "estimates to industrial workers at IR Sites 1 and 2 will be calculated based on the combined data set of systematic soil sample results." Section 8.5 of the Work Plan states that an "estimate of risk to industrial workers at IR Sites 1 and 2 will be calculated based on the combined data set of systematic soil sample results." Estimates of dose and risk at the Site will now be calculated using soil sample results from both systematic and bias locations.

NAVFAC SW FIELD CHANGE REQUEST FORM

Contract No.:	**CTO No.:**	**Field Change Request Form No.:**
N62473-16-C-2005	N/A	4

Recommended Disposition (timeframe of actions, submit sketch, if applicable)
Calculate estimated risk of cancer incidence for each SU based on results from systematic and bias soil samples collected within two feet of ground surface in each SU. Identify locations where individual shallow (two feet or less) soil sample results contribute significantly to industrial risk exceeding $5x10^{-6}$ in each SU (see SAP Worksheet #11 [Section 11.3]). Twenty-one (21) locations have been identified (see attached Table 1 and Figure 1, Figure 2 shows locations in SeaLaunch, Figure 3 shows locations in Gull Park).

Complete soil removal excavations at all 21 identified locations.

Perform replacement gamma scan surveys at all locations where an excavation has occurred since the last full gamma scan in 2018, including the 21 additional excavation locations referenced above, and replace previous gamma walkover scan survey at excavation locations with these new scan data to provide a final gamma walkover survey concluding the Data Gaps Investigation. Gamma walkover surveys will be performed at a total of 112 locations: 21 locations identified for soil excavation and 91 locations where investigations have been completed (see attached Table 2 and Figure 4).

Additional details on investigations are provided below.

Additional Details for Locations Selected for Additional Soil Removal
1. Prior to any subsurface intrusive activity perform gamma scan measurements over an area at least 4 feet by 4 feet at each of the 21 locations selected for additional soil removal to confirm the location of the highest gamma reading and delineate the extent of the planned excavation. Document the highest gamma activity with a static measurement approximately 10 cm above the ground surface using a 1-minute count with a Ludlum Model 44-20 (3x3) NaI detector.

2. Excavate soil from the area of elevated activity delineated by gamma scans in Step 1. Do not remove soil more than 2 feet below ground surface. Remove at least 1 cubic yard of soil from each location (approximately 4 feet long by 4 feet wide by 2 feet deep) using a mini-excavator or hand tools. Lay out soils on plastic adjacent to the excavation.

3. Screen soils to identify potential discrete objects. Segregate all discrete objects for separate disposal. After screening, soils will be loaded into a roll-off container, or similar.

4. Perform gamma scan measurements over the entire excavation to determine if the soil removal is complete. If the gross gamma readings are consistent with background the soil removal is complete. If the gross gamma reading of the sidewalls of the excavation is not consistent with background, continue removing soil from the sides of the excavation until the gross gamma reading of the sidewalls is consistent with background. Depth of the excavations are not to exceed 2 feet below ground surface.

5. After the sidewall excavations are completed measure and record the gross gamma reading approximately 10 cm above the original ground surface using a 1-minute count with a Ludlum Model 44-20 (3x3) NaI detector for comparison with the gamma static measurement from Step 1.

NAVFAC SW FIELD CHANGE REQUEST FORM

Additional Details (continued)

6. Perform an *in situ* gamma spectroscopy measurement of the excavation location identified in Step 1 using the Canberra Falcon, or equivalent detector, to count for up to 30 minutes. The detector will be positioned approximately 10 to 30 cm above the original ground surface. The *in situ* gamma spectrometry measurement will provide the average concentration of Ra-226 in a large volume of soil generally defined as a 10-foot diameter circle 15 cm thick. These measurements will be used in Step 10 to determine if a subsurface soil sample is required

7. Collect one confirmation composite soil sample at each of the 21 excavation locations from the excavation sidewalls following completion soil removal activities. The surface soil sample will be collected from the sidewalls of the excavation from the ground surface to a depth of 12 inches below ground surface at four locations around the excavation sidewalls. The soil from the four sidewall locations will be composited, mixed, and a representative sample packaged for analysis. The 12-inch sample depth is consistent with the collection of surface soil samples from systematic locations.

8. Perform a field gamma spectrometry measurement on each composite sidewall soil sample collected in Step 7 using the Canberra Falcon, or equivalent detector, to count each sample for up to 60 minutes to get a preliminary estimate of the Ra-226 concentration in each soil sample before they are sent to the laboratory for analysis.

9. If the field screening of the soil sample reports a Ra-226 concentration greater than 5 pCi/g, then the excavation will be extended by removing additional soil from the sides of the excavation and repeating steps 6 through 8.

10. If the *in situ* gamma spectroscopy result (see Step 6) exceeds 5 pCi/g or the post-excavation gross gamma reading (see Step 5) exceeds the investigation level of three standard deviations above the average reading, then collect an additional soil sample from the bottom of the excavation. The sample will be collected at the location of the highest gross gamma reading on the bottom of the excavation or from the center of the excavation if the gamma readings are uniform. The sample will be collected from the first 12 inches of soil starting at the bottom of the excavation (24 to 36 inches below ground surface). The 12-inch sample depth range is consistent with the collection of surface soil samples from systematic locations.

11. Perform laboratory analyses for Ra-226 (and Sr-90) in soil for all soil samples to provide definitive soil activities at each location.

12. Backfill and restore each excavation location. Materials used for backfill will be certified as background prior to being used at the site.

13. Perform a position correlated gamma scan survey of the 112 locations; 21 restored excavation locations and 91 previous investigation locations. Replace the previously collected gamma scan data with the new scan survey data to provide a final walkover survey.

14. Evaluate the potential exposure to industrial workers based on surface soil sample results. The total dose and total risk will be calculated for each SU using the methodology provided in Worksheet #37 of the approved SAP. The source term for the dose and risk calculations to evaluate compliance with the survey objective of $5x10^{-6}$ risk will be the 95% UCL based on soil samples collected within 2 feet of ground surface from systematic and bias locations in each SU.

15. Evaluate the potential exposure to industrial workers based on subsurface soil sample results. The total dose and risk will be calculated based on individual sample results assuming two feet of soil cover. The exposure duration will be adjusted to 200 hours per year (4 hours per week for 50 weeks, 10% of surface soil) to account for the small area of subsurface contaminated soil.

NAVFAC SW FIELD CHANGE REQUEST FORM

Will this change result in a contract cost or time change? ☒ Yes ☐ No

Estimate of contract cost or time charge (if any) To Be Determined

Preparer (signature)	Date	Preparer's Title	Technical Lead (Signature)	Date
Scott Hay	7/07/20	Project Health Physicist	Scott Hay	7/07/20

Disposition

☐ Approved

☐ Not approved (give reason): _____

Engineer (signature) (if engineering related)	Date	Project Manager (signature)	Date
☐ Comments (attached) ☐ No Comments		☐ Comments (attached) ☒ No Comments	
Navy ROICC (signature)	Date	QC Manager (signature)	Date
☐ Comments (attached) ☐ No Comments		☐ Comments (attached) ☒ No Comments	
Navy RPM (signature)	Date	NAVFAC SW QAO (signature)	
☐ Comments (attached) ☐ No Comments		☐ Comments (attached) ☐ No Comments	

Attachments: None

Distribution: Project File
Copy to Site File
Project Manager
NAVFAC SW QAO
NAVFAC SW RPM

Field Change Request - 004
Table 1 - 21 Planned Excavation Locations

Survey Unit	Current Risk	Planned Excavation Locations	Estimated Final Risk
SU 4	2.62E-05	04-17	4.81E-06
		04-18	
		LBNC-063	
SU 6	1.30E-05	06-17	1.31E-06
SU 10	3.56E-05	10-17	1.58E-06
		LBNC-036	
SU 11	1.05E-05	11-17	2.21E-06
		LBNC-073	
SU 12	1.98E-05	LBNC-012/023	4.51E-06
SU 14	5.51E-06	14-21	4.75E-06
SU 15	1.46E-05	15-18	4.30E-06
		15-26	
		LBNC-025	
SU 16	7.27E-06	16-17	3.11E-06
SU 17	5.59E-06	LBNC-100	2.84E-06
SU 18	5.94E-06	LBNC-002	4.48E-06
SU 29	1.34E-05	29-18	3.78E-06
		LBNC-045	
SU 31	4.49E-05	31-17	4.75E-06
		LBNC-053	
		LBNC-057	

Table 2 - 112 Locations for Scanning

Location ID	Easting	Northing	Proposed Excavation
LBNC 012/023	6494822.96	1729270.17	Yes
LBNC-002	6494915.24	1729476.14	Yes
LBNC-004	6494920.88	1729435.00	No
LBNC-010	6494852.63	1729260.25	No
LBNC-013	6494757.73	1729239.50	No
LBNC-015	6494723.05	1729457.49	No
LBNC-017	6494708.61	1729345.72	No
LBNC-018	6494936.63	1729425.90	No
LBNC-021	6494986.53	1729395.34	No
LBNC-025	6494926.42	1729416.14	Yes
LBNC-026	6494583.36	1729262.54	No
LBNC-027	6494509.81	1729131.67	No
LBNC-028	6494097.04	1728983.94	No
LBNC-030	6493871.55	1728883.84	No
LBNC-031	6493526.39	1728836.79	No
LBNC-032	6493450.58	1728827.28	No
LBNC-033	6493426.72	1728844.12	No
LBNC-034	6493407.53	1728855.98	No
LBNC-035	6493293.24	1728916.78	No
LBNC-036	6494547.54	1729130.15	Yes
LBNC-037	6494549.70	1729125.81	No
LBNC-038	6494383.29	1729071.57	No
LBNC-039	6494640.24	1729379.20	No
LBNC-040	6494833.49	1729385.09	No
LBNC-041	6494788.23	1729434.82	No
LBNC-042	6494658.85	1729459.08	No
LBNC-043	6492784.21	1728726.63	No
LBNC-044	6492843.59	1728772.33	No
LBNC-045	6493297.67	1728839.74	Yes
LBNC-046	6492760.76	1728785.50	No
LBNC-047	6492700.49	1728817.22	No
LBNC-048	6492967.98	1728826.61	No
LBNC-049	6493358.09	1728798.33	No
LBNC-050	6493513.24	1729173.45	No
LBNC-051	6494007.31	1729472.96	No
LBNC-052	6493979.01	1729386.47	No
LBNC-053	6494023.32	1729350.86	Yes
LBNC-054	6494038.53	1729314.28	No
LBNC-055	6494028.99	1729310.13	No
LBNC-056	6494033.14	1729291.79	No
LBNC-057	6494045.75	1729201.67	Yes
LBNC-058	6494045.89	1729166.29	No
LBNC-059	6494159.69	1729215.43	No
LBNC-060	6494023.99	1729267.14	No
LBNC-061	6494104.53	1729195.69	No
LBNC-062	6494099.54	1729198.28	No

Table 2 - 112 Locations for Scanning

Location ID	Easting	Northing	Proposed Excavation
LBNC-063	6494098.48	1729196.13	Yes
LBNC-064	6494101.51	1729191.67	No
LBNC-065	6494103.24	1729187.32	No
LBNC-066	6494094.82	1729186.66	No
LBNC-067	6494099.65	1729183.61	No
LBNC-068	6494035.75	1729289.15	No
LBNC-069	6493430.51	1728786.49	No
LBNC-070	6494006.18	1728945.32	No
LBNC-071	6492968.68	1728930.82	No
LBNC-072	6493048.22	1728867.37	No
LBNC-073	6494606.02	1729230.59	Yes
LBNC-074	6494367.35	1729243.04	No
LBNC-075	6494157.70	1729462.74	No
LBNC-076	6494612.43	1729598.35	No
LBNC-077	6495196.88	1729356.82	No
LBNC-078	6495204.54	1729363.33	No
LBNC-079	6495223.19	1729384.16	No
LBNC-080	6495160.85	1729339.95	No
LBNC-081	6494452.02	1729265.15	No
LBNC-082	6493357.39	1728784.36	No
LBNC-083	6494664.43	1729468.22	No
LBNC-084	6494757.08	1729476.41	No
LBNC-085	6494806.78	1729455.13	No
LBNC-086	6494687.06	1729434.68	No
LBNC-087	6494951.29	1729262.15	No
LBNC-088	6494738.30	1729277.59	No
LBNC-089	6494785.63	1729275.49	No
LBNC-090	6494812.79	1729316.52	No
LBNC-091	6494746.70	1729298.88	No
LBNC-092	6494742.34	1729352.10	No
LBNC-093	6494702.49	1729379.58	No
LBNC-094	6494870.25	1729469.54	No
LBNC-095	6494742.97	1729277.96	No
LBNC-096	6494751.07	1729281.29	No
LBNC-097	6494887.48	1729430.24	No
LBNC-098	6494888.56	1729424.96	No
LBNC-099	6494865.62	1729452.49	No
LBNC-100	6494867.53	1729425.49	Yes
LBNC-101	6494836.19	1729359.65	No
LBNC-102	6494810.52	1729374.35	No
LBNC-103	6494690.52	1729186.43	No
LBNC-104	6494694.95	1729188.03	No
LBNC-105	6494685.25	1729193.26	No
LBNC-106	6495042.99	1729636.90	No
LBNC-107	6492259.90	1728518.06	No
LBNC-108	6492561.75	1728478.72	No

Table 2 - 112 Locations for Scanning

Location ID	Easting	Northing	Proposed Excavation
LBNC-109	6492586.28	1728760.15	No
LBNC-110	6495075.60	1729340.17	No
LBNC-111	6495178.22	1729351.94	No
LBNC-112	6494919.04	1729308.84	No
LBNC-113	6494904.04	1729396.79	No
LBNC-114	6494644.18	1729493.95	No
LBNC-115	6494643.91	1729463.38	No
LBNC-116	6494823.90	1729507.94	No
LBNC-011	6494827.46	1729265.67	No
29-18	6493423.82	1728776.03	Yes
31-17	6494048.40	1729294.62	Yes
4-18	6494097.60	1729210.94	Yes
4-17	6494123.20	1729177.50	Yes
6-17	6494214.97	1729178.91	Yes
10-17	6494499.15	1729267.87	Yes
11-17	6494611.06	1729215.03	Yes
14-21	6494778.98	1729307.72	Yes
15-18	6494942.08	1729414.69	Yes
15-26	6494988.23	1729459.50	Yes
16-17	6494711.29	1729348.27	Yes

**PROPOSED EXCAVATION LOCATIONS
SEA LAUNCH**

**FORMER LONG BEACH NAVAL COMPLEX
LONG BEACH, CALIFORNIA**

6/2020	PROJECT No. R1-0008.01	FIGURE 1

CABRERA SERVICES
CHALLENGE ACCEPTED

Legend

Buildings

Survey Units (SU)

Class 1

Class 2

Elevated Location Status

(2008 Locations)

2008 Result/ Remove Additional Soil

(2018-2019 Locations)

2018-2019/ Remove Additional Soil

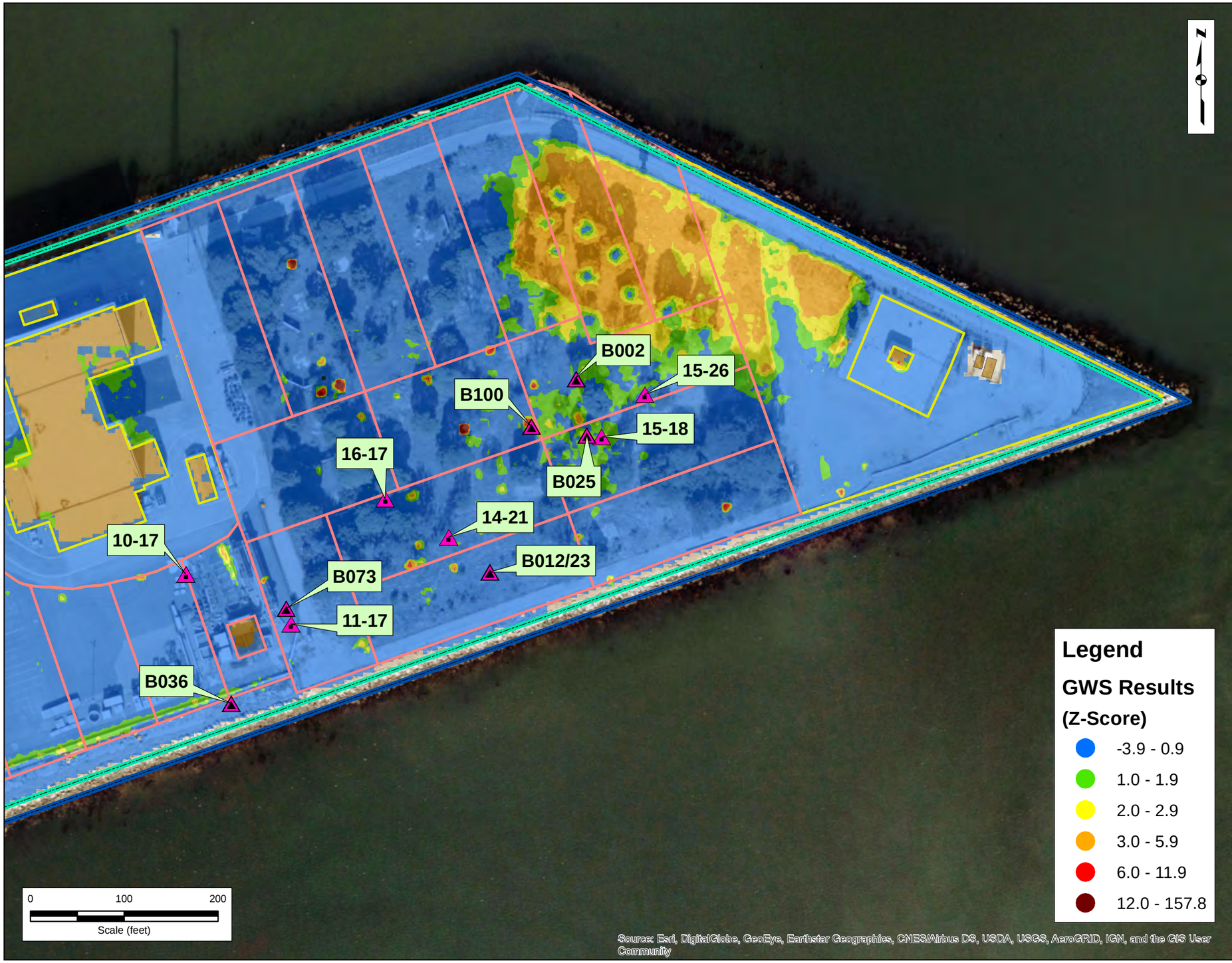
Notes:
2008 samples are denoted with the SU number and sample ID number separated by a "-". Sample numbers 1 thru 16 Systematic, 17+ are Bias.

PROPOSED EXCAVATION LOCATIONS SEA LAUNCH

FORMER LONG BEACH NAVAL COMPLEX LONG BEACH, CALIFORNIA

6/2020	PROJECT No. R1-0008.01	FIGURE 2

CABRERA SERVICES
CHALLENGE ACCEPTED



Legend

Buildings

Survey Units (SU)

Class 1

Class 2

Elevated Location Status

(2008 Locations)

2008 Result/ Remove Additional Soil

(2018-2019 Locations)

2018-2019/ Remove Additional Soil

Notes:
2008 samples are denoted with the SU number and sample ID number separated by a "-". Sample numbers 1 thru 16 Systematic, 17+ are Bias.

Legend

GWS Results (Z-Score)

- -3.9 - 0.9
- 1.0 - 1.9
- 2.0 - 2.9
- 3.0 - 5.9
- 6.0 - 11.9
- 12.0 - 157.8

PROPOSED EXCAVATION LOCATIONS GULL PARK

FORMER LONG BEACH NAVAL COMPLEX LONG BEACH, CALIFORNIA

6/2020	PROJECT No. R1-0008.01	FIGURE 3

CABRERA SERVICES
CHALLENGE ACCEPTED

Legend

- Replacement GWS Scan (65m2)
- IR Site 1
- IR Site 2
- Buildings

Survey Units (SU)

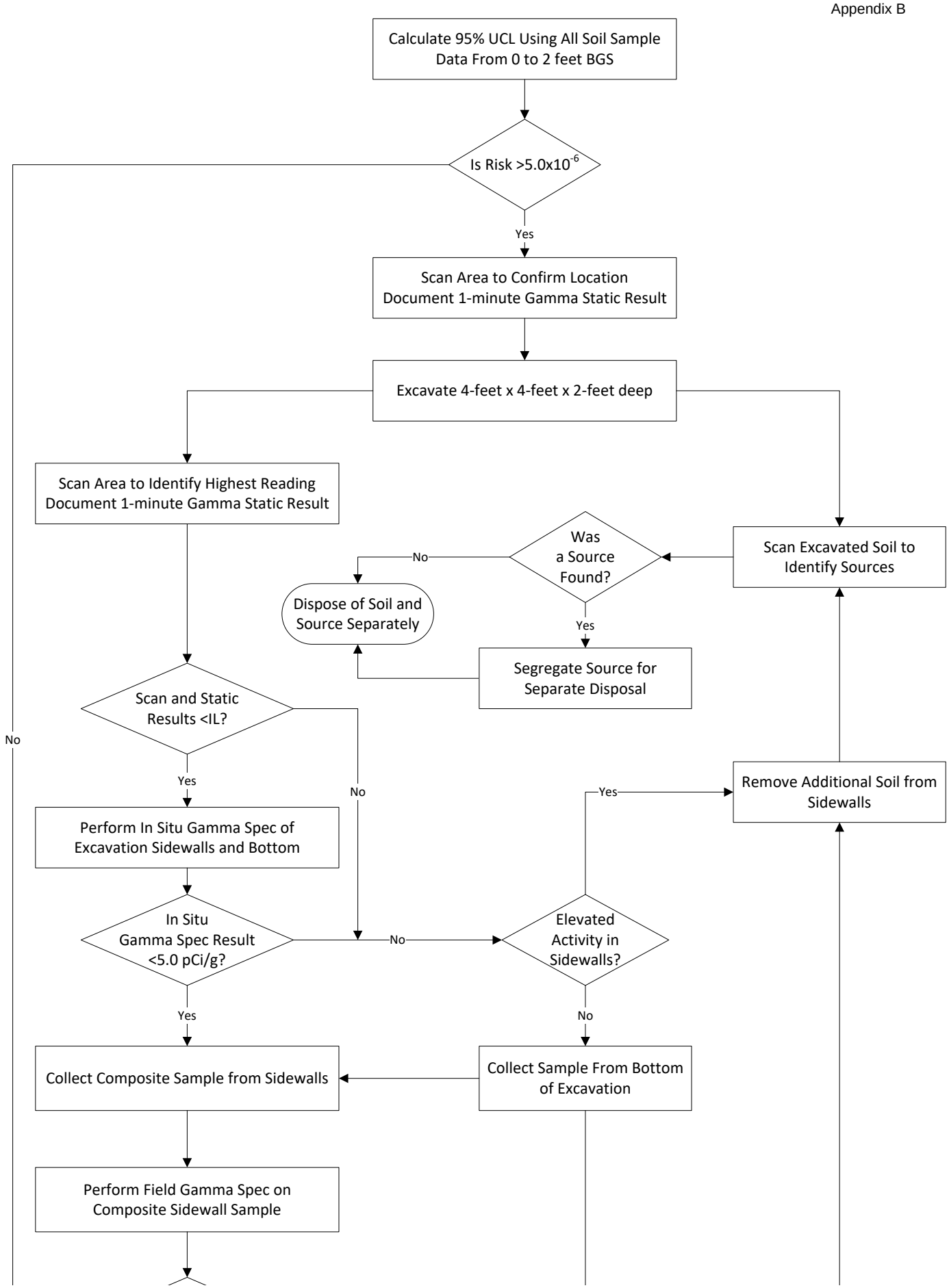
- Class 1
- Class 2

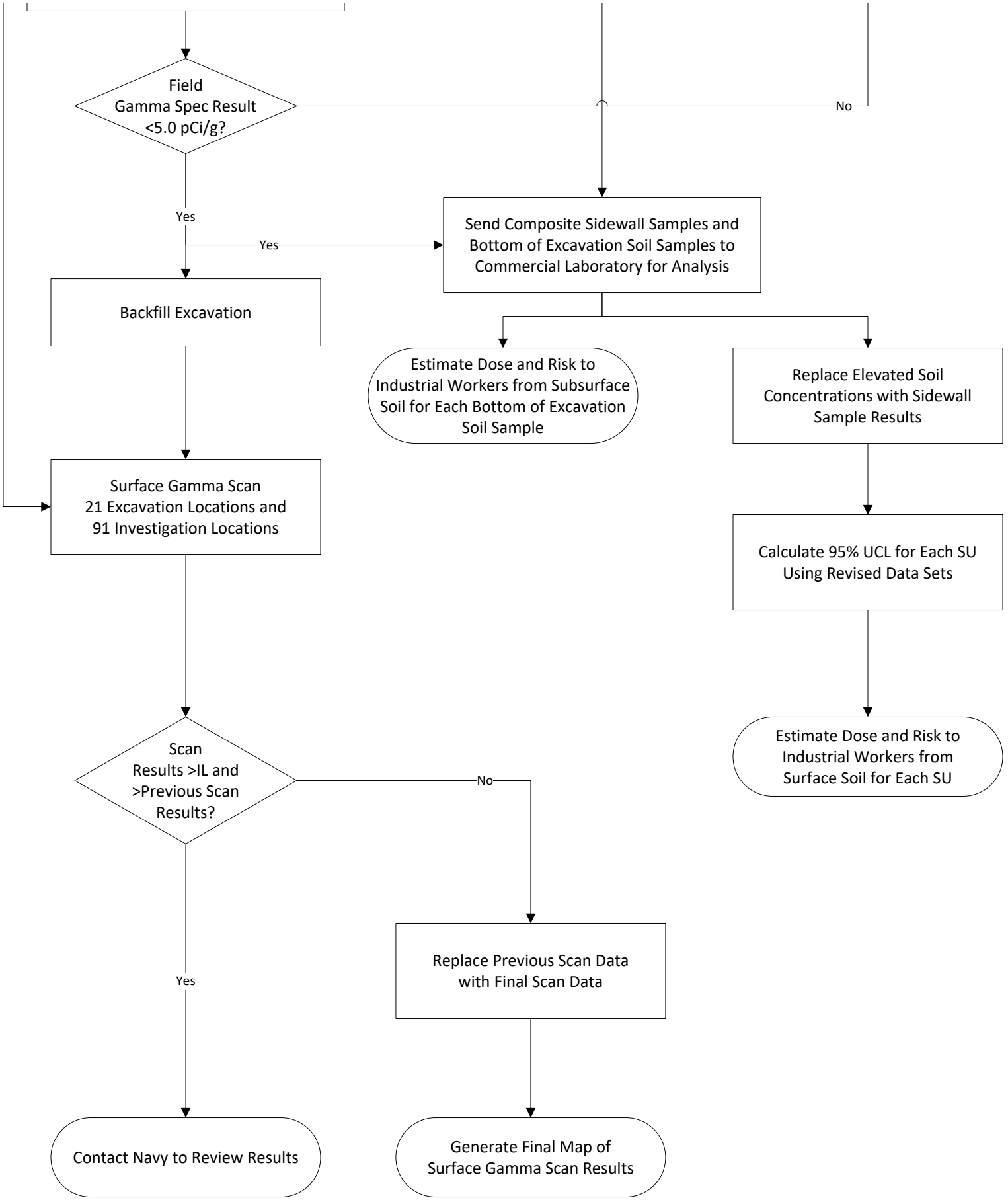
REPLACEMENT GAMMA SCAN LOCATIONS

**FORMER LONG BEACH NAVAL COMPLEX
LONG BEACH, CALIFORNIA**

6/2020	PROJECT No. R1-0008.01	FIGURE 4

CABRERA SERVICES
CHALLENGE ACCEPTED


Calculate 95% UCL Using All Soil Sample Data From 0 to 2 feet BGS
Is Risk >5.0x10-6
Yes
No
Scan Area to Confirm Location Document 1-minute Gamma Static Result
Excavate 4-feet x 4-feet x 2-feet deep
Scan Area to Identify Highest Reading Document 1-minute Gamma Static Result
Scan Excavated Soil to Identify Sources
Was a Source Found?
No
Yes
Dispose of Soil and Source Separately
Segregate Source for Separate Disposal
Scan and Static Results <IL?
No
Yes
Remove Additional Soil from Sidewalls
Perform In Situ Gamma Spec of Excavation Sidewalls and Bottom
In Situ Gamma Spec Result <5.0 pCi/g?
No
Yes
Elevated Activity in Sidewalls?
Yes
No
Collect Composite Sample from Sidewalls
Collect Sample From Bottom of Excavation
Perform Field Gamma Spec on Composite Sidewall Sample


Field
Gamma Spec Result
<5.0 pCi/g?
No
Yes
Yes
Send Composite Sidewall Samples and Bottom of Excavation Soil Samples to Commercial Laboratory for Analysis
Backfill Excavation
Estimate Dose and Risk to Industrial Workers from Subsurface Soil for Each Bottom of Excavation Soil Sample
Replace Elevated Soil Concentrations with Sidewall Sample Results
Surface Gamma Scan
21 Excavation Locations and
91 Investigation Locations
Calculate 95% UCL for Each SU Using Revised Data Sets
Estimate Dose and Risk to Industrial Workers from Surface Soil for Each SU
Scan
Results >IL and
>Previous Scan
Results?
No
Yes
Replace Previous Scan Data with Final Scan Data
Contact Navy to Review Results
Generate Final Map of Surface Gamma Scan Results

Appendix C: Responses to Regulatory Agency Comments

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Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
12/22/2022	1	Section 1.3 Statement of Purpose: This Section States: "implement LUCs in the form of engineering controls (ECs) and institutional controls (ICs), including ICs that restrict future land use to industrial use." The ESD must examine if the ECs in place are adequate protection from ROC.	The Navy acknowledges that Land Use Control (LUCs) referenced in the 2000 Record of Decision (ROD) may not be adequate to address radionuclides of concern (ROCs). The Explanation of Significant Differences (ESD) is documenting that ROCs are present at Sites 1 and 2, and LUCs that are adequate protection from ROCs will be officially documented in the forthcoming LUC Remedial Design (RD).
3/8/2023	1	DTSC appreciates the Navy response. Please revise the ESD, describe the land use controls proposed in the 2000 ROD, that had not considered protection of ROCs, and list all land use controls needed to protect Site users from risks associated with ROCs within the ESD text. These land use controls should be the same as those to be included in the LUC RD.	The ESD, Section 2.3 has been revised to include all the LUCs as listed in the June 2000 ROD that will be implemented to protect site users from risks associated with ROCs. Section 2.3 has been revised to list LUCs as follows: *"• Residential use is prohibited.* • *Site operations shall be restricted to industrial uses consistent with the California Coastal Act and the Certified Port Master Plan for the Long Beach Harbor District.* • *Industrial use shall not include a hospital for humans, school for persons under 21 years of age, day care center for children, or any permanently occupied human habitation other than those used for industrial purposes.* • *Removal of soil from IR Sites 1 and 2 prohibited, unless approved by the DTSC. Excavated soil and*

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
			groundwater must be tested for hazardous substances (including radioactive constituents) and hazardous wastes. • *Construction and/or operations on the property shall not interfere with ongoing monitoring or assessment of work being conducted by or for federal, state, or local regulatory agencies, unless specifically approved by the appropriate lead agency.* • *Removal and disposal of contaminated soil or groundwater shall be conducted in accordance with all applicable federal, state, and local regulations governing removal, transport, and disposal of hazardous substances and hazardous waste.* • *Disturbance or use of existing groundwater wells is prohibited unless specifically approved by all regulatory agencies. No groundwater production wells may be installed for residential, municipal, agricultural, or industrial use. Monitoring and other test wells are not subject to this provision, including borings for the purpose of testing wells, wells for monitoring the quality of groundwater, and borings to define geology.* • *Groundwater shall not be used for drinking water without the expressed authorization of the RWQCB."* The ESD, Section 3.2 has been revised to include an additional IC added to prohibit intrusive activities

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
			without prior review and approval from the FFA signatories. Section 3.2, page 3-3, first bullet has been added as follows: *"Intrusive activities are prohibited without prior review and approval from the FFSRA signatories. Intrusive activities require an approved soil management plan (SMP), approved by the FFSRA signatories that specifically addresses worker protection from potential residual ROCs. Intrusive activities include excavation; construction of roads, utilities, structures; demolition of hardscape; movement of soil from below ground surface to the surface, and any other actions that expose potentially ROC contaminated soil. The SMP must be approved before the start of any intrusive activities."* These will be the same LUCs that will be included in the forthcoming LUC RD.
12/22/2022	2a	Section 2.3 Description of Selected Remedy: This Section states: "The selected remedy complies with the statutory cleanup requirements in CERCLA by assuring protection of human health and the environment and satisfying ARARs." The ESD must provide a date when these Applicable or Relevant and Appropriate Requirements (ARARs) were approved and clarify that they did not address ROC remediation or State laws and regulations promulgated after this date.	ARARs for Sites 1 and 2 were approved in the Final Feasibility Study issued in February 1999 and did not include remediation to address ROCs. The ESD, Section 4, page 4-1, first paragraph has been revised as follows: *"The Navy's primary responsibility in regard to CERCLA is to achieve statutory requirements for protection of human health and the environment. Section 121 of CERCLA establishes several statutory requirements and preferences. The ARARs for Sites 1 and 2 were approved*

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
			in the Final Feasibility Study dated February 1999 and did not include remediation to address ROCs or address State laws and regulations promulgated after this date. The selected remedy as changed per this ESD, remains protective of human health and the environment."
3/8/2023	2a	DTSC finds the response adequate, thank you.	Noted. Thank you for your comment.
12/22/2022	2b	Section 2.3 Description of Selected Remedy: This Section also states that a Data Gaps Investigation, Remedial Action Completion Report, and a Land Use Control Remedial Design (LUC RD) Report will be published in the future. However, the ESD is based on the draft RACR conclusions. DTSC recommends revising the ESD, so it is not based on the draft RACR conclusions, but solely provides remediation goals for the Site cleanup.	The ESD has been revised to only reference remediation goals documented in the Final Work Plan for the Radiological Data Gaps Investigation issued in December 2017. In Section 2.2, the last paragraph on page 2-4 that continues to page 2-5 that indicates RAOs have been achieved [a Remedial Action Completion Report (RACR) conclusion] has been deleted.
3/8/2023	2b	DTSC finds the response adequate, thank you.	Noted. Thank you for your comment.
12/22/2022	2c	Section 2.3 Description of Selected Remedy: The ESD must state that a revised RACR will be prepared according to DTSC and CDPH comments and will document the implementation of the new cleanup goals.	The ESD references information from the DGI and does not include any data or reference to the RACR portion of the document or conclusions from the RACR. A revised DGI/RACR will follow the ESD.
3/8/2023	2c	DTSC finds the response adequate, thank you.	Noted. Thank you for your comment.
12/22/2022	2d	Section 2.3 Description of Selected Remedy: Although the Final ROD included LUCs requirement, LUCs have not been recorded or implemented. In order to expedite the	The Navy requires concurrence on the ESD before proceeding to preparation of the LUC RD, in accordance with the CERCLA process.

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
		implementation of LUC, DTSC requests the Navy to provide a draft LUC RD within 30 days of the date of this letter.	
3/8/2023	2d	Health and Safety Code § 67391.1. (b) Requirements for Land Use Covenants states: "The Department shall not approve or concur in a response action decision document which includes limitations on land use or other institutional controls, unless the limitations or controls are clearly set forth and defined in the response action decision document." DTSC considers ESD ROD a decision document. In addition, § 67391.1. (e)(2) states: "Whenever the Department determines that it is not feasible to record a land use covenant for property owned by the federal government, such as transfers from one federal agency to another, the Department and federal government shall use other mechanisms to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances which remain on the property." The appropriate land use controls have not been in place officially since 2000 to protect workers at the Site and there should not be any additional delays in drafting the LUC RD and associated documents that clearly state the prohibited activities and the required activities. The eight bullets provided on page 3-3, Section 3.2, Description of Significant Differences, in the Final Draft ESD are insufficient. Although paragraph 3 on page 3-2 states	The ESD, Section 2.3 has been revised to include all the LUCs as listed in the June 2000 ROD that will be implemented to protect site users from risks associated with ROCs. In addition, Section 3.2, page 3-3, first bullet provide an additional LUC to prohibit intrusive activities as follows: *"Intrusive activities are prohibited without prior review and approval from the FFSRA signatories. Intrusive activities require an approved soil management plan (SMP), approved by the FFSRA signatories that specifically addresses worker protection from potential residual ROCs. Intrusive activities include excavation; construction of roads, utilities, structures; demolition of hardscape; movement of soil from below ground surface to the surface, and any other actions that expose potentially ROC contaminated soil. The SMP must be approved before the start of any intrusive activities."* The reference to a 30-day notification has been removed as the SMP will be a preapproved document that is applicable to all intrusive activities including emergency repair activities that require an immediate response without notification. These will be the same LUCs that will be included in the forthcoming LUC RD.

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
		"current land use at the Sites is industrial, including industrial and office buildings with parking, industrial yard space, railway, and open space (GullPark)," the bullet list does not include prohibition of activates such as residential use, school for children under 18, and day care facilities, and construction of enclosed structures for human occupation at the Gull Park. In addition, a paragraph on page 3-2, Section 3.2 states "Prohibit intrusive activities without prior review and approval from the Navy and regulatory agencies." However, the bullet list does not specifically include a prohibition of soil disturbing activities or a requirement to have a soil and groundwater management plan and a site health and safety plan. Lastly, the only authority for DTSC included in the eight bullets is a "notification to the regulators". DTSC does not consider a 30-day notification sufficient for approving a complicated soil management plan addressing chemical and radiological contamination. As we discussed during the BCT meeting on February 15, 2023, the revised Final Draft ESD must include description of prohibited and required activities at IR Sites 1 and 2 for DTSC review as soon as possible. Also, property owner must ensure DTSC staff has access to the Site.	

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
12/22/2022	3	Section 3.2 Description of Significant Differences: This Section states: "Covenants to Restrict the Use of Property (CRUPs) and LUCs are currently in place at the Sites but will be modified to include additional required restrictions resulting from the post-ROD discovery of ROCs." It is DTSC understanding that CRUPs and LUCs have not been recorded, and there is no ICs implementation plan. Except there is ICs requirement in the 2001 ROD. Please revise this Section.	Section 3.2, The last paragraph and a bulleted list clarify that LUCs will be recorded in detail in the forthcoming LUC RD as follows: *"…Further details for implementing, monitoring, and enforcing the ICs will be described in the forthcoming LUC RD.* • *Requirement for annual inspections of the Sites to evaluate the integrity of LUCs.* • *Annual inspection results reported to appropriate agencies and organizations.* • *Map identifying where the ICs will be implemented.* • *Requirement for CERCLA Five-Year Reviews to assure that the selected remedy is still protective of human health and the environment.* • *Frequency and requirements for periodic monitoring or visual inspections, in addition to annual inspections.* • *Reporting results from monitoring or inspections.* • *Notification procedures to the regulators for planned property conveyance, corrective action required, or response to actions inconsistent with the ICs.* • *Consultation with DTSC and RWQCB, regarding wording for land use restrictions and parties to be provided copies of the deed language once executed."*

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
3/8/2023	3	DTSC finds the response adequate, thank you.	N/A
12/22/2022	4-1	Section 4, Statutory Determinations: This Section addressed DTSC ARARS California Code of Regulations (CCR) title 22, Section 67391.1(a) and (e)(1) and California Health and Safety Code (HSC) Section 25355.5 (a)(1)(c), but not the following ARARs: 1. California Civil Code, Div. 3, Part 1, Title 3, §1471	California Civil Code, Div. 3, Part 1, Title 3, §1471 was an ARAR listed in the 2000 ROD. Only additional ARARs are identified as necessary due to the significant differences identified for the selected remedy have been added to the ESD.
12/22/2022	4-2	2. DTSCs Toxicity Criteria Rule (TCR), promulgated on September 4, 2018.	The DON continues to develop a final position with respect to the Toxicity Criteria Rule (TCR); however, the DON has not accepted the toxicity criteria as ARARs for any site in California as of the preparation of this ESD. With respect to conducting risk assessments or identifying screening levels, under CERCLA, the lead agency conducts human health risk assessments during the initial, investigative stage of the process, whereas state-based requirements that the State has identified and proposed as potential ARARs are evaluated as part of the Feasibility Study (FS) (or Engineering Evaluation /Cost Analysis [EE/CA]), with final approval of any ARARs (both federal and state) made in the ROD (or Decision Document). Accordingly, there is no requirement to attain or to evaluate ARARs for purposes of risk assessments or screening levels.

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
			With respect to Remediation Goals (RGs), as the U.S. EPA has explained, "[c]hemical-specific ARARs are usually health-or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment." The U.S. EPA has further stated, "Levels or standards of control are basic performance objectives for (a) remedial action (e.g., acceptable exposure levels after the remedial action is completed)." (See National Contingency Plan [NCP] Preamble, Proposed Rule, 53 Fed Reg. at 51437, 51443.) While the values referenced by the TCR for particular Chemicals of Potential Concern (COPCs) may potentially be "applied to site-specific conditions," they do not in themselves establish "the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment," nor do they represent "basic performance objectives for (a) remedial action (e.g., acceptable exposure levels after the remedial action is completed)." Moreover, it does not appear that the State itself intended the TCR values to be viewed as ARARs. As stated in the responses to comments during the

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
			administrative ruling for the TCR (and in keeping with the TCR stated connection to human health risk-based remediation RGs), "[r]egarding the request to have the rule state that it is not intended to require remediation goals to be set at 1×10^{-6} incremental risk or a HQ of 1, the rule only requires that (risk-based) remediation goals be based on the toxicity criteria in accordance with §69021. The rule does not set remediation goals at any particular point in the risk management range and is intentionally silent on that issue to defer to the regular NCP risk-management process and the flexibility provided within that process. The rule neither requires nor prohibits risk managers from setting remediation goals at 1×10^{-6} incremental risk (or HQ of 1), or at any other point within the risk management range. The remediation goal-setting decision is made for each individual site based on site-specific facts and conditions." (See https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/07/Revised-Toxicity-Criteria-Rule-RTCs.pdf at bottom of pg. 33 of 64.) The Navy notes that the above response addresses only potential ARARs status and that the Navy will take into consideration the toxicity values associated with the TCR in conducting risk assessments and identifying screening levels for LBNS Sites 1 and 2, and with respect to the

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			calculation of risk-based RGs. Consequently, this ARAR has not been added to Appendix A.
3/8/2023	4-1, 4-2	DTSC is disappointed the Department of Defense admittingly has not accepted California law, DTSCs Toxicity Criteria Rule (TCR), that was subject to public review and comment and was promulgated five years ago. Although the Navy RTC concludes that Navy will take into consideration the toxicity values associated with the TCR in conducting risk assessments and identifying screening levels for LBNS Sites 1 and 2, and with respect to the calculation of risk-based remediation goals (RGs), the ESD does not state when such a review of the RGs will be conducted. Therefore, DTSC does not accept the Navy RTC. However, DTCS will accept the Navy proposal to conduct a post ROD evaluation during the next Five-Year Review. If when using the TCR (change to the law) during the next Five-Year Review the Navy determines that the ROD remedy is no longer protective, then the Navy would determine the actions needed to make it protective and select a new remedy through a new ESD or ROD Amendment. In order to comply with the TCR, the Five-Year Review must include risk evaluation of volatile organic compounds in groundwater to indoor air and if available the soil gas to indoor pathways and screening evaluation of metals and other chemicals of potential concern at the Site for DTSC review within 30 days from the date of this letter. Farah	The Navy will work with the DTSC on the TCR on a programmatic level. This is not project specific and does not require changes to the ESD. Note 3 does not include either radium or strontium in the list of substances; therefore, the U.S. EPA Regional Screening Levels (RSLs) apply. The discussion of groundwater to indoor air is superfluous for metals and there is no vapor pressure under ambient conditions.

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		Esfandiari, MPH, PhD, Environmental Toxicologist with Human and Ecological Risk Office, provided the following comments on Navy RBCs for the LBNS Sites 1 and 2 listed on Table 3-12 of 1999 Feasibility Study (FS): 1. Screening Levels: Screening levels including the risk-based concentrations (RBCs) listed in the 1999 LBNC FS are outdated. Besides, DTSC/HERO do not use the CA Ocean Plan Criteria for the protection of human health. Detected chemical concentrations in site media should be compared to DTSC screening levels (DTSC-SLs) listed in HERO HHRA Note 3. Note 3 incorporates HERO recommendations based on adoption of 2018 Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals rule (TCR). Per HHRA Note 3 and in accordance with the TCR, the DTSC-SLs provided in Note 3 should be used in preference to USEPA RSLs to evaluate chemical concentrations in environmental media at California sites and facilities. USEPA RSLs should continue to be used for contaminants for which a DTSC-SL value in Note 3 is not available. Regional Water Board's Environmental Screening Levels (ESLs) do also apply the hierarchy of TCR that is used by DTSC. The ESLs address a greater range of media and concerns than other commonly used screening levels (DTSC-SLs and RSLs) and reflect the broader scope of environmental concerns outlined in the Basin Plan. The	

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		updated HERO Note 3 [Revised May, 2022] may be found at https://dtsc.ca.gov/wp-content/uploads/sites/31/2022/02/HHRA-Note-3-June2020 -Revised-May2022A.pdf 2. Groundwater to Indoor Air Screening Levels: Groundwater to indoor air (IA) SLs are not listed in Table 3-12. Please note that GW at 26 ft bgs is considered relatively shallow and needs to be included in the vapor intrusion (VI) risk assessment. Cleaning up to CA maximum contaminants levels (MCLs) might not be protective of the VI exposure pathway particularly since the chlorinated volatile organic compounds (VOCs) are the contaminants. GW to indoor air risk-based screening levels are calculated by applying the chemical specific Henry's law constant and DTSC default GW attenuation factor (0.001) to the target indoor air (IA) concentrations (listed in May 2022 HHRA Note 3). HERO recommends that the FS includes assessment of groundwater to indoor air risks using VI multiple lines of evidence.	
12/22/2022	4-3	Section 4, Statutory Determinations: This Section addressed DTSC ARARS California Code of Regulations (CCR) title 22, Section 67391.1(a) and (e)(1) and California Health and Safety Code (HSC) Section 25355.5 (a)(1)(c), but not the following ARARs: 3. CDPH, Radiological Assessment Unit, ARARs addressing ROC mitigation in the Appendix.	As documented in the RTCs for the Long Beach Naval Shipyard (LBNS) Sites 1 and 2 Draft Data Gap Investigation (DGI)/RACR, the following is in response to the CDPH, Radiological Assessment Unit, ARARs addressing ROC mitigation. Consequently, these ARARs have not been added to Appendix A.

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			• 17 CCR 30256(k) Relevant and Appropriate: The Navy has reviewed the current request and determined that this requirement is not more stringent than federal ARARs for radiological waste at 10 C.F.R. §20.1402 and §20.1403. Because state decommissioning requirements are applicable to any person who possesses sources of radiation and a specific license from CDPH to possess radioactive material, these requirements may be potentially applicable at CDPH-licensed Navy sites. However, even though the state requirements at Cal. Code regs. tit. 17 §30256(k) may be applicable at CDPH-licensed sites, substantive provisions of these state requirements must be more stringent than federal ARARs to be potential ARARs. Because federal regulations at 10 C.F.R. Part 20 have been identified as potential ARARs, comparable state requirements that are no more stringent are not potential ARARs. Please see additional response below. • § 20.1403 Criteria for license termination under restricted conditions. Relevant and Appropriate: This is a federal requirement and was evaluated as a potential federal ARAR. This remedial action entails removal/remediation of radioactive waste-contaminated media to the levels that are protective of human health under restricted use. Potential

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			federal ARARs for this alternative are contained in NRC's Radiological Criteria for Restricted Use at 10 C.F.R. §20.1403 and substantive provisions of alternative criteria for license termination at 10 C.F.R. §20.1404. The substantive provisions of the following 10 C.F.R. §20.1403 regulations are potential ARARs: "A site will be considered acceptable for license termination under restricted conditions if: (a) The licensee can demonstrate that further reductions in residual radioactivity necessary to comply with the provisions of Section §20.1402 would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are as low as reasonably achievable (ALARA)….; (b) The licensee has made provisions for legally enforceable institutional controls that provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem per year. (e) Residual radioactivity at the site has been reduced so that if the institutional controls

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			were no longer in effect, there is reasonable assurance that the TEDE form residual radioactivity distinguishable from background to the average member of the critical group is ALARA and would not exceed either: 100mrem (1 mSv) per year; or 500 mrem (5 mSv) per year provided that the licensee i. Demonstrate that further reductions in residual radioactivity necessary to comply with the 100 mrem per year (1mSv per year) of paragraph (e)(1) of this section are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm' ii. Makes provisions for durable institutional controls" The substantive provisions of 10 C.F.R. §20.1403 indicate that in order to release a site under restricted use, a cost-benefit analysis is required to show that the release criteria proposed for restricted use is ALARA. For unrestricted use, the following federal ARARs are identified. Potential federal ARARs for unrestricted

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			use are contained in NRC's Radiological Criteria for Unrestricted Use at 10 C.F.R. §20.1402. The substantive provisions of the following regulation are potential ARARs: "A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are ALARA. • ROD Guidance, Applicable: The ROD Guidance is not a potential ARAR because it is not a cleanup standard, standard of control, or other substantive environmental protection requirement, criteria, or limitation promulgated under federal or state law. However, the Navy will be preparing the ESD in accordance with CERCLA and the guidance will be used to help with preparation. • 17 CCR 30256(k) in relation to RAM licenses and release of sites from state regulatory control: The Navy does not agree that 17 CCR 30256(k) is more stringent than federal ARARs. The federal ARAR identified at 10 CFR 20.1403 requires cleanup to

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			levels as low as reasonably achievable (ALARA). The Navy has determined that this substantive standard is relevant and appropriate. Since 17 CCR 30256(k)'s standard of "reasonable effort has been made to remove residual contamination" is not more stringent than ALARA, section 30256 is not a potential ARAR.
3/8/2023	4-3	Brad Loomis, Senior Health Physicist, Radiological Assessment Unit, California Department of Public Health (CDPH) comments on the Navy RTC are provided in the attached, letter, dated March 3.	The letter from California Department of Public Health (CDPH) dated March 3, 2023, states that there are no additional comments on the Draft Final ESD and the Draft Response to Comments (RTCs).
6/22/2023	1	Comment 1: Section 3.2 Description of Significant Differences, Page 3-2: *"Land use controls are a component of the selected remedy for IR Sites 1 and 2. The objectives of land use controls are to ensure that industrial use of the land at IR Sites 1 and 2 is maintained and to prevent residential use. The volume and concentration of contaminants left on site is protective for industrial workers."* The aforementioned paragraph is a new paragraph that did not appear in the draft final ESD. DTSC recommends editing the third sentence to state that a soil management plan and a site health and safety plan are required to protect the workers from the volume and concentration of contaminants left on site	The final sentence in the referenced paragraph has been revised as follows: *"A soil management plan (SMP) and a site health and safety plan are required to protect industrial workers from contaminants left on site."*

Comments from California Department of Toxic Substance Control (DTSC) dated December 5, 2022, March 8, 2023 and June 22, 2023 **Irena Edwards** **Environmental Scientist** **Site Mitigation and Restoration Program**			
Comment Date	**Number**	**Comment**	**Response**
6/22/2023	2	Comment 2: Section 3.2 Description of Significant Differences, Page 3-3: DTSC disagrees that a soil management plan must only address the ROC and not the COCs, and only the workers and not the environment. DTSC recommends revising the following paragraph: "Intrusive activities are prohibited without prior review and approval from the FFSRA signatories. Intrusive activities require an approved soil management plan (SMP), approved by the FFSRA signatories that specifically addresses worker protection from potential residual ROCs. Intrusive activities include excavation; construction of roads, utilities, structures; demolition of hardscape; movement of soil from below ground surface to the surface, and any other actions that expose potentially ROC contaminated soil. The SMP must be approved before the start of any intrusive activities." With the following language: *"Intrusive activities and other actions that may expose ROC and COC contaminated soil at the site are prohibited without prior review and approval of a soil management plan (SMP) by the FFSRA signatories. Prohibited intrusive activities may include but are not limited to excavation; construction of roads, utilities, structures; demolition of hardscape; demolition of a building foundation, movement of soil from below ground surface to the surface, and any other actions that may expose*	The referenced paragraph in Section 3.2, Page 3-3 has been revised with the language provided in the comment.

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		potentially ROC contaminated soil. The SMP must include procedures necessary to protect workers and the environment from potential residual ROCs and COC and ensure proper management of contaminated soil, radioactive, and hazardous waste. The SMP must be approved before the start of any intrusive activities."	
6/22/2023	3	Authorizing Signatures: Please replace Eileen Mananian, Unit Chief, with A. Edward Morelan, P.G., C.E.G., Branch Chief	The authorizing signature has been replaced as recommended.

Comments from California Department of Public Health dated November 22, 2022 and March 3, 2023 **Kevin Columna** **Associate Health Physicist** **Radiological Assessment Unit** **Radiological Health Branch**			
Comment Date	**Number**	**Comment**	**Response**
11/22/2022	1	CDPH has repeatedly requested that a background reference area be identified and used for comparison of survey data. We have requested background data on many occasions including: a. In Review: Draft Work Plan Radiological Data Gaps Investigation, Installation Restoration (IR) Sites 1 and 2, Former Long Beach Naval Complex, Long Beach, California, June 2017 - Page 5-1, Section 5.1 Gamma Walkover Survey: o "Procedure for determining background measurements and location of background measurements for gamma walkover survey is missing." - Page 5-4, Concerning the procedure for setting background for each building: o "Is there a specified range for 'acceptable' background measurements? o Is there a written procedure for choosing an alternate background location, if the background measurements indicate that the default background is in close proximity to a buried radioactive source?" b. In multiple Long Beach Naval Complex Base Realignment and closure meetings, we have brought up this issue: - April 14, 2021 – Dr. Mishra asked to convey his serious concerns with the background method. He said self-	The Navy acknowledges the multiple discussions and documentation with CDPH requesting a background reference area. This topic will be addressed separately from the ESD and documented in the revised DGI/RACR.

Comments from California Department of Public Health dated November 22, 2022 and March 3, 2023 **Kevin Columna** **Associate Health Physicist** **Radiological Assessment Unit** **Radiological Health Branch**			
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		backgrounding on a contaminated site is a big red flag. Mr. Callian said the methods used were described in the approved work plan. Dr. Mishra again expressed his concern. - September 29, 2021 - Dr. Mishra reminded Mr. Callian of an incomplete action item from the last BCT meeting. He had requested that the Navy explain the reasoning and technical basis for not yet conducting a background study, or for why the Navy believes the study is not necessary. March 9, 2022 - Dr. Mishra said that the action item regarding the self-backgrounding was not complete, and he was waiting for an answer. Mr. Whitcomb responded that once the new contract is in place, the Navy will prepare a response. The Navy committed to respond to Dr. Mishra's request for justification for the use of "self-backgrounding" and the technical points where the background data will be used.	
12/22/2022	2	Sr-90 is identified as an ROC. The Navy has not provided adequate methods for identification of Sr-90 contamination, or for containment of Sr-90 contamination that is unable to be identified and remediated using the proposed survey methods.	The methods for adequate identification of Sr-90 will be addressed in the revised DGI/RACR.
12/22/2022	3	The LUCs for the ESD have not been published for the review. We have requested and the Navy has promised LUCs for review. In the Navy's Responses to the Agency	The development of the LUCs for Sites 1 and 2 are more appropriately discussed in the LUC RD than an ESD in accordance with the CERCLA process.

Comments from California Department of Public Health dated November 22, 2022 and March 3, 2023 **Kevin Columna** **Associate Health Physicist** **Radiological Assessment Unit** **Radiological Health Branch**			
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		comments on the Draft Radiological Data Gaps Investigation, the Navy states "A 'do not dig' requirement will be further defined in the ESD." This LUC is not defined in the ESD. Furthermore, the ESD again delays committing to any LUCs until publication of an "LUC RD" document.	
12/22/2022	4	There was a reduction of 9 ROCs to 2 ROCs based off data from an incomplete 2014 Cabrera Survey. A subsequent Data Gaps investigation was necessary for 100% GWS coverage. Soil samples from subsequent studies have not been measured for all 9 ROCs.	The reduction of ROCs during the Supplemental Radiological Assessment from nine to two is discussed in the ESD in Section 2.2, page 2-4, first paragraph. Specific additional data on this reduction is not relevant to the ESD and will be addressed in revisions to the DGI/RACR.
12/22/2022	5	The potential for homogenized soil contamination, brought up in the RACR review and the September 29, 2021, BCT meeting, has not been addressed. According to the FINAL Radiological Supplemental Assessment Installation Restoration Sites 1 and 2 (Cabrera, 2014), "The radioactive contamination is composed of both distributed and discrete source contamination…" Furthermore, according to Appendix C ("GPS Based Gamma Radiation Survey of Port of Long Beach") of this report, Table 2 "Summary of Elevated Counts at Investigation Locations" contains a footnote stating there may be, "homogenously-contaminated soil."	Any discussion of potential homogeneously contaminated soil is not relevant to the ESD and will be addressed in revisions to the DGI/RACR.
12/22/2022	6	The Spectroscopy data and graphs have not been provided from ISOCS measurements taken on-site for comparison to soil sample analysis.	All SRA data was transmitted to DTSC and CDPH on 27 September 2022, 2 November 2022, and 4 November 2022. These files included all the raw data from the SRA. This level of data is not appropriate for inclusion in the ESD.

Comments from California Department of Public Health dated November 22, 2022 and March 3, 2023

Kevin Columna
Associate Health Physicist
Radiological Assessment Unit
Radiological Health Branch

Comment Date	Number	Comment	Response
3/3/2023	1-6	The California Department of Public Health has no additional comments on the above referenced documents	Noted. Thank you for your comment.

Comments from California Department of Toxic Substance Control dated November 30, 2022 and March 8, 2023 **Uriel Reveles** **Engineering Geologist** **Geological Services Branch**			
Comment Date	**Number**	**Comment**	**Response**
11/30/2022	1	The ESD does not include the risk of sea level rise (SLR) for IR Sites 1 and 2. The GSB is concerned of the future risk to groundwater at IR Sites 1 and 2, storm events and climate change are already impacting the Southern California Coast causing sea level to rise. Consideration of SLR and its potential impacts to the Site should be included in the ESD.	Actions necessary to ameliorate issues resulting from sea level rise (SLR) will be identified by LUC inspections during Five-Year Reviews.
3/8/2023	1	DTSC finds the response adequate, thank you.	Noted. Thank you for your comment.

Comments from Los Angeles Regional Water Quality Control Board dated January 30, 2023 and May 16, 2023 **January 30, 2023 comments:** **Renee Purdy** **Executive Officer** **May 16, 2023 comments:** **Susana Arredondo** **Executive Officer**			
Comment Date	**Number**	**Comment**	**Response**
1/30/2023	1	As part of the ARARs, include the following requirement while implementing the ICs: Prevent the unauthorized disturbance of soil and prevent the unauthorized disturbance and/or use of groundwater, in order to prevent exposure to the radiological contaminants during any future site activities.	The ESD, Section 3.2 has been revised to include all the LUCs as listed in the June 2000 ROD that will be implemented to protect site users from risks associated with ROCs. An additional LUC has been added to prohibit intrusive activities without prior review and approval from the regulatory agencies. These will be the same LUCs that will be included in the forthcoming LUC RD.
5/16/2023	1	LARWQCB concurs with the Navy response to this comment.	Noted. Thank you for your comment.
1/30/2023	2	Include a discussion of the fate and transport of both ^{226}Ra and ^{90}Sr compounds in both groundwater and sediment / soil media. Update the ARARs and/or ICs as necessary.	A discussion of the fate and transport of ^{226}Ra and ^{90}Sr compounds is not needed to adequately describe significant differences for Sites 1 and 2, and will not be included in the ESD.
5/16/2023	2	Los Angeles Water Board staff disagrees with the Navy response to Comment 2. Prior to implementing institutional controls (ICs), it is important to understand how both ^{226}Ra and ^{90}Sr affect onsite and offsite human and ecological sensitive receptors. Once the fate and transport is evaluated, the ICs may require modifications to be protective of human health and the environment. Include a fate and transport discussion for ^{226}Ra and ^{90}Sr in both groundwater and soil/sediment media.	The impact of the ROCs at Sites 1 and 2 on groundwater has been investigated and discussed in the Final Supplemental Radiological Assessment Installation Restoration Sites 1 and 2 Long Beach Naval Complex Long Beach, California Cabrera Services, May 2014. Section 2.2.5 of the DGI/RACR will include additional information on this topic. Groundwater sampling and analyses identified no radiological impacts to groundwater at Sites 1 and 2 above the project investigation levels (ILs), which were based on the California Ocean Plan Criteria. The empirical evidence for the absence of subsurface soil and groundwater contamination supports the Navy's CSM that attributes

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			the lack of mobility of the radiological contamination to either discrete objects, or the immobilization resulting from the paint matrix that contains the radionuclides. The physico-chemical properties of ionic strontium and radium salts dictate high mobility resulting from their solubility. Sandy soil has the lowest cation exchange capacity, which should increase mobility. That behavior is not observed at Sites 1 and 2 in areas where infiltration occurs, e.g. Gull Park.
1/30/2023	3	In addition to the above, it is necessary to update the ARARs to reflect the current science and guidance on vapor intrusion.	The remedial actions for VOCs and metals in soil included the removal and off-site disposal of contaminated soil, waste drums, and debris buried in shallow areas; and on-site treatment of groundwater with an in-situ air sparging with soil vapor extraction (IAS/SVE) system within an approximate 1.4-acre area on the northeastern portion of what is now Gull Park. After meeting the chemical-specific performance objectives for groundwater, the IAS/SVE system was shut down in August 2003; and following two years of long-term monitoring, it was removed in 2007. In addition, there is no vapor pressure under ambient conditions. Therefore, vapor intrusion has been addressed as part of the Sites 1 and 2 remedy and an update to ARARs is not necessary.
5/16/2023	3	LARWQCB concurs with the Navy response to this comment.	Noted. Thank you for your comment.

Comments from Los Angeles Regional Water Quality Control Board dated January 30, 2023 and May 16, 2023 **January 30, 2023 comments:** **Renee Purdy** **Executive Officer** **May 16, 2023 comments:** **Susana Arredondo** **Executive Officer**			
Comment Date	**Number**	**Comment**	**Response**
1/30/2023	4	Please change the signatory page to Renee Purdy, Executive Officer, Los Angeles Regional Water Quality Control Board as the designated signatory for the Los Angeles Water Board in the Final ESD	The signature page has been updated with Renee Purdy, Executive Officer, as the designated signatory for the Los Angeles Water Board.
5/16/2023	4	Please update the Executive Officer's name to Susana Arredondo on the signatory page	The signatory page has been updated with Susana Arredondo as the Executive Officer for the LARWQCB.