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UNEXPLODED ORDNANCE 18 (UXO 18) CAYO LA CHIVA REMEDIAL ACTION, LAND USE CONTROL AND LONG TERM MONITORING WORK PLAN ATLANTIC FLEET WEAPONS TRAINING AREA, FORMER VIEQUES NAVAL TRAINING RANGE VIEQUES PUERTO RICO

04/01/2019

CH2M HILL

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Atlantic
Norfolk, Virginia

Final

UXO 18, Cayo La Chiva
Remedial Action, Land Use Control, and Long-Term Monitoring Work Plan

Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Vieques, Puerto Rico

April 2019

Prepared for NAVFAC Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
Contract N62470-16-D-9000
CTO 0004

Executive Summary

This document presents the Remedial Action (RA), Land Use Control (LUC), and Long-term Monitoring (LTM) Work Plan for UXO 18, Cayo La Chiva, which is located south of the Eastern Maneuver Area (EMA) (**Figure ES-1**). This RA, LUC, and LTM Work Plan describes how the elements of the remedy jointly selected by the Department of the Navy (Navy) and the Environmental Protection Agency (EPA), with concurrence of the Puerto Rico Department of Natural and Environmental Resources/Puerto Rico Environmental Quality Board (PRDNER/PREQB), in the Record of Decision (ROD; NAVFAC, 2018) will be implemented.

The selected remedy will achieve the following remedial action objectives (RAOs):

- Prevent or reduce explosive hazard that may be present associated with munitions and explosives of concern (MEC) to be compatible with current and anticipated future land use
- Prevent or reduce the potential for unauthorized access to portions of UXO 18

The various elements of the selected remedy are:

- Removal of any MEC identified during site preparation for recreational use (i.e., construction support)
- Physical demarcation and institutional controls (ICs) to guide future access
- LTM to ensure LUCs are in place and effective and to identify and remove any additional MEC that may become exposed or discovered

The primary sections of the Work Plan are:

Focused MEC Clearance Plan

Focused MEC clearance will be performed to identify and remove any surface or subsurface MEC down to an estimated maximum (based on near-surface bedrock) depth of 1 foot below ground surface (bgs) that is identified during site preparation for the planned recreational use on Cayo La Chiva. MEC clearance will be conducted from the planned trail centerline out to approximately 10 feet on each side of the trail centerline, which will provide for clearance within a vegetative buffer on both sides of the trail. Vegetation cutting will be performed to establish a landing/picnic area, an overlook/picnic area, and a trail linking the two, and facilitate MEC clearance activities at these locations (**Figure ES-2**). Minor pruning of vegetation will also be conducted in the vegetative buffer area in order to facilitate MEC clearance, while maintaining the vegetative cover adjacent to the trail.

Land Use Control Plan

LUCs will be implemented to guide access to areas intended for recreational use (**Figure ES-3**), discourage access to areas not planned for public use, and provide for explosive safety awareness, all of which will reduce the potential for human exposure to any MEC potentially remaining at the site (i.e., reduce potential explosive hazard).

Long-term Monitoring Plan

LTM will occur at UXO 18 to ensure the RAOs continue to be met. LTM activities will include periodic inspections to determine if MEC becomes exposed by erosion (and to remove any that does) and to evaluate the condition of physical controls and make any necessary repairs.

Reporting

Following the implementation of the RA, a Remedial Action Completion Report (RACR) will be prepared to summarize the remedial activities, including details of any MEC found and removed during site preparation activities for recreational use and the implementation of physical controls.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.

Inspection checklists will be completed for each annual inspection and included in an annual status report. The status reports will provide detail regarding routine maintenance tasks and LUC inspection, MEC inspection findings, and any corrective actions taken.

Five-Year Review reports document detailed evaluation of the effectiveness of the RA and include such things as identification of issues that may affect the remedy protectiveness, evaluation of long-term monitoring, conclusions on the remedy effectiveness, and recommendations for modifications or follow-up actions.

Resumen Ejecutivo

Este documento presenta el Plan de Trabajo para la Acción de Remediación (RA, por sus siglas en inglés), los Controles de Uso del Terreno (LUC, por sus siglas en inglés) y el Monitoreo a Largo Plazo (LTM, por sus siglas en inglés) para UXO 18, Cayo La Chiva, localizado al sur del Área de Maniobras del Este (EMA, por sus siglas en inglés) **(Figura ES-1).** Este Plan de Trabajo para la RA, LUC y LTM presenta la manera que se implementarán los elementos del remedio seleccionado conjuntamente por la Marina y la Agencia de Protección Ambiental (EPA, por sus siglas en inglés), mediante acuerdo con el Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA) en el Récord de Decisión (ROD, por sus siglas en inglés, NAVFAC, 2015).

El remedio seleccionado alcanzará los siguientes Objetivos de Acción de Remediación (RAOs, por sus siglas en inglés):

- Prevenir o disminuir el peligro de explosión que podría estar presente asociado a municiones y explosivos de preocupación (MEC, por sus siglas en inglés), para que sea compatible al uso vigente y anticipado del terreno
- Prevenir o disminuir el posible acceso no autorizado a partes de UXO 18

El remedio seleccionado consta de los siguientes elementos:

- Remoción de cualquier MEC que fuera identificado en el sitio durante su habilitación para uso recreativo (es decir, apoyo durante la construcción)
- Líneas de demarcación físicas y controles institucionales (ICs, por sus siglas en inglés) para dirigir el acceso futuro del público
- Monitoreo a Largo Plazo (LTM, por sus siglas en inglés) para asegurar que los LUCs están colocados y son efectivos, y para identificar y remover cualquier MEC adicional que pudiera haber sido expuesto o encontrado

El Plan de Trabajo comprende las siguientes secciones primarias:

Plan de Remoción Enfocada de MEC

Durante los trabajos de acondicionamiento de Cayo La Chiva para su uso recreativo, se efectuará una remoción enfocada de MEC para identificar y remover cualquier MEC expuesto sobre la superficie o bajo la superficie, hasta una profundidad estimada máxima (basado en el lecho de roca próximo a la superficie) de 1 pie bajo la superficie del terreno (bgs, por sus siglas en inglés). La limpieza de MECs se extenderá desde el centro de la vereda a construirse hasta unos 10 pies hacia los laterales, lo cual resultará en remoción de cualquier MEC dentro de un amortiguador vegetativo a ambos lados de la vereda. La vegetación será cortada para establecer un área de desembarco/merendero, un área de observación/merendero, y una vereda que conecta a ambas áreas, y para facilitar las actividades de limpieza de MECs en el área **(Figura ES-2).** También se efectuará una poda leve en el área vegetativa de amortiguación para facilitar la limpieza de MECs a la vez que se preserva la cubierta vegetativa contigua a la vereda.

Plan de Control de Uso del Terreno

Se utilizarán LUCs para dirigir el acceso del público a las áreas destinadas para uso recreativo (**Figura ES-3**), desalentar el acceso a aquellas áreas no designadas para uso público y concienciar sobre la seguridad ante explosivos, todo lo cual disminuirá el potencial de exposición humana a cualquier MEC que pudiera permanecer en el sitio (es decir, reducir cualquier peligro potencial de explosión).

NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

Monitoreo a Largo Plazo

El monitoreo a largo plazo de UXO 18 servirá para asegurar que los RAOs sigan cumpliéndose. Las actividades de LTM incluirán inspecciones periódicas para determinar si hay MECs expuestos por erosión (y para remover aquellos que estén expuestos) y para evaluar el estado de los controles físicos y hacer las reparaciones necesarias.

Informes

Luego de la implementación de la Acción de Remediación (RA, por sus siglas en inglés) se preparará un Informe de Cierre de la Acción de Remediación (RACR, por sus siglas en inglés) para resumir las actividades de remediación, incluyendo detalles de los MECs encontrados y removidos durante las obras de preparación del sitio para uso recreativo y la implementación de controles físicos.

Durante cada inspección anual se completará una lista de cotejo a ser incluida en el informe anual de estado actual. Los informes de estado actual detallarán las tareas rutinarias de mantenimiento e inspección de los LUC, hallazgos durante las inspecciones de MECs y cualquier acción correctiva tomada.

Los Informes de Evaluación a los Cinco Años presentarán un análisis detallado de la efectividad de la RA. Incluirá elementos tales como la identificación de problemas que pudieran afectar el nivel de protección del remedio, una evaluación del monitoreo a largo plazo, conclusiones sobre la efectividad del remedio, y recomendaciones sobre modificaciones o acciones de seguimiento.

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ECA – Eastern Conservation Area
EMA - Eastern Maneuver Area
LIA – Live Impact Area
SIA – Surface Impact Area
NASD - Naval Ammunition Support Detachment
VNTR - Vieques Naval Training Range

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Figure ES-1
Site Location Map
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

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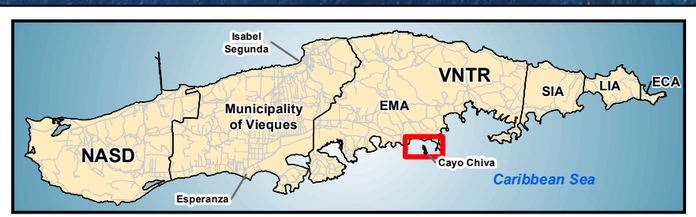

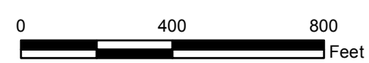

Figure ES-2
Land Use Plan for Cayo La Chiva
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

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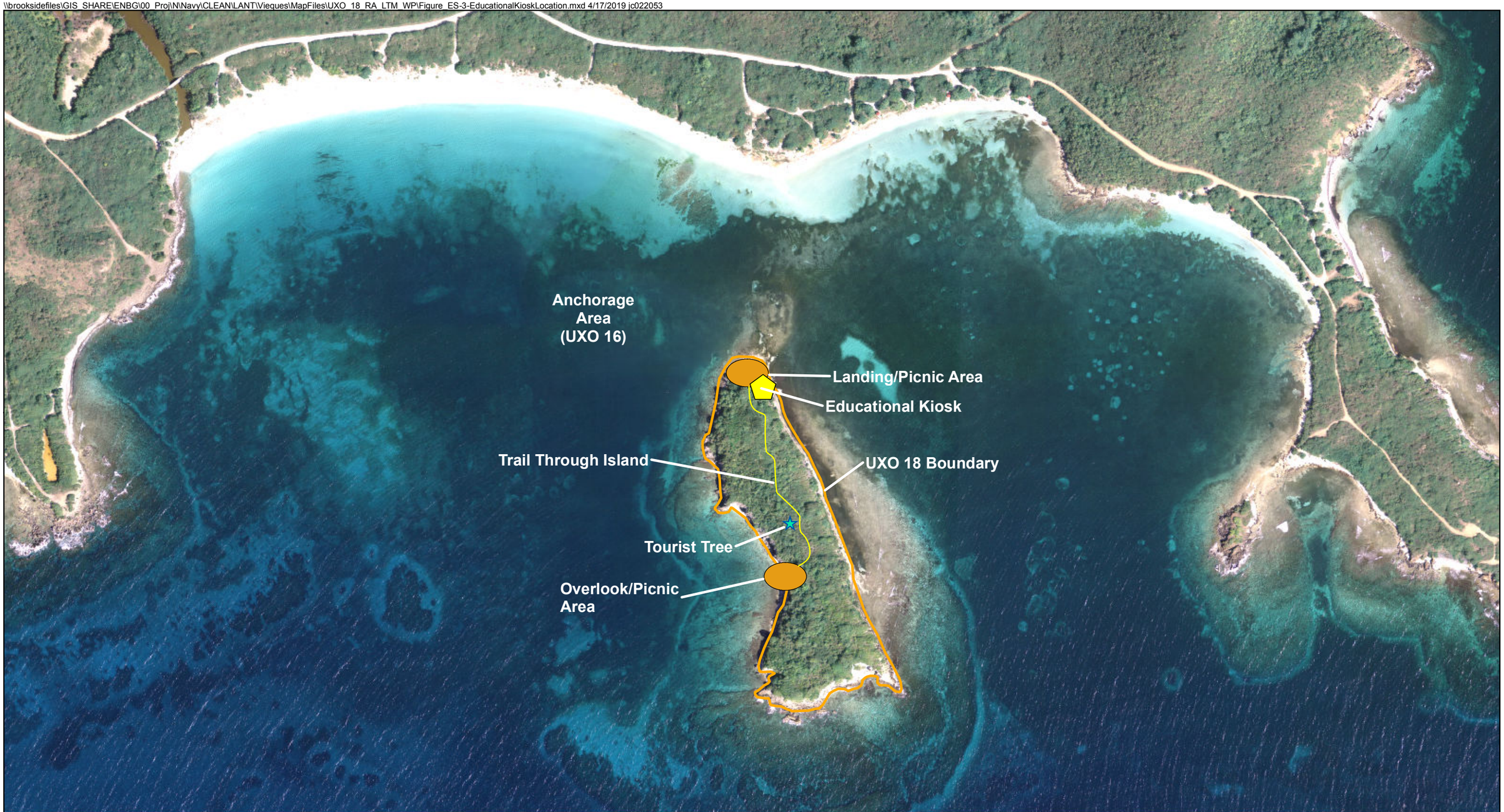

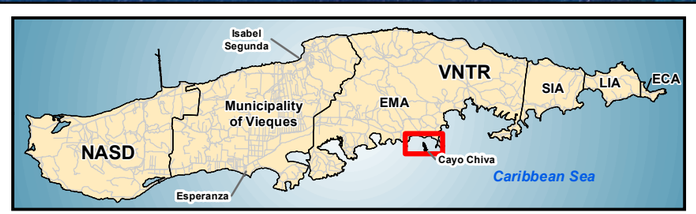

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Figure ES-3
Educational Kiosk Location
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

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ES-3 Educational Kiosk Location

1-1 Site Location Map

2-1 Land Use Plan for Cayo La Chiva

3-1 Educational Kiosk Location

Acronyms and Abbreviations

bgs	below ground surface
BIP	blow-in-place
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
CSM	Conceptual Site Model
EMA	Eastern Maneuver Area
EPA	Environmental Protection Agency
ESS	Explosives Safety Submission
FFA	Federal Facility Agreement
GPS	global positioning system
IC	institutional control
LTM	long-term monitoring
LUC	land use control
MD	munitions debris
MDAS	material documented as safe
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
msl	mean sea level
NASD	Naval Ammunition Support Detachment
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
OU	operable unit
PRDNER	Puerto Rico Department of Natural and Environmental Resources
PREQB	Puerto Rico Environmental Quality Board
RA	remedial action
RACR	Remedial Action Completion Report
RAO	remedial action objective
ROD	Record of Decision
RRD	range-related debris
SEMS	Superfund Enterprise Management System
SMP	Site Management Plan
SUXOS	Senior UXO Supervisor
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
VNTR	Vieques Naval Training Range

SECTION 1

Introduction

This document presents the Remedial Action (RA), Land Use Control (LUC), and Long-term Monitoring (LTM) Work Plan for UXO 18, Cayo La Chiva, hereinafter called the RA Work Plan, located south of the Eastern Maneuver Area (EMA) at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (**Figure 1-1**). Unlike most of the former VNTR, UXO 18 is not part of the Vieques National Wildlife Refuge that is managed by the United States Fish and Wildlife Service (USFWS). Instead, UXO 18 is owned by the Commonwealth of Puerto Rico and managed by the Commonwealth of Puerto Rico Department of Natural and Environmental Resources (PRDNER).

This RA Work Plan was prepared under the Department of the Navy (Navy) Comprehensive Long-term Environmental Action - Navy (CLEAN) Contract N62470-16-D-9000, Contract Task Order 0004, for submittal to the Naval Facilities Engineering Command (NAVFAC) Atlantic, Environmental Protection Agency (EPA) Region 2, and PRDNER/Puerto Rico Environmental Quality Board (PREQB). The Navy, EPA, PRDNER/PREQB, as well as USFWS for those portions of the former VNTR that are part of the Vieques National Wildlife Refuge, work jointly to implement the Vieques Environmental Restoration Program.

This RA Work Plan describes how the elements of the remedy jointly selected by the Navy and the EPA, with concurrence of the PRDNER/PREQB, in the Record of Decision (ROD; NAVFAC, 2018) will be implemented.

The selected remedy will address any remaining potential explosive hazards at the site by reducing the potential for human exposure via focused munitions and explosives of concern (MEC) clearance in areas planned for public use and implementation, monitoring, and maintenance of LUCs.

1.1 Site Background and Conceptual Site Model

UXO 18 is also known as Operable Unit (OU) 28 in the Superfund Enterprise Management System (SEMS), which is a database maintained by the EPA to track the progress at hazardous waste sites. UXO 18 comprises the entire 12-acre island of Cayo La Chiva located south of the EMA at the former VNTR in Vieques, Puerto Rico (**Figure 1-1**). The only documented military training activity on Cayo La Chiva was along the northern portion where a 0.50-caliber machine gun nest fired blank rounds during simulated amphibious landings at Playa La Chiva in 1950. However, during site investigation activities, several MEC (5-inch rockets) were identified both on the island and in the nearshore waters; the MEC located offshore were addressed separately as part of UXO 16. Munitions debris (MD) (smoke canisters) were also found on the island.

Cayo La Chiva is a rocky island isolated from the Vieques coastline, located several hundred yards south of Playa La Chiva, also known as Blue Beach. The topography ranges from ocean level at the perimeter (0 feet above mean sea level [msl]) to above 35 feet msl in the central portion of the island. The majority of the western and southern portions of the island consist of steep, nearly vertical rock slopes rising more than 30 feet above the ocean. The northern portion and very northeastern tip of the island consists of a narrow strand of sandy beach that extends to a very shallow seagrass bed within the bay. Because of the presence of high cliffs and dense native vegetation, the most practical route of access to UXO 18 is limited to the northern portion of the island where the narrow sandy beach is present.

The geology of Cayo La Chiva is characterized as weathered limestone, either near or exposed at the ground surface. In some areas, a thin layer (generally less than 1 foot thick) of sandy loam soil overlies the weathered bedrock. Only the northern portion of the island is sandy. Groundwater within UXO 18 occurs within the bedrock and is saline due to the thin veneer of soil, small size of the island, and the proximity to the ocean. No surface water features are present within UXO 18.

UXO 18 is heavily vegetated, with the dominant vegetation being a dry scrub forest with occasional isolated stands of taller secondary growth forest. A thin range of mangrove forest exists along the eastern and northern coasts of the island. The site is relatively undisturbed and provides suitable terrestrial habitat for a variety of plant, invertebrate, bird, and mammal communities.

A more detailed description of site background, physical setting, previous investigations and removal actions, Conceptual Site Model (CSM), and site geology and hydrogeology can be found in the Remedial Investigation/ Feasibility Study Report (CH2M, 2015), and other documents contained in the Administrative Record for UXO 18.

1.2 Remedial Action Objectives

The following remedial action objectives (RAOs) were developed to be protective of current and potential future receptors, in accordance with the current and intended future land use (NAVFAC, 2018):

- Prevent or reduce explosive hazard that may be present associated with MEC to be compatible with current and anticipated future land use
- Prevent or reduce the potential for unauthorized access to portions of UXO 18

1.3 Scope of Work

The scope of work for the selected RA, LUC, and LTM consists of the following major components:

- Removing any MEC identified during site preparation for recreational use (i.e., construction support)
- Implementing physical demarcation and institutional controls (ICs) to guide future access
- Performing LTM to ensure LUCs are in place and effective and to identify and remove any additional MEC that may become exposed or discovered

General construction support (i.e., MEC avoidance) can be provided for intrusive activities performed by PRDNER in support of the planned land use, such as installation of physical demarcation(s), compost toilet, etc. Additionally, unless otherwise qualified, PRDNER or their designees who will be responsible for maintaining the public use areas can be provided with unexploded ordnance (UXO) awareness training.

1.4 Work Plan Organization

This RA Work Plan is organized as follows:

- Section 1 – Introduction
- Section 2 – Focused MEC Clearance Plan
- Section 3 – Land Use Control Plan
- Section 4 – Long-term Monitoring Plan
- Section 5 – Reporting
- Section 6 – Project Schedule
- Section 7 – References

Tables and figures are provided at the end of each section, as applicable.

ECA – Eastern Conservation Area
EMA - Eastern Maneuver Area
LIA – Live Impact Area
SIA – Surface Impact Area
NASD - Naval Ammunition Support Detachment
VNTR - Vieques Naval Training Range

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Figure 1-1
Site Location Map
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

SECTION 2

Focused MEC Clearance Plan

Focused MEC removal was selected to remove any MEC identified during site preparation (i.e., construction support), thereby reducing MEC explosive hazard in support of the planned future recreational activities. The MEC removal also includes removal of any MEC that may become exposed by erosion and is identified during LTM or reported by the public or agencies. This section presents the technical implementation for the focused MEC clearance.

2.1 Technical Approach

The technical approach to field operations includes the components identified herein. Specific requirements for the activities are also identified.

2.1.1 Recreational Use Areas Demarcation

Figure 2-1 shows the planned public use areas where focused MEC clearance, and subsequent removal if necessary, will take place. Prior to vegetation cutting and focused MEC clearance, PRDNER will demarcate the boundaries of the two picnic areas and the trail between them. Following the demarcation, the Navy will perform vegetation cutting, MEC clearance, and installation of physical LUCs.

2.1.2 Vegetation Cutting

Vegetation cutting/removal by hand and/or with the aid of mechanized equipment will be conducted to establish a landing/picnic area, an overlook/picnic area, and a trail linking the two, and to facilitate MEC clearance activities in those areas (**Figure 2-1**). Minor pruning of vegetation with hand tools will also be conducted in a vegetative buffer area along the trail in order to facilitate MEC clearance, while maintaining the vegetative cover adjacent to the trail.

If necessary to avoid creating brush piles, cut vegetation will be chipped and spread or transported off island. Appropriate temporary erosion control measures (e.g., silt fence and/or hay bales) will be implemented before land-disturbing activities begin in areas where there is the potential for erosion to impact the surrounding water.

2.1.3 MEC Clearance

Focused MEC clearance will be performed to an estimated maximum (based on near-surface bedrock) depth of 1 foot below ground surface (bgs) to support PRNDER's planned recreational use. PRDNER's plans for recreational features and public use areas on Cayo La Chiva include a landing/picnic area at its northern end, an overlook/ picnic area on the west coast of the island, a trail through the center of the island connecting these two areas, and an anchorage area to the northwest of the island, as shown in **Figure 2-1**. MEC clearance will be conducted at each of the public use areas on Cayo La Chiva, including out to 10 feet on each side of the trail centerline and a 10-foot radius around the Tourist Tree, to include a vegetative buffer on both sides of the trail and around the Tourist Tree. The planned anchorage area is part of UXO 16 and will be addressed as part of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process for UXO 16 and does not affect the UXO 18 RA or attainment of the UXO 18 RAOs.

MEC clearance will follow the approaches used for MEC clearance throughout the former VNTR and Naval Ammunition Support Detachment (NASD). Specifically, MEC clearance will be done in accordance with the *Master Munitions and Explosives of Concern (MEC) Work Plan, Former Vieques Naval Training Range (VNTR) Vieques, Puerto Rico* (CH2M, 2006), or with applicable protocol contained in the munitions removal work plan in effect at the time the MEC clearance is performed.

Due to the small quantity of MEC found on the island, the limited use of the island for military training activities, and the thin soil layer overlying bedrock, a visual and magnetometer-assisted approach will be used for the focused MEC surface and subsurface clearance.

Following PRDNER's demarcation of the public use areas (comprising the trail, landing/picnic area, overlook/picnic area, and Tourist Tree), and vegetation cutting/removal, the ground surface and shallow subsurface will be cleared of MEC following the general process below (the procedures defined in Master MEC Work Plan, or the applicable munitions removal work plan in effect at the time the MEC clearance is performed):

- Search each area demarcated by PRDNER visually and with the aid of an all-metals detector, including the location of any physical LUC installation.
- For any item found (including any item found during LTM or reported by the public or an agency), determine whether the item is MEC or other debris.
- All material potentially presenting an explosive hazard (MPPEH) will be identified and located using a global positioning system (GPS) device. Data for the item(s) recovered/identified will be recorded in the field following the procedures in the Vieques Electronic Data Entry Standard Operating Procedure (CH2M, 2006).
- If the item is MEC, a positive identification will be documented and confirmed by another UXO technician.
- All items recovered will be handled as described in Section 2.1.4.
- If excavation is required, the hole will be backfilled with the soil removed during excavation.

2.1.4 MPPEH Handling

All items recovered will be handled in accordance with the applicable Explosives Safety Submission (ESS) and in general accordance with the following procedures:

- If the MEC is safe to move (as confirmed by the Senior UXO Supervisor [SUXOS] and UXO Safety Officer [UXOSO]), it will be moved for controlled detonation to an area within the former VNTR designated for demilitarization. MEC will be destroyed by open detonation by the use of a consolidated shot of the item(s). Prior to moving the MEC, the SUXOS and the UXOSO will conduct a risk determination and document that it is safe to move in accordance with applicable protocol contained in the munitions removal work plan in effect at the time the MEC is found and addressed.
- MEC that is not safe to move will be clearly marked. Additionally, the accessibility, explosive hazard, location, and other factors will be assessed to determine if additional safety measures should be put in place to protect site workers until it can be destroyed by blow-in-place (BIP) methods in accordance with applicable protocol contained in the munitions removal work plan in effect at the time the MEC is found and addressed. Prior to initiation of detonation operations, all non-essential personnel will be evacuated from the detonation site. In addition, avenues of ingress will be physically blocked. Upon completion of BIP operations, qualified UXO technicians will visually inspect each disposal shot and, providing that there are no residual explosive hazards, the SUXOS will authorize the resumption of normal land use from an explosive safety standpoint.
- Inert metallic items (i.e., MD, range-related debris [RRD], and cultural debris) will be removed for processing in a designated area on the former VNTR. Any archeological artifacts found will be handled in accordance with the Puerto Rico State Historic Preservation Office protocol. These materials will be visually inspected by two qualified UXO technicians; the first UXO technician (i.e., certifier) will perform a 100 percent inspection and the second UXO technician (i.e., verifier) will perform an independent 100 percent re-inspection. If both inspectors agree that the material does not present an explosive hazard, the material will be determined to be material documented as safe (MDAS) and handled accordingly.

2.1.5 Potential Additional Construction Support and UXO Awareness Training

While construction support will comprise mainly MEC clearance within the public use areas depicted in **Figure 2-1**, if PRDNER includes related amenities that support those public use areas, such as signage or compost toilets, the Navy will provide UXO avoidance/clearance support during their construction. Additionally, UXO awareness training can be provided to PRDNER or their designee who will be responsible for maintaining the public use areas.

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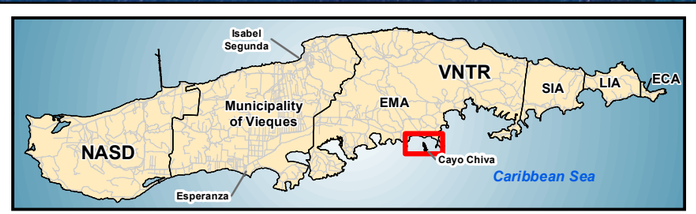

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Figure 2-1
Land Use Plan for Cayo La Chiva
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

SECTION 3

Land Use Control Plan

This LUC plan is developed to satisfy the ROD requirement for LUCs and for implementation, operation, maintenance, and enforcement of the LUCs component of the RA. The Navy will be responsible for performing all short- and long-term implementation actions at UXO 18 as per *The Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions* (EPA, 2003), the Federal Facility Agreement (FFA), the ROD, and applicable Navy directives. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity and will continue to maintain responsibility for implementing, monitoring, and enforcing LUCs. Land use at UXO 18 is anticipated to remain as identified by PRDNER and shown in **Figure 2-1**. Any planned changes to land use at UXO 18 by PRDNER in the future that may necessitate a modification to the RA, including LUCs, will be coordinated with the Navy and approved by EPA prior to implementation.

3.1 Land Use Control Objective

LUCs are legal mechanisms and/or physical structures/barriers that restrict the use of or limit access to an area to prevent or reduce risks to human health. The UXO 18 LUCs will be implemented to guide access to areas intended for recreational use, discourage access to areas not planned for public use, and provide for explosive safety awareness, all of which will reduce the potential for human exposure to any MEC potentially remaining at the site (i.e., reduce potential explosive hazard). LUCs will be maintained at UXO 18 as long as MEC potentially remains at the site.

3.2 LUC Implementation

- A bilingual (Spanish and English) educational kiosk will be installed at the landing/picnic area (approximate location shown in **Figure 3-1**) following MEC clearance performed as described in Section 2.1. MEC clearance at the kiosk location will be performed to the depth of installation or bedrock, whichever is shallower. The educational kiosk will guide visitors to areas of planned public use, discourage access to areas not intended for public use, and provide explosive awareness and safety procedures. The design and content of the actual kiosk produced will be based on coordination between the Navy and PRDNER, but will include language/graphics that provide explosive awareness and safety procedures, as well as guidance to stay within designated public areas.
- The LUC boundary, with coordinates, together with the corresponding LUC objectives and associated requirements, will be documented in an LUC Plan, which will be provided to PRDNER and EPA following implementation of the RA.
- The Navy shall not modify or terminate LUCs or RA implementation activities without concurrence by EPA and PRDNER. The Navy shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.
- PRDNER will communicate to the Navy any planned activities within the UXO 18 LUC boundary to ensure they are consistent with the RA and LUCs. Prior to seeking concurrence from the EPA, PRDNER must notify and obtain approval from the Navy of any proposals for a land use change that is inconsistent with the use restrictions and assumptions described in the ROD and detailed herein.

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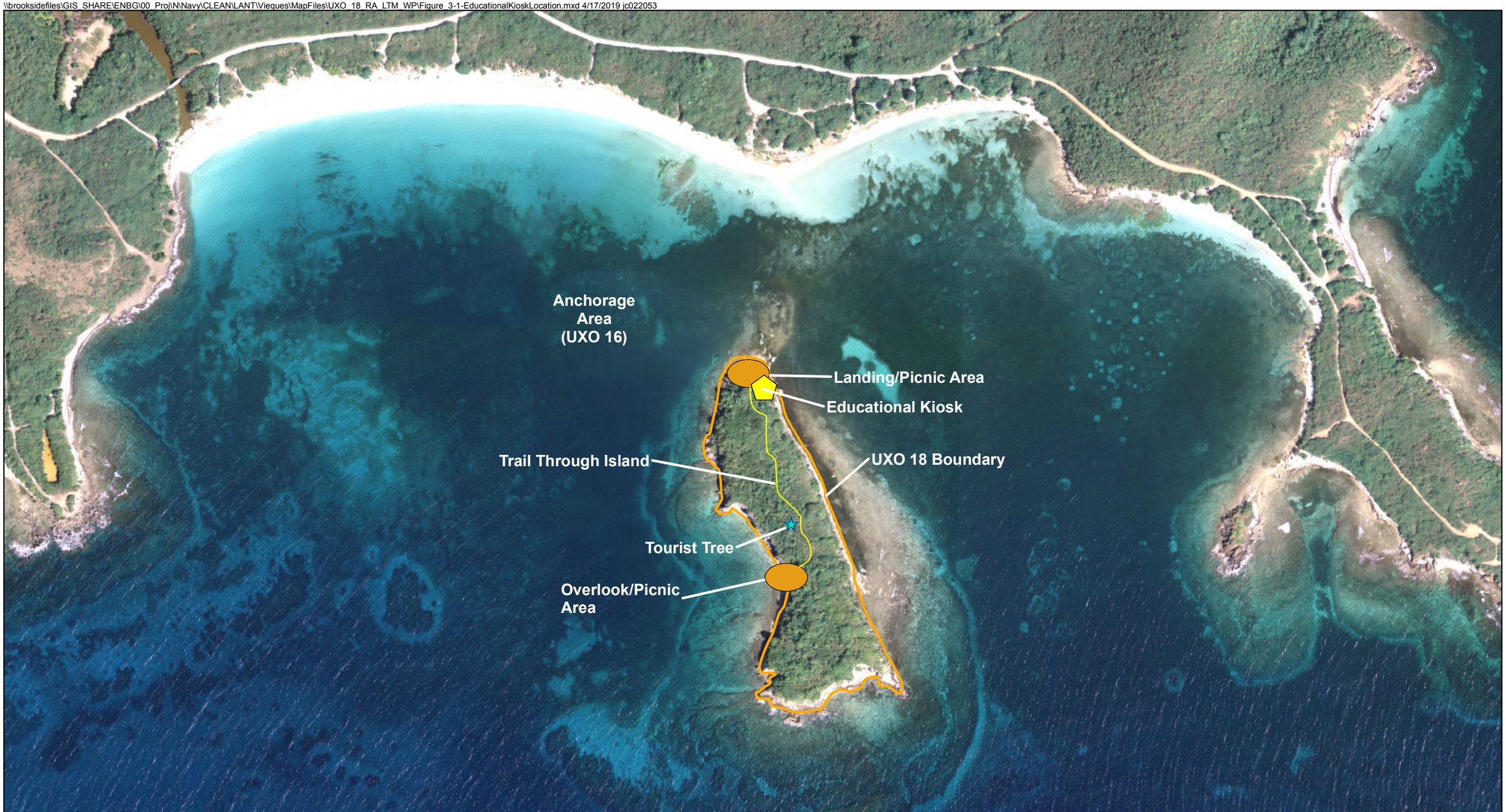

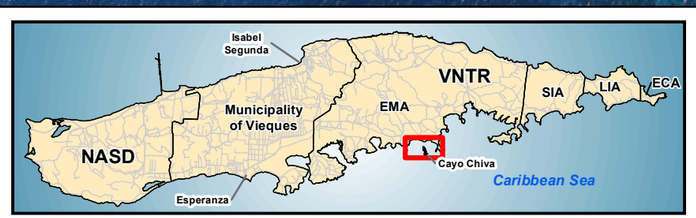

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Figure 3-1
Educational Kiosk Location
UXO 18, Cayo La Chiva, Remedial Action, Land Use Control, and Long Term Monitoring Work Plan
Former VNTR
Vieques, Puerto Rico

SECTION 4

Long-term Monitoring Plan

Long-term monitoring will occur at UXO 18 to assess and document the progress of the LUCs as they pertain to the RAOs. It will be PRDNER's responsibility to keep the vegetation cut back at/along the landing area, trail, and overlook (i.e., the intended public use areas). The Navy's responsibility will be to provide inspections of these areas (as well as where trespassing is evident) and remove any MEC identified. Immediately following RA implementation, an LTM program will be established by the Navy to identify any MEC that has been exposed at the surface within the recreational areas, determine whether access is occurring in areas not intended for public use (i.e., via observation of any new trails, encampments, etc.), and to evaluate the condition of the educational kiosk. The LTM program will be implemented via instrument-aided visual inspections within all public areas as well as along any potential trespassing routes that are noted. LTM inspections will be conducted annually and following events (as soon as practicable, considering access logistics and safety) that may threaten the integrity of the LUCs (i.e., named hurricanes/tropical storms, fires) at UXO 18. If any additional MEC is identified by the Navy during the inspections or reported to the Navy by the public or other agency at any time, MEC clearance and subsequent removal, as applicable, will be conducted in accordance with Section 2 of this RA Work Plan. Further, any vegetation obscuring LUC or explosive hazard awareness on the kiosk will be cut back and any damage to the kiosk will be repaired, or if not practical, the kiosk will be replaced.

The Navy will communicate to PRDNER its schedule for conducting LTM inspections. During each inspection, the LUC inspection checklist shown in **Attachment A** will be completed and photographs will be taken, especially of any conditions/activities that appear inconsistent with the LUC objectives. Over time, based on observations made during the LTM program, this checklist may be modified, if warranted, to ensure applicability and increase its effectiveness. The educational kiosk will be kept in operating condition. Operational defects noted during inspections will be repaired.

The Navy shall notify EPA and PRDNER as soon as practicable of the discovery of activity at UXO 18 inconsistent with the LUC objectives stated in Section 3, and then promptly investigate and take appropriate corrective action. Such notice will also outline the steps to be taken to: (1) investigate the cause and outcomes and/or potential outcomes of the activity inconsistent with the LUC objectives, (2) develop appropriate corrective action, and (3) evaluate the effectiveness of LUCs and assess lessons learned and prevent recurrence.

SECTION 5

Reporting

5.1 Remedial Action Completion Report

Following the implementation of the RA (including implementation of LUCs), an interim Remedial Action Completion Report (RACR) will be prepared to summarize the activities and results. The RACR will be prepared in accordance with the following guidance documents, as applicable:

- Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities (DoD/EPA, 2006)
- Guidance to Documenting Milestones Through the Site Closeout Process (Navy, 2006)
- Close Out Procedures for National Priorities List Sites, Office of Superfund Remediation and Technology Innovation, 9320.2-22 (EPA, 2011)

5.2 Annual LTM Inspection Logs and Status Report

Following each inspection, a summary report with the inclusion of photographs will be provided to EPA and PRDNER documenting routine maintenance tasks, inspection findings, and, as applicable, corrective actions taken. Inspection checklists will be completed for each annual inspection and included in an annual status report. A summary of all inspections, activities taken to maintain LUCs according to this work plan, LUC infractions, and corrective actions taken or proposed will be included in the Five-Year Reviews (see Section 5.3).

5.3 Five-Year Review Report

There are six components to the Five-Year Review process: (1) community involvement and notification, (2) document review, (3) data review and analysis, (4) site inspection, (5) interviews, and (6) protectiveness determination.

The conclusions of the Five-Year Review will include:

- Identification of issues, as applicable
- Evaluation and recommendation on the monitoring frequency based on observations made during the annual inspections or other activities, especially if those observations identify issues that may threaten the integrity of the RA or LUCs
- Recommendations and follow-up actions
- A determination as to whether the RA is, or is expected to be, protective of human health and the environment

The Five-Year Review report will generally follow the template included in Appendix E of *Comprehensive Five-Year Review Guide* (EPA, 2001) or most recent guidance, as applicable, unless an alternate format is concurred upon by the Navy, EPA, and PRDNER. The report shall be submitted to EPA and PRDNER.

SECTION 6

Project Schedule

Because the schedule for the RA will be based on such factors as PRDNER's schedule for preparing and opening the area for public use, weather, availability of personnel and resources, funding allocation, contracting, and duration of RA implementation, the timing of the RA implementation will be included in the annual Site Management Plan (SMP) schedule provided for regulatory review. All agencies will be kept up to date on any changes to the schedule and the reason for those changes.

SECTION 7

References

CH2M HILL, Inc. (CH2M). 2006. *Master Munitions and Explosives of Concern (MEC) Work Plan, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico.* December.

CH2M. 2015. *Remedial Investigation/Feasibility Study Report, UXO 18, Atlantic Fleet Weapons Training Area - Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* May.

Department of the Navy (Navy). 2006. *Guidance to Documenting Milestones Through the Site Closeout Process.* March.

Environmental Protection Agency (EPA). 2001. *Comprehensive Five-Year Review Guide*. EPA 540-R-01-007. June.

EPA. 2003. *The Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions*. October.

EPA. 2011. *Close Out Procedures for National Priorities List Sites, Office of Superfund Remediation and Technology Innovation, 9320.2-22*. May.

Naval Facilities Engineering Command (NAVFAC) Atlantic. 2018. *Record of Decision, UXO 18, Cayo La Chiva, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* August.

United States Department of Defense and Environmental Protection Agency (DoD/EPA). 2006. *Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities.* August.

Attachment A
LUC Site Inspection Checklist

Attachment A
LUC Site Inspection Checklist
Former Vieques Naval Training Range, Vieques, Puerto Rico

UXO 18 (Annual Inspection)

DATE: _____ **WEATHER CONDITIONS:** _____ **INSPECTOR'S NAME:** _____

Item	Potential Problems	Observations	Acceptable ?		Recommended Corrective Action	Date of Completion
			Yes	No		
Kiosk	Damage or deterioration of kiosk or its informational banners; obstruction of kiosk by vegetation					
Landing Area	Potentially exposed munitions due to erosion or public use					
Public Access Trail	Potentially exposed munitions due to erosion, public use					
Overlook	Potentially exposed munitions due to erosion or public use					
Evidence of Public Access to Areas not intended for Public Use	Newly created trails/paths, encampments, etc.; potentially exposed munitions due to erosion or public use in these areas					
Other Observations						

Attachment B
Final Responses to Regulator Comments

Final Responses to EPA Comments on the DRAFT UXO 18, CAYO LA CHIVA, REMEDIAL ACTION, LAND USE CONTROL, AND LONG-TERM MONITORING WORK PLAN DATED DECEMBER 2018

ATLANTIC FLEET WEAPONS TRAINING AREA – VIEQUES FORMER VIEQUES NAVAL TRAINING RANGE VIEQUES, PUERTO RICO

SPECIFIC COMMENTS

1. **Section 1.1, Site Background and Conceptual Site Model, Page 1-1:** The first paragraph of this section states that "The only documented military training activity on Cayo La Chiva was along the northern portion where a 0.50-caliber machine gun nest fired blank rounds during simulated amphibious landings at Playa La Chiva in 1950. However, during site investigation activities, several MEC were identified both on the island and in the nearshore waters; the MEC located offshore were addressed separately as part of UXO 16. Munitions debris (MD) (smoke canisters) were also found on the island." For clarity, modify this section to identify these MEC/MD items and depict the locations where they were found on Figure 2-1.

   Navy Response: The referenced text has been revised to read: "The only documented military training activity on Cayo La Chiva was along the northern portion where a 0.50-caliber machine gun nest fired blank rounds during simulated amphibious landings at Playa La Chiva in 1950. However, during site investigation activities, several MEC (5-inch rockets) were identified both on the island and in the nearshore waters; the MEC located offshore were addressed separately as part of UXO 16. Munitions debris (MD) (smoke canisters) were also found on the island." Further, assuming that the comment was referring to Figure 1-1, that figure has been revised to indicate the locations of the former MEC and MD identified.

2. **Section 1.1, Site Background and Conceptual Site Model, Page 1-1:** The second paragraph of this section provides a description of Playa La Chivas Island. However, this description does not identify the Tourist Tree depicted on Figures 2-1 and Figures 3-1. For clarity, add a discussion to this section explaining the nature of the Tourist Tree.

   Navy Response: The Tourist Tree was provided in the land use map by PRDNER and the Navy understands this to be a scenic tree that recreational users would observe on the trail to the overlook/picnic area. The Navy does not have any other detailed information or the nature of the Tourist Tree. However, it will be the responsibility of PRDNER to identify the tree during the RA, and the trail will be located so as to include the Tourist Tree, as depicted in Figures 2-1 and 3-1.

3. **Figure 2-1, Land Use Plan for Cayo La Chiva:** For clarity and consistency, add to the figure legend all colored features that are depicted in the figure. These features include the Landing/Picnic Area, Trail Through the Island, Tourist Tree and Overlook Picnic Area.

   Navy Response: All referenced items shown on the figure (other than the UXO boundary) are already labeled in the figure; therefore, it would be unnecessarily redundant to add them to the legend. The UXO 18 boundary has been added as a label in the figure and the Legend has been removed. All other figures have been revised accordingly.

4. **Section 3.2, LUC Implementation, Page 3-1:** It appears that the kiosk will be located near the entrance to the trail, but is unclear if additional warning signs or fences also should be posted along the trail to discourage visitors from going off-trail. Revise the Work Plan to clarify if there will also be placement of signs along the trail.

Navy Response: No additional warning signs or fences are planned.

5. **Section 3.2, LUC Implementation, Page 3-1:** It is unclear how the Puerto Rico Department of Natural and Environmental Resources (PRDNER) will be informed of where land use controls (LUCs) have been imposed, as this is not stated. Revise this section to clarify how PRDNER will be informed of where LUCs have been imposed, and if EPA will be made aware of this information transfer.

   Navy Response: The second and third bullets of Section 3.2 has been combined and revised to read: "The LUC boundary, with coordinates, together with the corresponding LUC objectives and associated requirements, will be documented in a LUC Plan, which will be provided to PRDNER and EPA following implementation of the RA."

6. **Figure 3-1, Educational Kiosk Location:** For clarity and consistency, add all colored features to the figure legend that are depicted in the figure. These features include the Landing/Picnic Area, Trail Through the Island, Tourist Tree and Overlook Picnic Area.

   Navy Response: Please see the response to Comment #3 above.

7. **Section 4.0, Long-term Monitoring Plan, Page 4-1:** This section states that LUC inspections will be conducted annually and following events that may threaten the integrity of the LUCs (i.e., named hurricanes/tropical storms, fires) at UXO 18. However, it is not specified how long after a natural disaster or similar event that a LUC inspection will be conducted. Revise this section to clarify how long after a natural disaster or similar event a LUC inspection will be conducted.

   Navy Response: Due to the nature of natural disasters, such as hurricanes, and the inherent dangers presented to onsite field personnel following them, an exact timeframe for performing these inspections is impossible to estimate. However, the inspections would be done as soon as practicable. The associated sentence in the first paragraph of Section 4 has been revised to read: "LTM inspections will be conducted annually and following events (as soon as practicable, considering access logistics and safety) that may threaten the integrity of the LUCs (i.e., named hurricanes/tropical storms, fires) at UXO 18."

8. **Section 4.0, Long-term Monitoring Plan, Page 4-1:** This section states that munitions and explosives of concern (MEC) identified by or reported to the Navy will be cleared and removed, and that operational defects in the kiosk noted during inspections will be repaired. However, the length of time between the identification of MEC or operational defects and their removal or repairs is not specified. Revise this section to clarify how long after MEC has been identified or operational defects are noted that removal or repairs will be initiated.

   Navy Response: As stated in Section 4, the Navy shall notify EPA and PRDNER as soon as practicable of the discovery of activity at UXO 18 inconsistent with the LUC objectives stated in Section 3, and then promptly investigate and take appropriate corrective action. Because the response time may necessarily vary based on a number of factors (e.g., weather, accessibility, safety), an exact timeframe is not practical to include.

9. **Attachment A, Educational Kiosk Schematic Diagram:** It is unclear if the text of the center panel of the Educational Kiosk Schematic sufficiently stresses the need for visitors to stay within the designated public use areas and trail as currently written. It is recommended that the text be revised to read, "Please stay within the designated public areas and trail, and practice the 3Rs" (or similar, to first stress that the public stay within designated areas). In addition, it is recommended that consideration be given to adding the word "warning" or "caution" to draw visitors to the kiosk. Consider revising the kiosk text accordingly.

   Navy Response: Please note that the Section 3.2 indicates the actual kiosk format/content produced may vary from that shown in the schematic, but will convey the information shown in the schematic. To that end, as suggested in the comment, the information will be modified to convey the following message (actual text may vary): "Caution: Please stay within the designated public areas and trail, and practice the 3Rs." Note:

During the April 2019 Vieques Technical Subcommittee Meeting, it was concurred that the educational kiosk schematic diagram (Attachment A of the draft) will be removed and a notation will be added to the work plan text that the design and content of the actual kiosk will be based on coordination between the Navy and PRDNER. This notation will include that the kiosk will include language/graphics that provide explosive awareness and safety procedures, as well as guidance to stay within designated public areas.

10. **Attachment B, LUC Site Inspection Checklist:** The checklist includes one entry for inspection of the kiosk, but Section 4.0, Long-term Monitoring Plan, indicates that instrument-aided visual inspections of all public areas will be performed (i.e., the landing area, trail, and overlook). The inspection checklist should include rows for evaluations of these public areas, with potential problems identified as evidence of public access of areas not intended for public use. Revise the inspection checklist to include rows for evaluations of the landing area, trail, and overlook areas as part of the annual inspection events.

    Navy Response: The checklist in Attachment B has been expanded to include rows to document the results of the inspections at the various public use areas.

Final Responses to PRDNER/PREQB Comments on the Draft UXO 18, Cayo La Chiva, Remedial Action Land Use Control, and Long-Term Monitoring Work Plan

Atlantic Fleet Weapons Training Area – Vieques Former Vieques Naval Training Range Vieques, Puerto Rico

GENERAL COMMENTS

1. Executive Summary, Section 4.0, and Section 5.2 of the Work Plan. Please note that the Work Plan indicates that inspections (LUCs and LTM for MEC) will be conducted annually and following events that may threaten the integrity of the LUCs (i.e., named hurricanes/tropical storms, fires). PREQB may wish to request that inspections be conducted on a slightly more frequent semi-annual basis for the first five (5) years, as well as following significant events that may threaten the integrity of the LUCs. The semi-annual inspection schedule appears warranted, particularly since MEC will potentially be left on the island, steep topography combined with rainfall in Puerto Rico makes trails, including potential trespassing routes, prone to erosion, and recreational opportunities will encourage visitors to UXO 18 resulting in increased potential for trespassing to occur. The frequency could also be adjusted, as appropriate, in the future. Please add to the WP the MEC clearance requirements and maintenance of the signs referenced in the ROD. Please add the sign locations to the appropriate figures.

Navy Response: The Navy feels annual inspections are appropriate for UXO 18, especially considering the significant amount of vegetation that will be left undisturbed on the island, the relatively thin overburden, that erosion has not been observed during the various investigations and munitions removal conducted on the island, the suspected historical use of the island, and the very few munitions found. Erosion is not anticipated to be a concern due to the shallow nature of the bedrock on the island; however, focused MEC clearance is planned to an estimated depth of 1-foot bgs (based on the shallow bedrock) to support the planned recreational use.

Please note that the ROD does not indicate signs will be installed. It refers only to "signage," which is the kiosk; its general location is shown in Figure 3-1. Section 4 has been updated to indicate that during LUC inspections, any vegetation obscuring land use control or explosive hazard awareness on the kiosk will be cut back and that any damage to the kiosk will be repaired or, if not practical, the kiosk will be replaced.

Further, text has been added in Section 3.2 to state that the educational kiosk will be installed after the focused MEC clearance activities have been completed.

PREQB Backcheck Response: The response is acceptable.

2. The WP addresses the Anchorage Area as part of UXO 16 and states it is not part of UXO 18 LUC/LTM WP; however, how will the shallow water landing and shallow water around the picnic areas where site users will be wading to gain access to UXO 18 be cleared of MEC? PREQB recommends these areas be considered as part of the trail removal action and inspections.

Navy Response: Comment noted. Any offshore work would be addressed as part of UXO 16. Figure 3-1 has been revised to include "(UXO 16)" under the "Anchorage Area" label.

PREQB Backcheck Response: The response is acceptable; however, UXO 18 should not be opened to the public until the areas described in this comment have been cleared of MEC.

3. Please add a description of the Tourist Tree and add to the WP the MEC clearance requirements and the inspection/maintenance requirements.

Navy Response: The Tourist Tree was provided in the land use map by PRDNER and the Navy understands this to be a scenic tree that recreational users would observe on the trail to the overlook/picnic area. The Navy does not have any other detailed information or the nature of the Tourist Tree. The first sentence of the fourth paragraph of Section 2.1.3 has been revised to read: "Following PRDNER's demarcation of the public use areas (comprising the trail, landing/picnic area, overlook/picnic area, and Tourist Tree), . . . "The bullets below this paragraph indicate these areas will be searched for MEC. In addition, the third sentence of the first paragraph of Section 2.1.3 has been revised to read: "MEC clearance will be conducted at each of the public use areas on Cayo La Chiva, including out to 10 feet on each side of the trail centerline and a 10-foot radius around the Tourist Tree, to include a vegetative buffer on both sides of the trail and around the Tourist Tree.

Regarding maintenance requirements of the Tourist Tree environ, it will be the responsibility of PRDNER to keep vegetation cut back off the planned public areas. The Navy's responsibility will be to provide inspections of these areas (as well as any areas where trespassing is evident) and remove any MEC identified. This information has been added to Section 4.

PREQB Backcheck Response: The response is acceptable provided PRDNER concurs that the responsibility of maintaining the public use areas is the responsibility of PRDNER and if the public use areas are not maintained then it may impact the areas in which the Navy will conduct the annual inspections.

4. Please describe how QA/QC will be conducted during the MEC clearance.

Navy Response: As described in Section 2 of the WP, MEC clearance, including QA/QC procedures, will follow the approaches used for MEC clearance throughout the former VNTR and NASD. Specifically, MEC clearance will be done in accordance with the *Master Munitions and Explosives of Concern (MEC) Work Plan, Former Vieques Naval Training Range (VNTR) Vieques, Puerto Rico* (CH2M, 2006), or with applicable protocol contained in the munitions removal work plan in effect at the time the MEC clearance is performed.

PREQB Backcheck Response: The response is acceptable.

PAGE-SPECIFIC COMMENTS

1. Page 2-2, Section 2.1.3, First Bullet. Please establish in this bullet that the instrument aided visual investigation will be conducted by grids.

Navy Response: Please see the response to General Comment #4 above.

PREQB Backcheck Response: The response is acceptable.

2. Page 2-2, Section 2.1.3, First Bullet. The 5 inch rocket tubes are made from aluminum please change magnetometer to all metals detectors.

Navy Response: The requested revision has been made.

PREQB Backcheck Response: The response is acceptable.

3. Page 3-1, Section 3.1. Revise the first sentence to include "administrative" controls and delete from the sentence, "and/or the environment".

Ref. EPA website definition for LUCs: "Land Use Controls (LUCs) may consist of non-engineered instruments, such as administrative and legal controls or engineered and physical barriers, such as fences and security guards. LUCs help to minimize the potential for exposure to contamination and/or protect the integrity of a response action and are typically designed to work by limiting land and/or resource use or by providing information that helps modify or guide human behavior at a site."

Navy Response: The requested revision has been made.

PREQB Backcheck Response: The response is acceptable.

4. Page 4-1, Section 4, First Paragraph. With 12 months scheduled between inspections and significant vegetation regrowth is expected will the inspections include vegetation removal with instrument aided visual "inspection" of the public use areas?

Navy Response: Please see the response to General Comment #3 above. The Navy will not perform vegetation removal, but will perform inspections within those areas depicted in Figure 3-1 that PRDNER has kept accessible or where trespassing is evident.

PREQB Backcheck Response: The response is acceptable provided PRDNER concurs that the responsibility of maintaining the public use areas is the responsibility of PRDNER and if the public use areas are not maintained then it may impact the areas in which the Navy will conduct the annual inspections.

5. Page 4-1, Section 4 - Long-Term Monitoring:

a. First Paragraph:

i. The second sentence states "Immediately following RA implementation, an LTM program will be established by the Navy…" Please clarify if the LTM program will be independently documented in a written LTM Plan and submitted to regulatory agencies for review.

Navy Response: The LTM Plan is Section 4 of the reviewed document.

ii. Please revise the third sentence to read "The LTM program will be implemented via instrument-aided visual inspections within all public areas as well as along any potential trespassing routes that are noted." This is consistent with the Table 2 of the PRAP.

Navy Response: The text has been revised as requested.

b. Second Paragraph: PREQB requests that photographic documentation be included as part of the inspections, checklist, and subsequent reporting. Particularly, PREQB is interested in documentation of activities that appear inconsistent with the LUC objectives.

Navy Response: The second sentence of the second paragraph has been revised to read: "During each inspection . . . will be completed and photographs will be taken, especially of any conditions/activities that appear inconsistent with the LUC objectives." As documented in Section 5.2 of the UXO 18 RA WP, following each annual inspection, a summary report will be provided to EPA and PRDNER documenting routine maintenance tasks, inspection findings, and, as applicable, corrective actions taken. Inclusion of photographs has been added to Section 5.2.