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MCRD PARRIS ISLAND
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WORK PLAN FOR CONFIRMING THE NATURE OF GEOPHYSICAL ANOMALIES AT MUNITIONS RESPONSE PROGRAM SITES USING HAND EXCAVATION IN ARCHAEOLOGICALLY SENSITIVE AREAS MCRD PARRIS ISLAND SC

2/1/2012

TETRA TECH

Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62470-08-D-1001

Work Plan
Confirming the Nature of Geophysical Anomalies at Munitions Response Program Sites Using Hand Excavation in Archaeologically Sensitive Areas at MCRD Parris Island, South Carolina

Contract Task Order JM10

February 2012

NAVFAC Naval Facilities Engineering Command
NAVFAC SOUTHEAST
NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH

WORK PLAN

CONFIRMING THE NATURE OF GEOPHYSICAL ANOMALIES AT MUNITIONS RESPONSE PROGRAM SITES USING HAND EXCAVATION IN ARCHAEOLOGICALLY SENSITIVE AREAS

MARINE CORPS RECRUIT DEPOT – PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

February 2012

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1.0 PROJECT BACKGROUND

The Navy and Marine Corps have conducted various testing, training, and disposal activities related to military munitions at Marine Corps Recruit Depot (MCRD) Parris Island, South Carolina since its establishment in 1915 as a recruit training facility.

In 2010, in accordance with the Military Munitions Response Program (MMRP), Tetra Tech Inc conducted a Site Investigation (SI) for seven Munitions Response Areas (MRAs) located at MCRD Parris Island (Figure 1-1). The primary objective of the SI was to determine the presence or absence of Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC) within the MRAs identified as a result of the Archives Search and Range Identification/Preliminary Range Assessment conducted by U.S. Army Corps of Engineers (USACE, 1999a and b). Field activities for the SI utilized remote sensing methods and were non-intrusive. Remote sensing activities included unexploded ordnance (UXO) detector-aided surface surveys and geophysical surveys. Sampling of soil and sediment for MC was also conducted using small diameter core borings.

The two-phase SI approach included use of non-intrusive geophysical equipment to map surface and subsurface anomalies, which could be due to suspect MEC, Material Potentially Presenting Explosive Hazard (MPPEH), or non-munitions debris. The SI identified geophysical anomalies that could represent MEC, MC, or UXO at six of the seven MRAs. The six sites include UXO Sites 3 to 8 (Figure 1-2). In the SI report, additional work under a Remedial Investigation (RI) was recommended to resolve a subset of these anomalies through intrusive investigation at these sites.

The RI is not a removal action but rather is designed to establish the nature and extent of MEC/MPPEH and MC contamination associated with the historical use of munitions at each of the UXO sites. The investigative approaches are designed to provide for the collection of sufficient site-specific data to evaluate risk and, if necessary, develop remedial alternatives such as source removal. Only a subset of the geophysical anomalies within each UXO site will be subject to intrusive testing, as described in the Remedial Investigation Work Plan (RIWP) (Tetra Tech, 2012).

The RI is planned for implementation in Spring 2012. It will be conducted in two stages. Stage 1 consists of an MEC investigation of UXO Sites 3 to 8 that includes additional detector-aided surface surveys and land-based geophysical surveys in areas that were not surveyed previously during the SI. Several types of detection equipment will be used, including magnetometers, all-metal detectors, and electromagnetic detectors. The combined geophysical data sets from both the SI and RI will be evaluated to identify regions of suspect anomalies within each UXO site where intrusive investigation is recommended to determine whether and to what extent the anomalies may be due to the presence of subsurface MEC or MPPEH. The areas selected for intrusive investigation will be plotted on maps for review and approval by the Partnering Team and, once approved, will be subject to intrusive investigation through carefully controlled dig processes until the cause of the target anomalies can be resolved.

The second stage of the RI consists of an MC investigation that includes sampling and analysis of soil, sediment, and groundwater from UXO Sites 3 to 8, as well as human health and ecological risk evaluations for UXO Sites 2 to 8. The two investigative stages are intended to be conducted interactively because the highest concentrations of MC are expected to be found in environmental media located directly beneath or adjacent to MEC and MPPEH. If MEC or MPPEH are identified during the intrusive investigation, biased MC samples will be collected from the immediate vicinity of the item, and the item will be destroyed through intentional detonation in accordance with the approved explosives safety planning documents. Engineering controls (e.g., sandbags) will be used to minimize the effects of the blast and contain the detonation to as small an area as possible. A complete set of site maps showing areas where intrusive investigations could be conducted during the RI is included in Appendix A.

In UXO Sites 4, 6, and 7 some of the geophysical anomalies that could be subject to intrusive investigation are located within the delineated boundaries of previously recorded archaeological sites that

are eligible for or listed in the National Register of Historic Places (Figure1-3). Table 1-1 lists and summarizes the attributes of the potentially impacted sites. As such, MCRD Parris Island recognizes that archaeological resources may be potentially affected by the proposed RI activities. However, the probable presence of MEC and/or MC poses a threat to human life, as well as to the preservation of the archaeological sites. In response to this dual threat, this workplan has been prepared to ensure that no adverse effect to any of the archaeological sites will result from RI activities.

Table 1-1 Summary of Archaeological Sites that will require intrusive testing.

UXO site	Archaeological Site	Status	Site Description	Cultural Periods	Site Type
4	38BU0924	Eligible (NRHP)	Multi-component: 18th - 20th c./Shell midden	18th - 20th c. /Early Woodland to Miss	Shell midden
4	38BU1401	Eligible (NRHP)	Elliot Plantation Site, 18th - 19th c./ Woodland ceramic scatter	18th - 19th c./Woodland-Miss	
4	38BU1912	Eligible (NRHP)	Multi-component: Homesite, 19th - 20th c./ Shell midden, Early Woodland to Miss.	19th - 20th c.	Shell midden
6	38BU0958 B	Eligible (NRHP)	Habersham Plantation Site, 19th - 20th c./prehistoric scatter	19th - 20th c./Early-Middle Woodland	Lithic/ceramic scatter
7	38BU1103	Listed(NHL)	Component of Charlesfort-Santa Elena NHL	16th c.	
6-7	38BU0162	Listed(NHL)	Component of Charlesfort-Santa Elena NHL	16th c.; 19th c.	

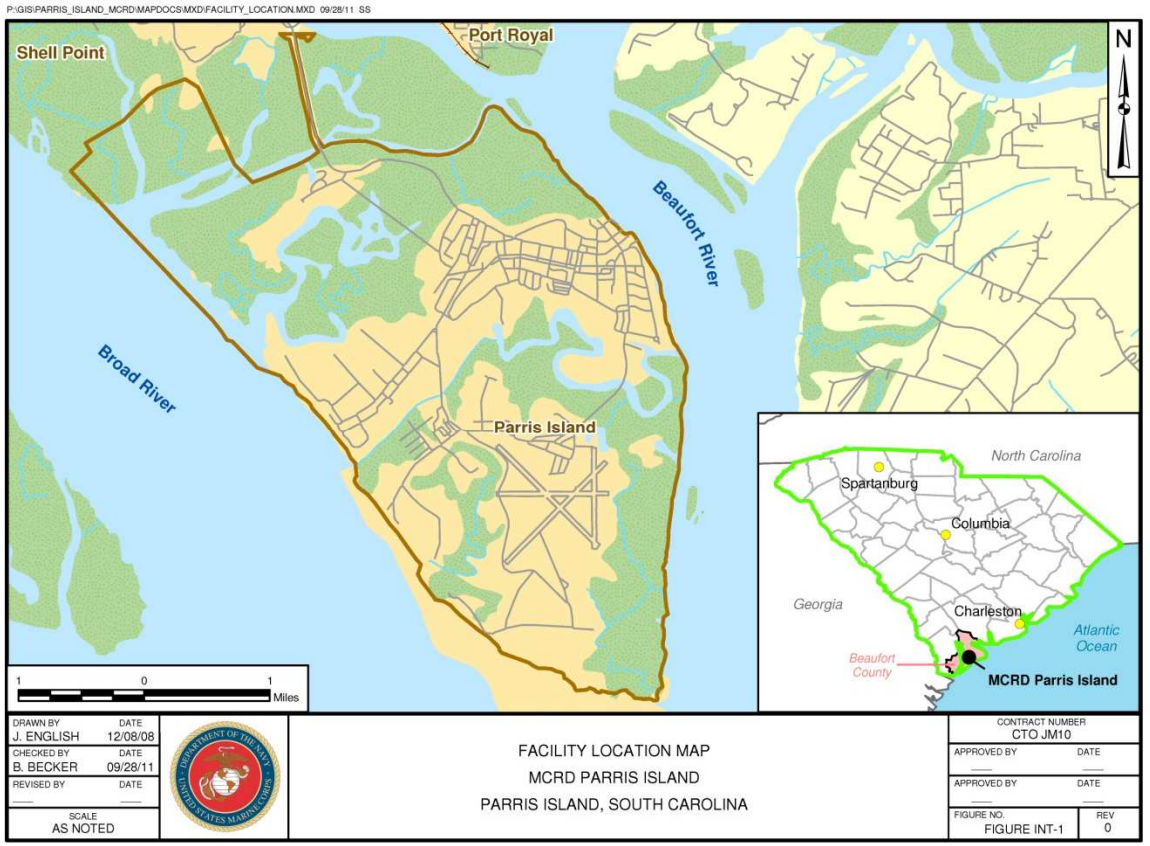

Figure 1-1. Project Location Map

Figure 1-2. UXO Sites

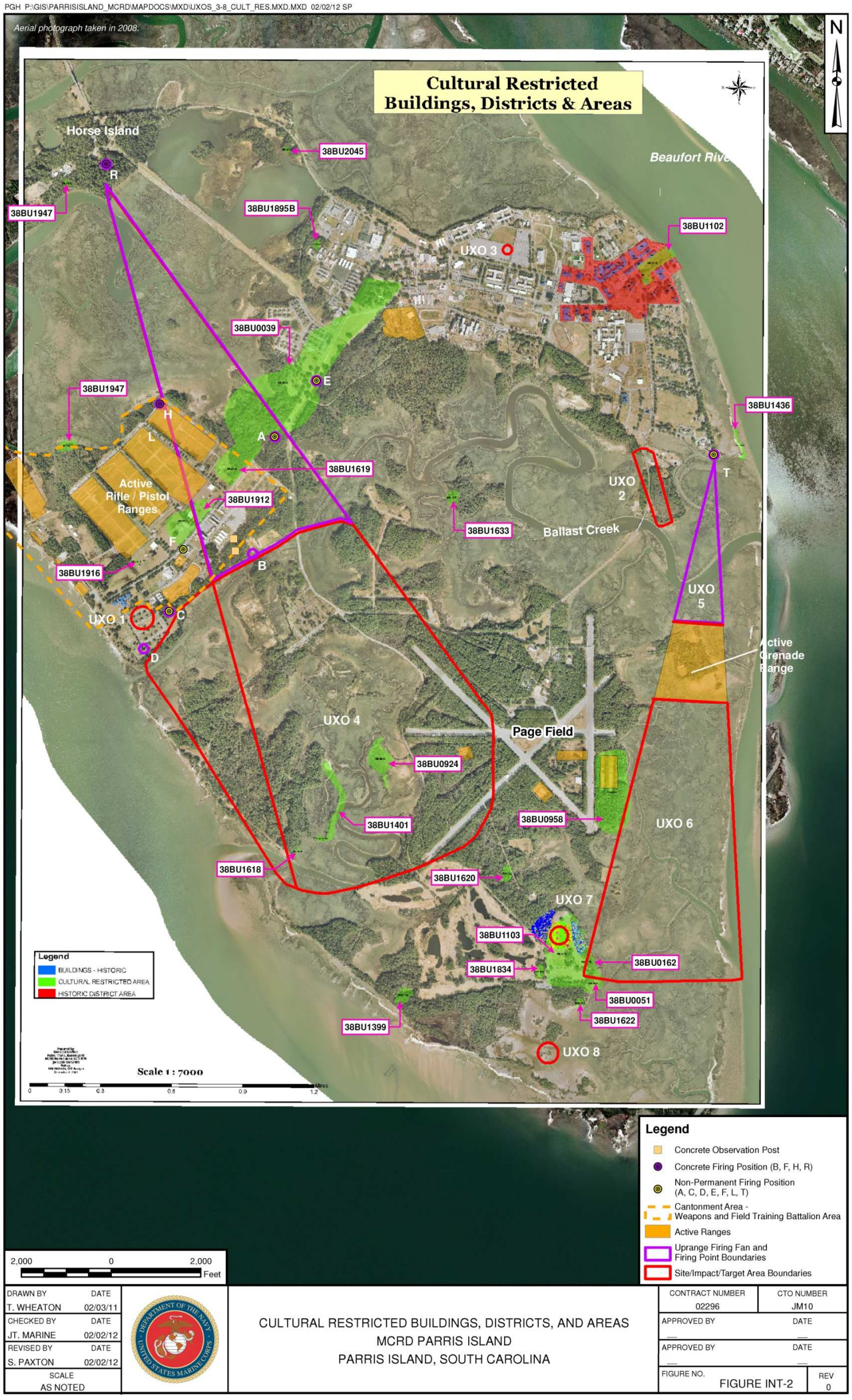

Figure 1-3. UXO Sites overlain with Archaeological Sites

2.0 ALTERNATIVES ANALYSIS AND ADMINISTRATIVE CONTROLS

Because the purpose of the RI is linked to human life and health, a “no action” alternative is not an option. Therefore Tetra Tech will minimize the impacts to archaeological resources by implementing administrative controls. Administrative controls that will be implemented are as follows:

- Cemeteries and burial sites represent the most sensitive archaeological resources; Tetra Tech will not investigate geophysical anomalies in any area known to contain human remains.
- After the combined geophysical data sets from both the SI and RI have been evaluated, and when possible, Tetra Tech will select geophysical anomalies in areas where artifact or feature density is known to be low.
- Because archaeological investigations and MEC investigations share similar objectives with respect to recovering buried objects/artifacts, the intrusive UXO investigation will utilize methodology that combines safety measures used in typical MEC investigations with archaeological excavation methods. This methodology has been formalized in a standard operation procedure (SOP) that is incorporated in the Sampling and Analysis Plan (SAP) prepared for the RI.

3.0 FIELD METHODS

This SOP establishes the procedure for confirming the nature of geophysical anomalies believed to represent subsurface munitions and explosives of concern (MEC) in archaeologically sensitive areas of Marine Corps Recruit Depot (MCRD) Parris Island.

3.1 TRAINING REQUIREMENTS

Prior to intrusive investigation of geophysical anomalies within designated unexploded ordnance (UXO) sites in areas that overlap archaeologically sensitive areas, UXO technicians will receive field and classroom instruction in archaeological excavation techniques by a Registered Professional Archaeologist (RPA). The classroom instruction will consist of an audio visual presentation on the recognition of prehistoric and historic artifacts, and the types of cultural features that may be encountered. Field instruction will be provided by an RPA in an area approved by the MCRD Parris Island Cultural Resource Manager (CRM). Field instruction will focus on the archaeological excavation techniques to be used to excavate Test Units (TUs) in arbitrary 10-centimeter (4-inch) levels.

3.2 EXCAVATION METHODS

TU size will vary in accordance with the size and depth of the geophysical anomaly being investigated. The expected TU size will range from 0.50-m wide by 0.50-m long to as large as necessary to resolve an anomaly that may lie as deep as 10 feet below the surface. TUs will be excavated in arbitrary 10-centimeter levels within natural strata. If soil conditions permit, TUs will be excavated with a flat bladed shovel using a shovel skimming technique whereby the excavation floor is lowered incrementally by

removing thin layers of soil. Vertical control of the excavation will be maintained as practiced in the field training, by using a chaining pin, string, line level, tape measure or surveying instrument.

Soil from each separate 10-centimeter level will placed on 4-mil plastic sheeting within the exclusion (K-40) zone. After the UXO investigation has been completed or aborted, and the area has been cleared for entry, the archaeologist will enter and screen the soil by level. Artifacts recovered from the screening process will be collected and recorded by horizontal location depth below surface, stratigraphic horizon, and site level. Each excavation level will be documented by the archaeologist with written records on standardized forms and logs, and will include plan and profile drawings of each excavated TU, as well as digital photo-documentation. The location of all excavated TUs will be recorded on project maps.

At any time during the course of the excavation: if the UXO technician encounters an object or soil anomaly (e.g. stain, burn) that he/she believes to be an artifact or cultural feature, excavation will cease. The UXO Field Operations Leader (FOL) will authorize the archaeologist to enter and examine the object/anomaly. If the archaeologist rules that the object/anomaly may have cultural significance the object/anomaly will be left *in-situ*, photographed, and recorded on project mapping. The excavation will then be lined with plastic and backfilled.

3.3 DISPOSITION OF ARTIFACTS AND FIELD DOCUMENTS

All artifacts and original copies of field documents (written or electronic) will be turned over to the MCRD Parris Island CRM fro disposition at the completion of the project. The CRM will update the site files maintained by the South Carolina SHPO as necessary.

3.4 REPORTING

At the request of MCRD CRM and or SHPO, Tetra Tech will prepare addendum archaeological reports detailing the methods and results of testing at each archaeological site.

APPENDIX A

UXO SITE MAPS SHOWING AREAS OF PLANNED INTRUSIVE INVESTIGATIONS

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Aerial photograph taken in 2008.

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X3SB104
X3SB105
X3SB103
X3TW103
X3SB106
X3SB107
X3SB108
X3SB109
X3SB102
X3TW102
X3SB110
X3SB111
X3SB112
X3SB101
X3TW101

Former Aerial Bombing Target

Parade Deck

Guantanamo Street

Cape Gauffre Street

Boulevard De France

Midway Street

Panama Street

00615 00604 00603 00589 00620 06005 00566 00565 00183 00191 00182 00590 00591 00658 00627 00626 00176 00296 00170 00096 00139 00674 00602 06002 06003 00601 00599 00166E 00166 00166B 00283 00635 00635A 00651

200 0 200 Feet

Legend

- Colocated Temporary Well / Soil Boring Location
- Soil Boring Location
- MEC RI: Intrusive Investigation of Anomalies
- MEC SI: Geophysical Survey (2.5-foot Transect Spacing)
- Approximate Location of Former Aerial Bombing Target

Notes:
1. Collect discrete samples at all soil boring locations for metals analysis.
2. Collect composite samples, comprised of one aliquot from each soil boring location, for explosives analysis.
3. Collect groundwater samples from each well location for metals and explosives analysis.

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J. ENGLISH	08/17/11
CHECKED BY	DATE
B. BECKER	01/25/12
REVISED BY	DATE
MK BOND	01/25/12
SCALE	
AS NOTED	

DEPARTMENT OF THE NAVY · UNITED STATES MARINE CORPS

MC INVESTIGATION LOCATIONS
UXO 3 - AERIAL BOMBING TARGET AT PARADE DECK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER 02296	CTO NUMBER JM10
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FIGURE NO. FIGURE 17-1	REV 0

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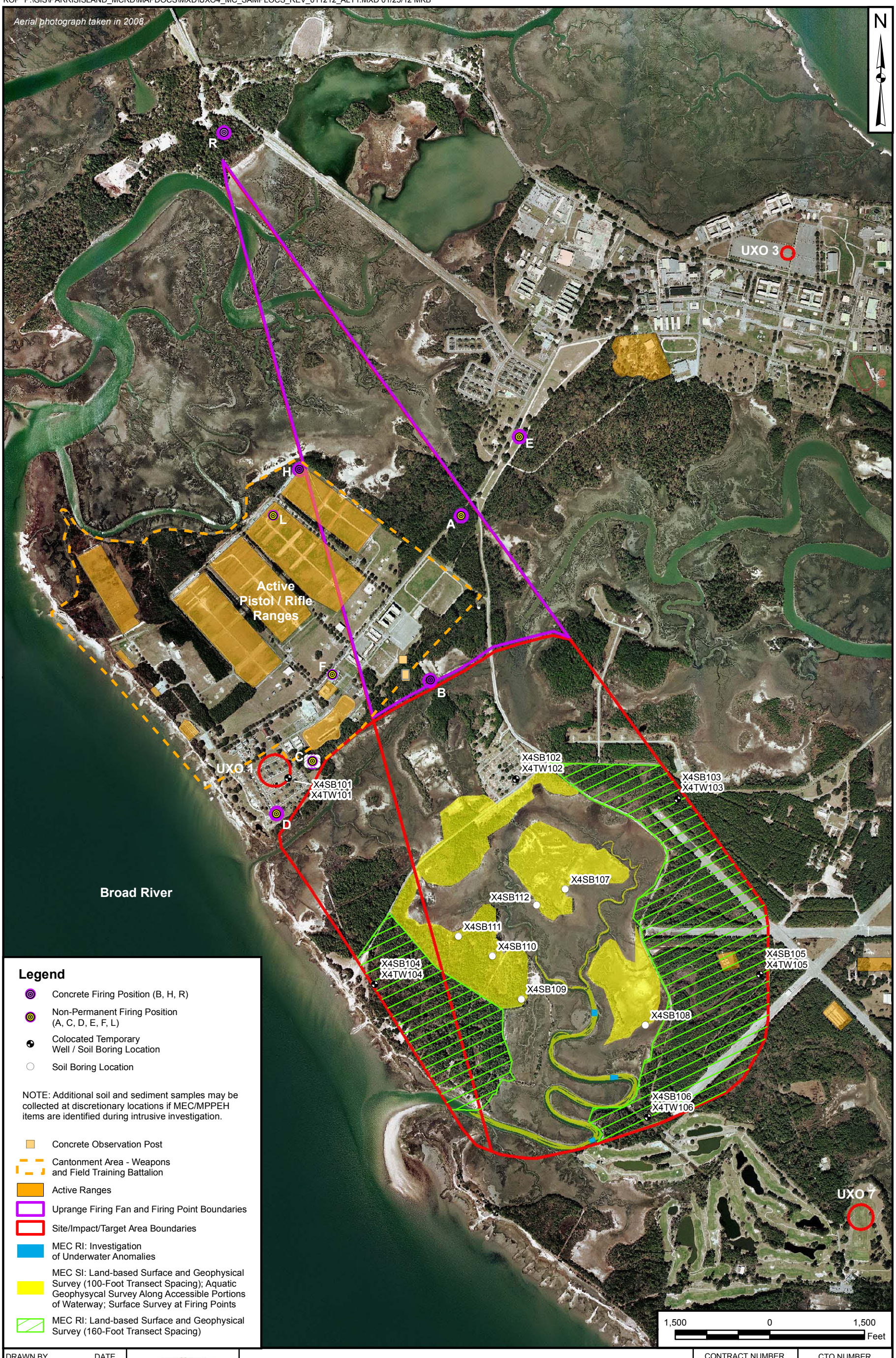

Legend

- Concrete Firing Position (B, H, R)
- Non-Permanent Firing Position (A, C, D, E, F, L)
- Colocated Temporary Well / Soil Boring Location
- Soil Boring Location

NOTE: Additional soil and sediment samples may be collected at discretionary locations if MEC/MPPEH items are identified during intrusive investigation.

- Concrete Observation Post
- Cantonment Area - Weapons and Field Training Battalion
- Active Ranges
- Uprange Firing Fan and Firing Point Boundaries
- Site/Impact/Target Area Boundaries
- MEC RI: Investigation of Underwater Anomalies
- MEC SI: Land-based Surface and Geophysical Survey (100-Foot Transect Spacing); Aquatic Geophysycal Survey Along Accessible Portions of Waterway; Surface Survey at Firing Points
- MEC RI: Land-based Surface and Geophysical Survey (160-Foot Transect Spacing)

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MC INVESTIGATION LOCATIONS
UXO 4 - FIELD ARTILLERY WEST MAIN RANGE
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
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FIGURE NO.	REV
FIGURE 17-2	0

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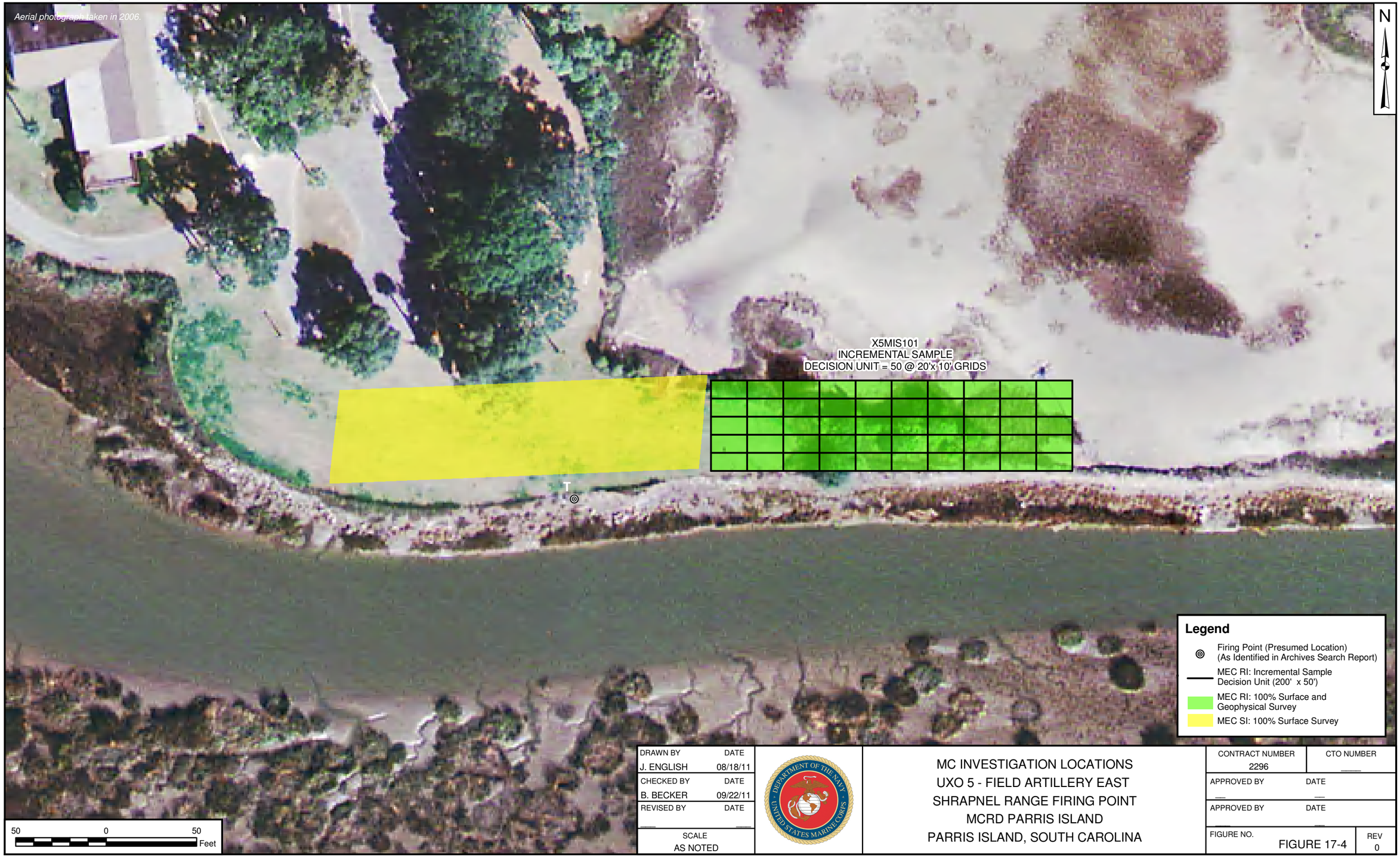

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MC INVESTIGATION LOCATIONS
UXO 5 - FIELD ARTILLERY EAST
SHRAPNEL RANGE FIRING POINT
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
2296	
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FIGURE 17-4	0

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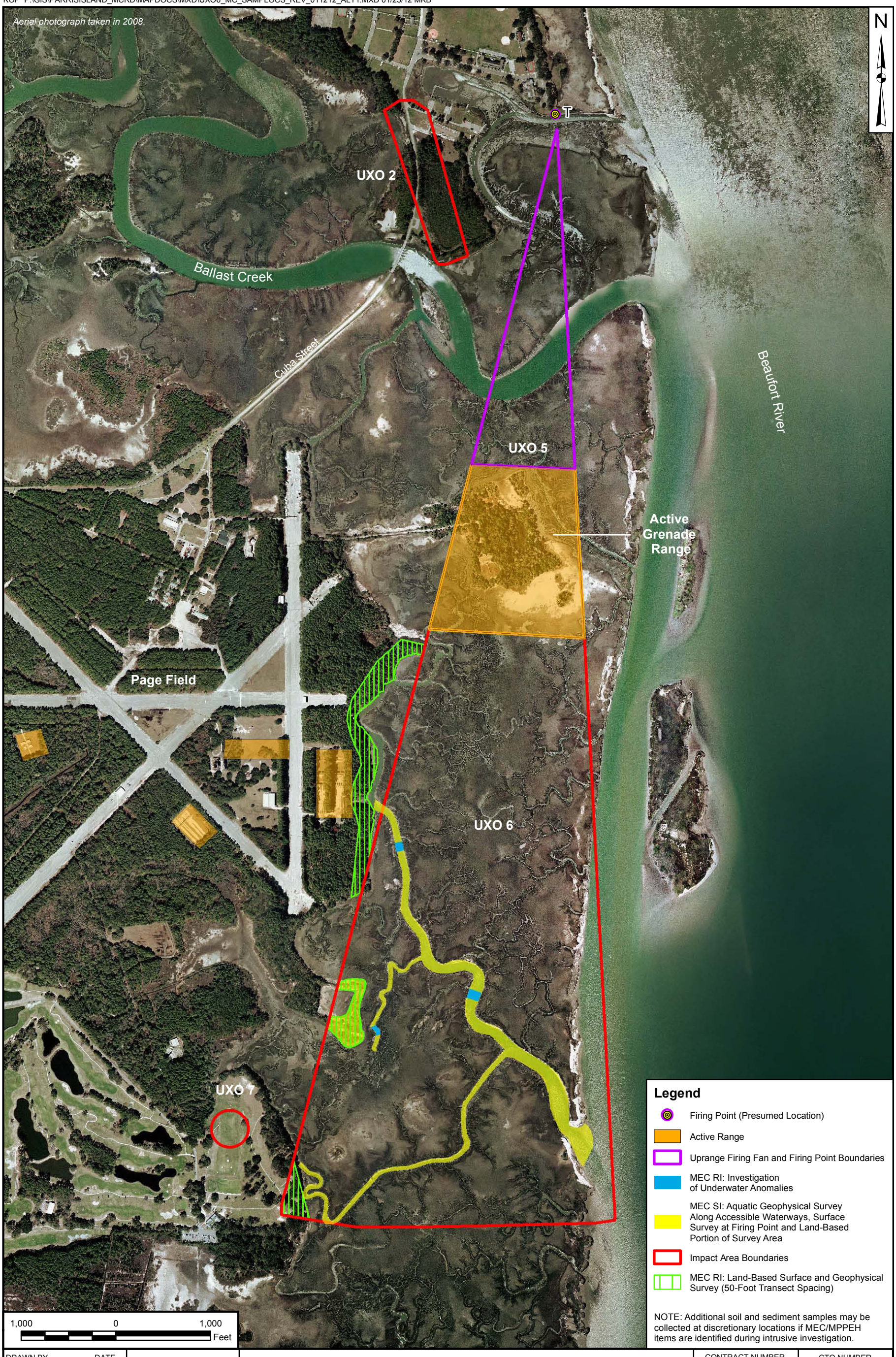

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REVISED BY / DATE	MK BOND 01/25/12
SCALE	AS NOTED

MC INVESTIGATION LOCATIONS
UXO 5 / UXO 6 - FIELD ARTILLERY EAST SHRAPNEL RANGE
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

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FIGURE NO.	FIGURE 17-5
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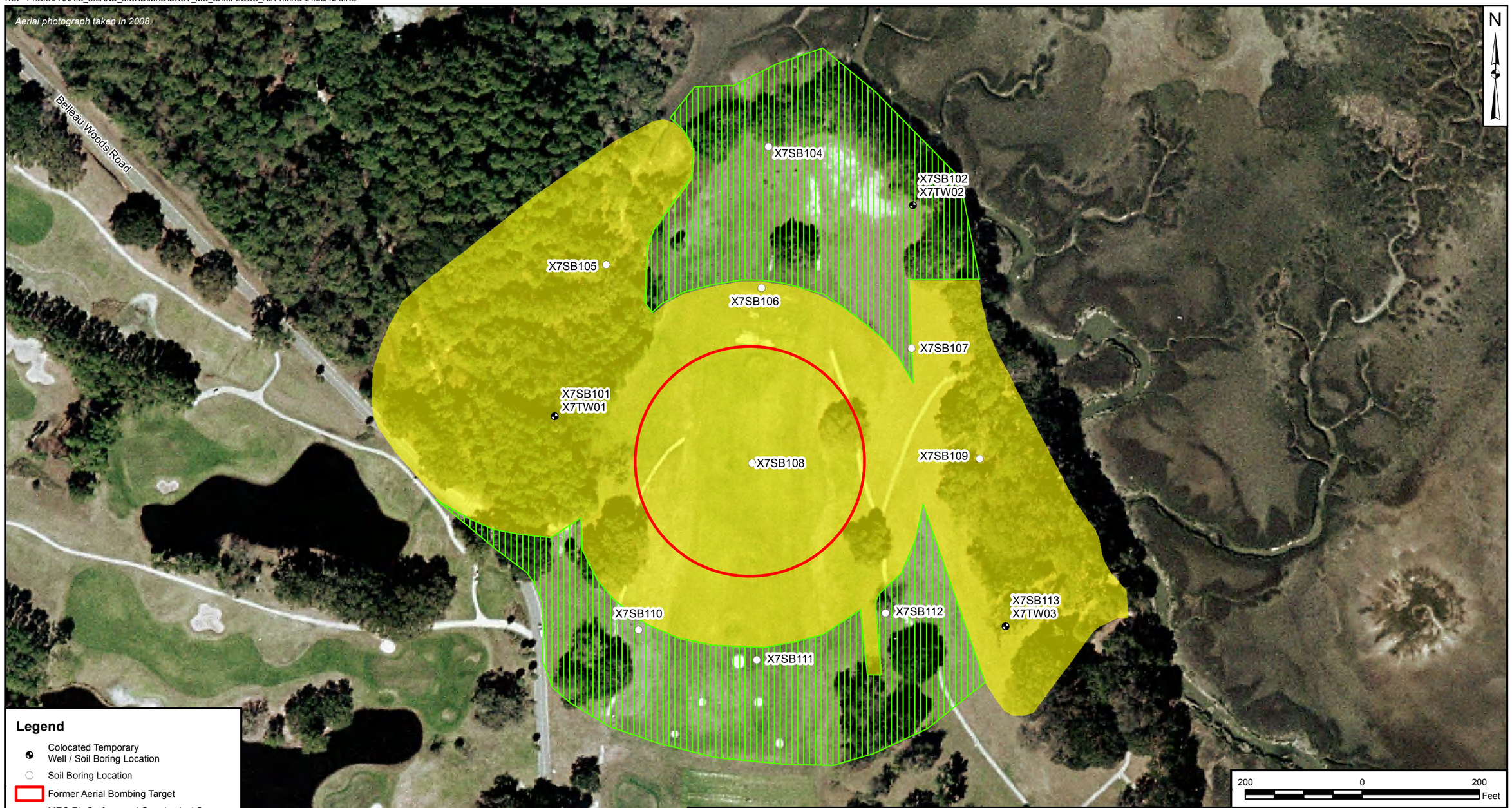

Legend

- Colocated Temporary Well / Soil Boring Location
- Soil Boring Location
- Former Aerial Bombing Target
- MEC RI: Surface and Geophysical Surveys (5-foot / 10-foot Transect Spacing)
- MEC SI: Surface and Geophysical Surveys (5-foot / 10-foot Transect Spacing)

Notes:
1. Collect discrete samples at all soil boring locations for metals analysis.
2. Collect composite samples, comprised of one aliquot from each soil boring location, for explosives analysis.
3. Collect groundwater samples from each well location for metals and explosives analysis.

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MC INVESTIGATION LOCATIONS
UXO 7 - AERIAL BOMBING TARGET AT GOLF COURSE
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
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