11/1/07-00645

Confirmation Sampling Work Plan for Site 5 Removal Action Phases 1 through 3

Addendum to Work Plan for Delineation of Hot Spot Removal Areas at Site 5, St. Juliens Creek Annex, Chesapeake, Virginia

Introduction

This technical memorandum presents the approach for confirmation sampling activities associated with Phases 1 through 3 of the Site 5 Removal Action at St. Juliens Creek Annex (SJCA), Chesapeake, Virginia. This technical memorandum is an addendum to the *Final Work Plan for Delineation of Hot Spot Removal Areas at Site 5* (CH2M HILL, May 2007).

A phased non-time-critical removal action (NTCRA) is planned at Site 5 (former Burning Grounds) to address human health and/or ecological risk associated with waste/burnt soil and contaminated surface soil and drainage sediment. The approach for the NTCRA was developed in the Engineering Evaluation/Cost Analysis (EE/CA) (CH2M HILL, February 2007). Phase 1 of the removal action includes excavation of the waste/burnt soil area; Phase 2 includes excavation of the delineated surface soil hot spot areas; and Phase 3 includes excavation of the additional surface soil and sediment areas (Figure 1). The removal action activities will be conducted under the AGVIQ-CH2M HILL Joint Venture I (JV I), contract N62470-03-D-4403, Task Order (TO) 005 and AGVIQ-CH2M HILL Joint Venture II (JV II), contract N62470-03-D-0260, TO 015. The confirmation sampling activities will be conducted under the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN), contract N62470-02-D-3052, Contract Task Order (CTO) 139.

Remedial Investigation (RI) activities identified metals in surface soil posing potential risk to human receptors and metals, pesticides, and polycyclic aromatic hydrocarbons (PAHs) in surface soil and drainage sediment posing potential risk to ecological receptors (CH2M HILL, March 2003). As part of the EE/CA, risk-based cleanup goals were developed to ensure sufficient removal of the areas determined to pose risks to human health (Table 1). Ecological cleanup goals were not developed because the site-wide average concentrations of ecological chemicals of potential concern (COPCs) remaining in place in surface soil and sediment following implementation of the removal action reduce the potential risks to an acceptable level, based on the approach described in the EE/CA. Therefore, to verify that the extent of the removal actions result in concentrations protective of human health, confirmation samples will be collected from areas identified to pose human health risks (Figure 1).

Field Investigation Activities

The technical approach for the proposed field activities at Site 5 is detailed in the following subsections. The *Final Master Project Plan (MPP), St. Juliens Creek Annex, Chesapeake, Virginia* (CH2M HILL, July 2003) addresses the protocols and standard operating procedures (SOPs) to be used for all investigations at SJCA. The project specific SOPs and health and safety

plan (HASP) are provided as Attachments A and B, respectively, in the *Final Work Plan for Delineation of Hot Spot Removal Areas at Site 5, St. Juliens Creek Annex, Chesapeake, Virginia* (CH2M HILL, May 2007).

Mobilization Activities

As part of the field mobilization, CH2M HILL will procure the following types of subcontractors to support investigation activities:

- Offsite analytical laboratory
- Data validation
- Investigation-derived waste (IDW) handler

Upon procurement and prior to mobilization, subcontractor-specific training and health and safety policies will be reviewed and approved of by the CH2M HILL Health & Safety Manager. CH2M HILL and its IDW subcontractor will have field meetings to discuss the work items, worker responsibilities, and familiarize workers with the HASP prior to beginning work.

JVI and JV II will work with CH2M HILL to schedule mobilization and allow access to the removal areas, providing a minimum of 2 days notice of when areas will be ready for sampling. Mobilization for the field effort includes procurement of necessary field equipment and initial transport to the site. Equipment and supplies will be brought to the site when the CH2M HILL field team mobilizes for field activities. Prior to any intrusive activities, the site will be marked for utilities under the JV I and JVII contracts.

Based on the historical use of Site 5, there is potential for encountering munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) at the site. A draft Explosives Safety Submission (ESS) was submitted to Naval Ordnance Safety and Security Activity (NOSSA) on June 12, 2007 to cover Phase 1 of the removal action. During Phase 1 of the removal action, on-site construction support will be provided by JVII based on historical use as a burning ground and a disposal area for waste and munitions and due to the nature of munitions debris (MD) encountered during previous investigations. During Phases 2 and 3, on-call construction support will be practiced given that no known disposal activities were conducted in those areas. In the event that findings of Phase 1 indicate higher likelihood of encountering MEC outside of the waste/burnt soil area (e.g., high concentrations of MEC are found near the perimeter of the waste/burnt soil area), on-site construction support will be implemented in accordance with the procedures developed for the waste/burnt soil area in the ESS. The Procedures for Communicating Potential Live MEC to Navy if any suspected live MEC is encountered at SJCA is provided in the *Final Technical Memorandum Work Plan for Delineation of Hot Spot Removal Areas at Site 5* (CH2M HILL, May 2007) as Attachment D.

Soil Sampling

Confirmation soil samples will be collected during the 3 phases of the removal action to confirm that the vertical and horizontal extent of removal in the waste/burnt soil area, and vertical extent of removal in the hot spot areas and additional surface soil and sediment areas result in concentrations protective of human health, as described in the sections below.

All organic material (roots and grasses) will be removed from the samples prior to placement into sample containers. Any debris or gravel will also be removed from the samples. The samples will be logged to record soil descriptions, and other relevant information such as possible evidence of contamination. The samples will be collected with a decontaminated stainless steel trowel or hand auger, placed in a decontaminated stainless steel bowl or on disposable plastic sheeting, homogenized, and contained in laboratory-prepared, sample bottles and packed on ice for overnight shipment to an offsite laboratory. Table 2 shows the required containers and holding times for samples as well as the analytical methods. The soil samples will be analyzed on a quick turn around time (24-hr) to prevent production delays.

Phase 1 Removal - Waste/Burnt Soil Area

The waste/burnt soil area was delineated by test pitting activities conducted during the RI. Based on the test pit results, the waste/burnt soil area covers approximately 4.2 acres and extends from the surface to 26 inches below ground surface (bgs). Human health risks were identified from exposure to waste and arsenic, copper, and lead concentrations in surface soil in this area. The actual horizontal and vertical limits of removal will be determined visually during the removal action and will ultimately be based on the results of the confirmation samples collected below the visible limits of the waste.

To verify that the vertical extent of the removal results in concentrations protective of human health, one 5-point composite confirmation floor sample will be collected per 75 × 75 ft grid cell within the approximate grid system shown on Figure 2. The samples will be collected from 0 to 6 inches bgs, with 0 indicating the level of exposed soil following excavation. To verify that the horizontal extent of the removal results in concentrations protective of human health, 10 wall samples will be collected around the perimeter of the excavation, proposed sample locations are shown on Figure 2. Wall samples will not be collected along the perimeter adjacent to the additional surface soil and sediment removal areas, as those samples would be expected to show contamination, which will be removed during the Phase 3 activities. The sample interval of the wall samples will be dependent upon the excavation depth and composite the entire excavation depth.

The samples will be inspected by the MEC technician to ensure no MEC/MPPEH are present. Samples will be analyzed for arsenic, copper, and lead.

Phase 2 Removal - Hot Spot Areas

Based on the results of the RI, two isolated hotspot areas (SS19 and SS66) were identified that pose human health risk from exposure to copper and/or lead concentrations in surface soil. Therefore, SS19 was identified as a human health risk-based removal area for lead and SS66 was identified as a human health risk-based removal area for copper and lead in the EE/CA. The horizontal extent of the isolated hot spot areas SS19 and SS66 were delineated by sampling activities conducted in 2007 (CH2M HILL, October 2007). The horizontal extent of removal (Figure 3) is based on sample results below the risk-based cleanup goals. The vertical limits of removal will be to a depth of 1 ft, based on subsurface soil data collected during the RI and will ultimately be based on the results of the confirmation samples.

To verify that the vertical extent of the removal area is sufficient, one 5-point composite confirmation floor sample will be collected from each hot spot. The samples will be collected from 0 to 6 inches bgs, with 0 indicating the level of exposed soil following excavation.

Samples collected from hot spot SS19 will be analyzed for lead and samples collected from hot spot SS66 will be analyzed for copper and lead.

Phase 3 Removal- Additional Surface Soil Areas

Based on the results of the RI, several areas outside the waste/burnt soil area were identified that pose human health risk from exposure to arsenic, copper, and/or lead concentrations in surface soil. Therefore, they were identified as human health risk-based removal areas in the EE/CA. The horizontal extent of removal for the additional surface soil areas (Figure 4) is based on existing sample results, where concentrations do not pose a potential human health risk. The vertical limits of removal will be to a depth of 1 ft, based on subsurface soil data collected during the RI and will ultimately be based on the results of the confirmation samples.

To verify that the vertical extent of the removal results in concentrations protective of human health, one 5-point composite confirmation floor soil sample will be collected per 75 × 75 ft grid cell within the approximate grid system shown on Figure 4. The samples will be collected from 0 to 6 inches bgs, with 0 indicating the level of exposed soil following excavation.

Samples collected from the human health risk-based removal area located east of the waste/burnt soil area will be analyzed for arsenic, copper, and lead. Samples collected from the human health risk-based removal area located west of the waste/burnt soil area will be analyzed for arsenic.

Sampling Equipment Decontamination

All non-disposable sampling equipment, such as trowels, bowls, and the hand auger, will be decontaminated immediately after each use in accordance with the applicable SOPs. Decontamination fluids will be collected and contained in a 55-gallon drum for characterization and disposal.

Demobilization Activities

Demobilization activities include the return transport of field equipment and crew, and IDW disposal.

Excess soil from the sampling activity will be replaced into the area from which it was generated. Aqueous IDW, expected to consist of decontamination fluids, will be containerized in 55-gallon drums on secondary containment, which will temporarily be stored adjacent to Site 5. IDW drums will be labeled in accordance with the procedures outlined in the MPPs.

The IDW will be properly disposed of by subcontractors within 90-days of generation, based on the results of the waste characterization. Disposable equipment, including personal protective equipment (PPE), poly sheeting, and paper towels, will be disposed of as solid waste.

Sample Analysis and Data Validation

CH2M HILL will track the samples from collection through analysis and obtain results from the subcontracted laboratories. The analyses will be conducted at an off-site laboratory that fulfills all requirements of the Navy's Quality Assurance/Quality Control (QA/QC) Program Manual and U.S. Environmental Protection Agency's (EPA's) Contract Laboratory Program (CLP). A signed certificate of analysis will be provided with each laboratory data package, along with the applicable federal, state, and local regulations.

Off-site analyses will include the proper ratio of field QC samples recommended by Navy Facilities Engineering Service Center (NFESC) guidance for the data quality objectives (DQOs). The off-site laboratory will submit the data in hard copy and an electronic format that can be amended and readily incorporated into the geographic information system (GIS) management system for SJCA. The off-site laboratory has not been determined for this sampling event, however once the laboratory is identified, EPA will be notified.

The analytical results will be validated by a CH2M HILL subcontractor. Procedures used for the validation process will be in accordance with *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* (EPA, April 1993) and the *Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-Media Multi-Concentration* (EPA, 2004). Data that should be qualified will be flagged appropriately. Results for QA/QC samples will be reviewed and the data will be qualified further, if necessary. Finally, the data set as a whole will be examined for consistency, anomalous results, reasonableness, and utility.

The data validator will be provided with the hard copy and electronic version of the laboratory results and will add data validation qualifiers to both versions. The electronic version will be examined for completeness and accuracy and downloaded into the CH2M HILL master database.

Project Staff and Schedule

The CH2M HILL Activity Manager for SJCA is Ms. Kimberly Henderson and the Project Manager is Ms. Adrienne Jones. Activity and project management responsibilities include daily technical support and guidance, budget and schedule review and tracking, preparation and review of invoices, personnel resources, planning and allocation of resources, subcontractor coordination, preparation of monthly progress reports, and communication and coordination of events with the Navy and the project team.

Prior to initiating field activities, CH2M HILL will notify the Navy of the CH2M HILL staff and subcontracted personnel that will conduct the field investigations. The project schedule is dependent upon the schedule of each removal action phase conducted by JV I and JV II. The tentative schedule is as follows: Phase 1 of the removal action is scheduled to begin mid November 2007, Phase 2 the beginning of February 2008, and Phase 3 the beginning of April 2008.

Data Evaluation and Reporting

The analytical results will be compared against the cleanup goals established in the EE/CA (Table 1) and provided to the Navy and JVI and JVII project managers real-time. If the concentrations do not meet the cleanup goals, the 95% upper confidence limit (UCL) of the mean will be calculated for the samples, and if the 95% UCL of the mean is below the cleanup goal, no additional removal will be required and no additional samples will be collected. If the 95% UCL exceeds the cleanup goal, an additional 0.5 ft will be excavated and an additional confirmation sample will be collected and analyzed[1]. The process will be repeated until each confirmation sample meets the cleanup goal, or as otherwise directed by the Navy.

Following receipt of the validated data, the confirmation sampling results from all removal phases will be summarized in a Technical Memorandum. The report will include a narrative explanation of the activities conducted and data evaluation.

References

CH2M HILL, March 2003. *Final Remedial Investigation/Human Health Risk Assessment/Ecological Risk Assessment Report for Sites 3, 4, 5, and 6, St. Juliens Creek Annex, Chesapeake, Virginia.*

CH2M HILL, July 2003. *Final Master Project Plan, St. Juliens Creek Annex, Chesapeake, Virginia.*

CH2M HILL, February 2007. *Final Engineering Evaluation/Cost Analysis for Site 5 Waste/Burnt Soil Area and Impacted Surface Soil and Sediment Areas, St. Juliens Creek Annex, Chesapeake, Virginia.*

CH2M HILL, May 2007. *Final Work Plan for Delineation of Hot Spot Removal Areas at Site 5, St. Juliens Creek Annex, Chesapeake, Virginia.*

CH2M HILL, October 2007. *Draft Site 5 Hot Spot Delineation Technical Memorandum, St. Juliens Creek Annex, Chesapeake, Virginia.*

EPA, April 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses.*

EPA, March 2004. *Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-Media Multi-Concentration.* ILM05.3.

JVII, September 2007. *Draft Removal Action Work Plan, Site 5 Waste/Burnt Soil Area, St. Juliens Creek Annex, Chesapeake, Virginia.*

[1] Because the cleanup goal for lead is based on a site wide average, individual sample concentrations exceeding the cleanup goal will be evaluated on a case by case basis to determine if they will exceed the site wide cleanup goal.

Table 1
Summary of Background UTLs and Human Health Risk-Based Cleanup Goals for Soil
Confirmation Sampling Work Plan for Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex, Chesapeake, Virginia

COC	95% Background UTL for Dredge Fill Soil (mg/kg)	Human Health Risk-Based Cleanup Goals (mg/kg)
Arsenic	14	22
Copper	40	3,043
Lead	86	400*

Notes:
Recommended cleanup goals are shaded gray
* Average site-wide concentration
COC = constituent of concern
mg/kg = milligrams per kilogram
UTL = upper tolerance limit

Table 2
Analytical Methods and Required Containers, Preservatives, and Holding Times for Samples
Confirmation Sampling Work Plan for Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex, Chesapeake, Virginia

Analysis	Method	Sample Container	Holding Time	Volume of Sample
Soil Samples				
Select TAL Metals	CLP ILM05	8-oz plastic or glass bottle	6 months	Fill to shoulder
Aqueous QC Samples				
Select TAL Metals	CLP ILM05	1-liter polyethylene bottle	6 months	Fill to shoulder

Notes:
CLP = Contract Laboratory Program
QC = Quality Control
TAL = target analyte list

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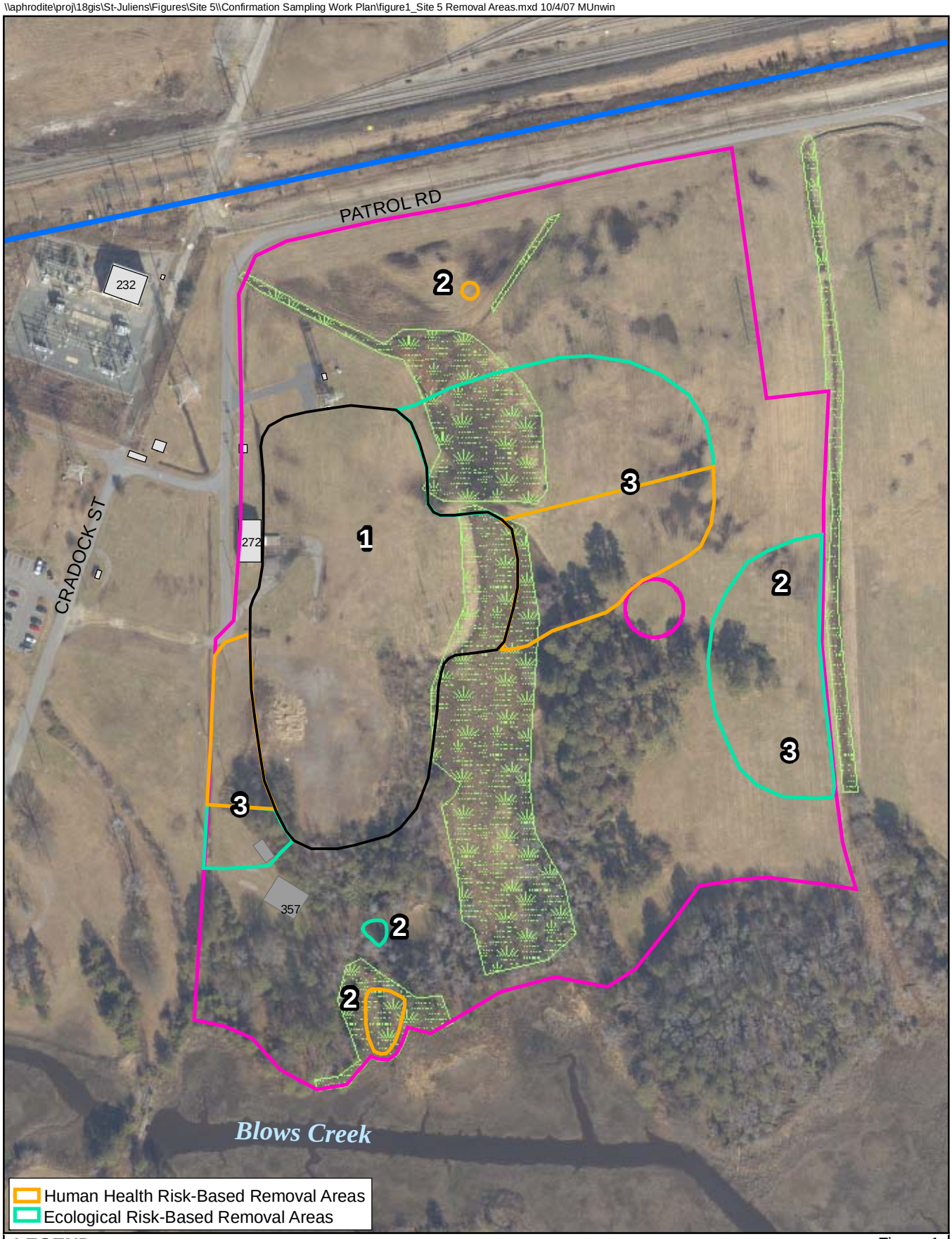

LEGEND

- SJCA Boundary
- Site 5 Boundary
- Site 5 Waste/Burnt Soil Area
- Existing Delineated Wetland Area
- Existing Buildings
- Former Buildings

Numbers represent removal action phase.

N

0 100 200 Feet

Figure 1
Removal Areas
Confirmation Sampling Work Plan
Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex
Chesapeake, Virginia

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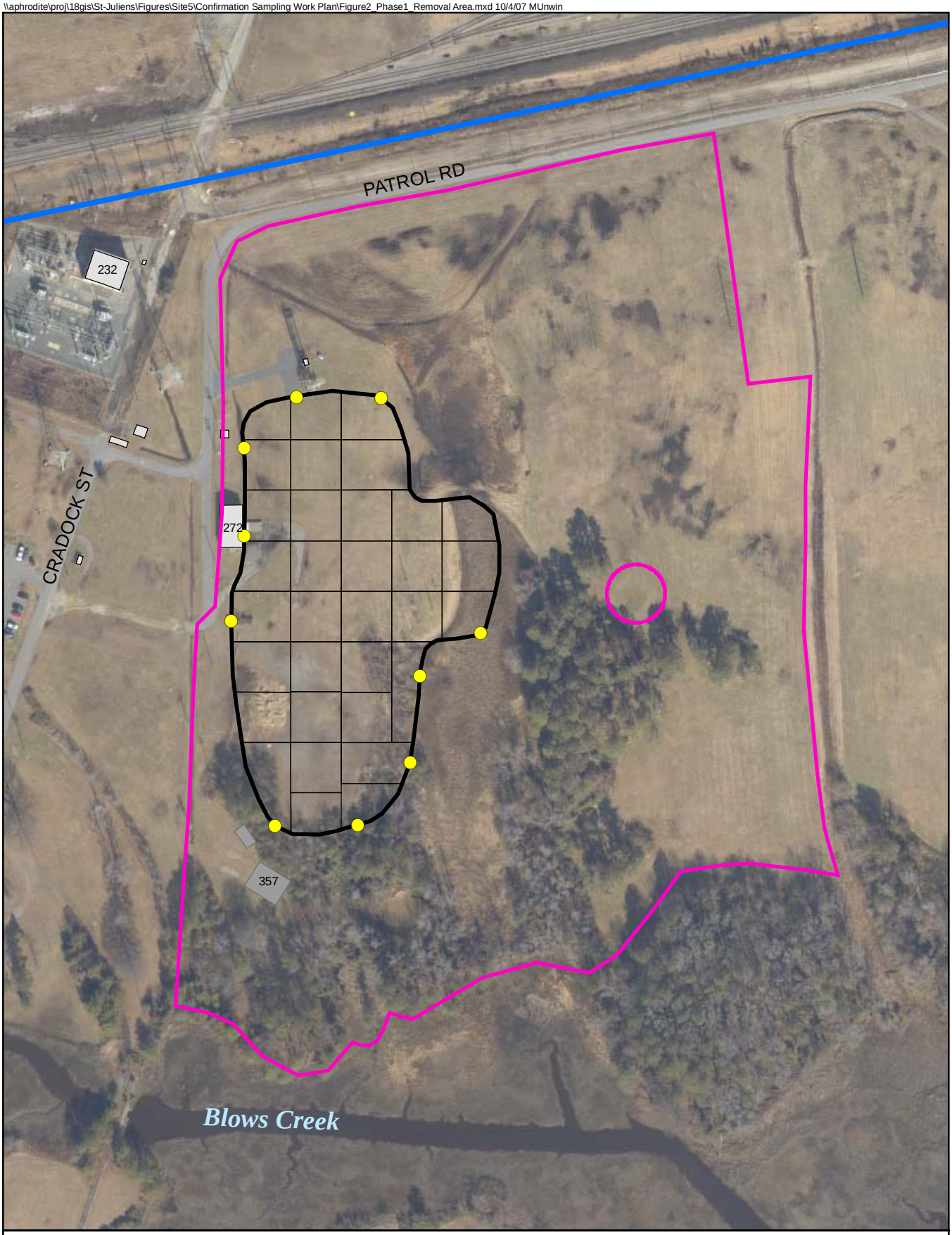

LEGEND

- SJCA Boundary
- Site 5 Boundary
- Site 5 Waste/Burnt Soil Area
- Existing Buildings
- Former Buildings
- Proposed Wall Samples
- 75' x 75' Approximate Grid System

N

0 100 200 Feet

Figure 2
Phase 1 Removal Area and
Approximate Confirmation Sample Locations
Confirmation Sampling Work Plan
Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex
Chesapeake, Virginia

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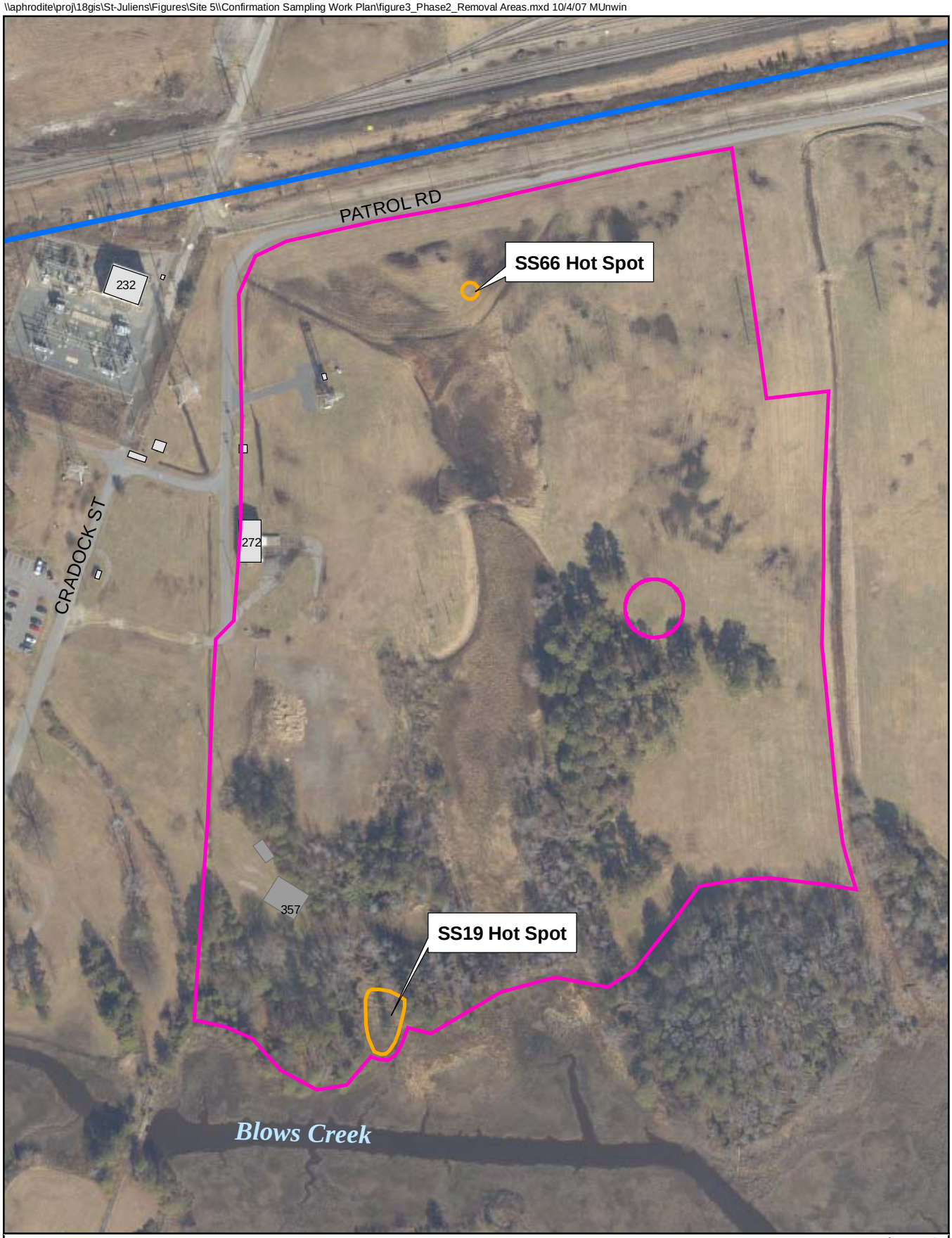

LEGEND

- SJCA Boundary
- Site 5 Boundary
- Human Health Risk-Based Removal Areas
- Existing Buildings
- Former Buildings

N

0 100 200

Feet

Figure 3
Phase 2 Removal Areas
Confirmation Sampling Work Plan
Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex
Chesapeake, Virginia

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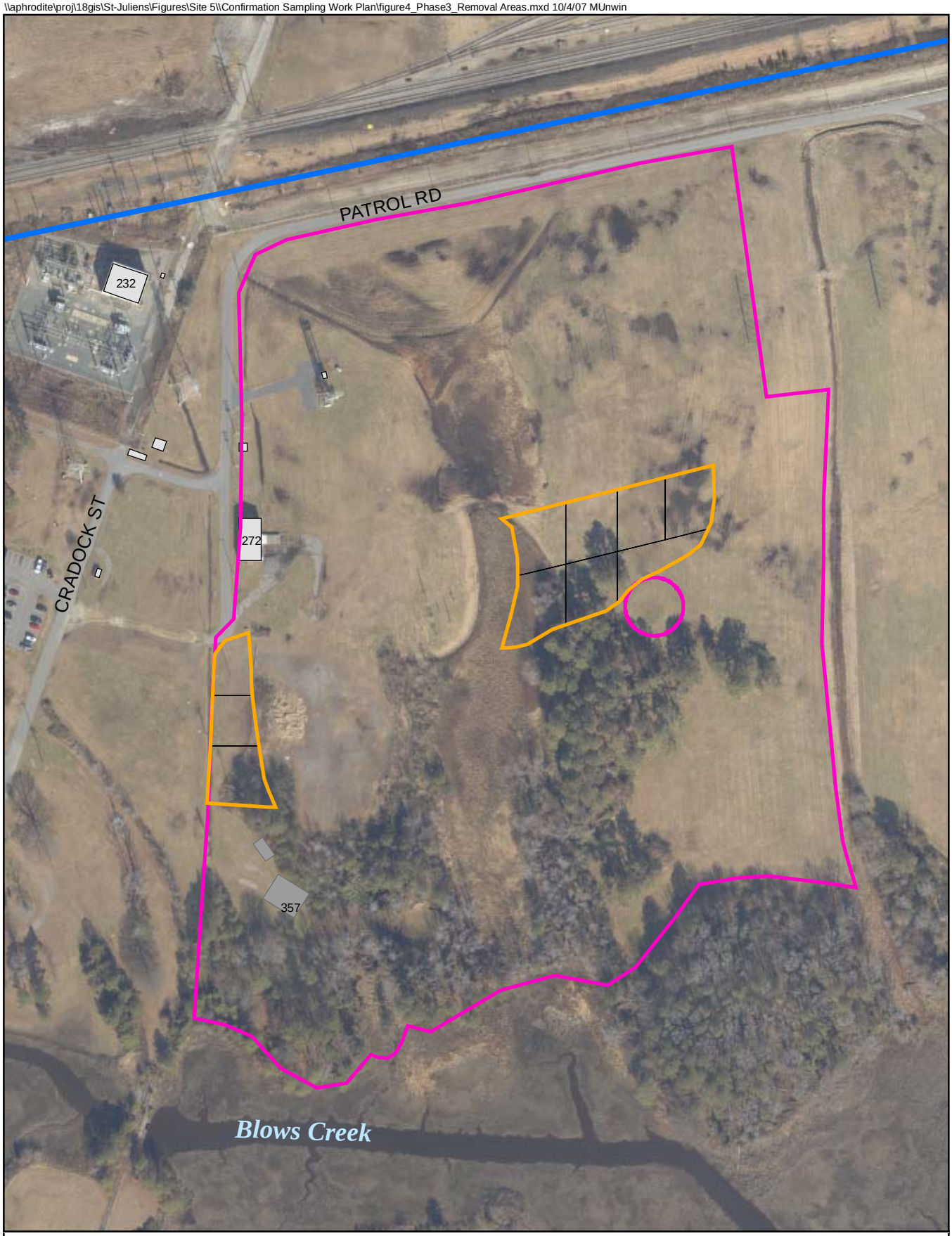

LEGEND

- SJCA Boundary
- Site 5 Boundary
- Human Health Risk-Based Removal Areas
- Existing Buildings
- Former Buildings
- 75' x 75' Approximate Grid System

N

0 100 200 Feet

Figure 4
Phase 3 Removal Areas and
Approximate Confirmation Sample Locations
Confirmation Sampling Work Plan
Site 5 Removal Action Phases 1 through 3
St. Juliens Creek Annex
Chesapeake, Virginia

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