Impact Area Groundwater Study Program

REVISED DRAFT

Small Arms Ranges
Soil Removal Activities Completion of Work Report

Camp Edwards
Joint Base Cape Cod
Cape Cod, Massachusetts

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CY	cubic yard
EPA	U.S. Environmental Protection Agency
IAGWSP	Impact Area Groundwater Study Program
ISM	incremental sampling methodology
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
mg/Kg	milligrams per kilogram
mm	millimeter
ppm	parts per million
SAR	Small Arms Range
SAR DD	Small Arms Ranges Decision Document
TCLP	toxicity characteristic leaching procedure
UCL	Upper Concentration Limit
XRF	X-Ray fluorescence

1.0 INTRODUCTION

The purpose of this Completion of Work Report is to document field activities associated with the soil removal actions carried out by Impact Area groundwater Study Program (IAGWSP) at ten Small Arms Ranges (SARs) located at Camp Edwards, Joint Base Cape Cod. The basis for these actions and the data used to determine the need for these actions are presented in the January 2014 Final Small Arms Range Investigation Report (SAR IR). In the report several areas were identified where specific metals concentrations in soil exceeded applicable standards. The September 2015 Small Arms Ranges Decision Document (SAR DD) requires that response actions be completed to address these areas (EPA 2015).

The SAR DD indicated that the levels of lead and antimony observed in soil at the operational SARs were, in most cases, below the applicable action levels and that the overall results or groundwater sampling indicated that the SARs were not currently a source of groundwater contamination; however, that additional action was needed to address residual soil contamination at certain operational and non-operational ranges, including B, Former B, C, Former C, Former D, G, KD East, N, Former N and Former M2 Ranges, since elevated levels of small arms-related metals (including antimony, lead, and tungsten) existed in some surface soils that pose a threat to groundwater, and in some instances a future health risk for direct contact depending on future range use (EPA 2015).

According to the SAR IR, the nature of the soil at Joint Base Cape Cod serves to retard the migration of most metals detected in surface soils at the SARs. In particular, lead is relatively strongly sorbed by subsurface soils and is not anticipated to undergo rapid downward migration through range subsurface soils to groundwater. Given depths to groundwater of approximately 100 feet, models have predicted it will take in excess of 100 years to reach groundwater. There is relatively limited data available in the literature on the environmental behavior of antimony; however, available information suggests that antimony is more mobile than lead under certain soil chemical conditions. Data also suggest that the migration of tungsten in subsurface soils may be more complex than that of most other metals at the SARs and literature describing the geochemistry suggests that dissolved tungsten migrates as a tungstate anion and under certain conditions as a poly-tungstate species. These forms can be soluble under some conditions (IAGWSP 2014).

The ten ranges where soil was removed as part of this action include B, Former B, C, Former C, D, Former D, G, Former M2, N and Former N Ranges. Note that soil was removed from D Range (not included in the recommendations in SAR IR, nor in the requirements in the SAR DD) in anticipation of a future change in the status of the range and follow-up surface soil sampling results, while no soil removal was necessary at KD Range East based on follow-up sampling results. The scope of these removal actions and associated soil sampling are presented in the following Project Notes, copies of which are included in Appendix A:

- The Sampling, Soil Removal and Monitoring at Small Arms Ranges Project Note (12 May 2014) defined soil excavation, soil sampling, groundwater monitoring, and other activities planned for SARs at Camp Edwards. Ranges included for surface soil sampling and/or soil removal were B, Former B, C, Former D, G, KD East, N, Former N, and Former M2 Ranges (IAGWSP 2014b).

- In August 2014, the Addendum to the May 2014 Project Note for “Sampling, Soil Removal,

and Monitoring at Small Arms Ranges" was issued clarifying and/or updating soil removal extents for lead-impacted soil at Former B, Former D and G Ranges based on changes to the S-1/GW-1 lead cleanup standard (from 300 mg/Kg to 200 mg/Kg) promulgated by the Massachusetts Department of Environmental Protection (MassDEP) in the Massachusetts Contingency Plan (MCP) effective April 25, 2014. The addendum also proposed surface soil sampling at Former C Range (IAGWSP 2014c).

- In December 2014, the Second Addendum to the May 2014 Project Note for "Sampling, Soil Removal, and Monitoring at Small Arms Ranges" was issued specifying additional surface soil sampling at B, Former B, Former C, G, N and Former D Ranges and subsurface soil sampling at Former C Range. In addition, it updated the extent of soil removal at B, Former B, Former D, G, Former M2 and N Ranges based on the results of surface soil sampling prescribed in the May 2014 Project Note and August 2014 Addendum. The Second Addendum also included the results from soil sampling prescribed in the May 2014 Project Note and August 2014 Addendum (IAGWSP 2014d).

- In June 2015, the Third Addendum to the May 2014 Project Note for "Sampling, Soil Removal, and Monitoring at Small Arms Ranges" was issued specifying additional surface soil sampling at Former B Range and sub-surface soil sampling Former C Range. In addition, it updated the extent of soil removal at Former B, Former C, Former D, G and N Ranges based on the results of surface soil sampling prescribed in the December 2014 Second Addendum. The Third Addendum also included the results from soil sampling prescribed in the December 2014 Second Addendum (IAGWSP 2015b).

- In February 2016, the Fourth Addendum to the May 2014 Project Note for "Sampling, Soil Removal, and Monitoring at Small Arms Ranges" was issued specifying additional soil sampling and excavation areas at Former B Range based on the results of surface soil sampling prescribed in the June 2015 Third Addendum and at D Range. The Fourth Addendum also included the results from soil sampling prescribed in the June 2015 Third Addendum (with the exception of subsurface soil sampling at Former C Range, which was reported via a 29 July 2015 email to the U.S. Environmental Protection Agency (EPA) and MassDEP at the 30 June 2015 Technical Update Meeting) and surface soil sampling at D Range (IAGWSP 2016).

- In March 2016, the Fifth Addendum to the May 2014 Project Note for "Sampling, Soil Removal, and Monitoring at Small Arms Ranges" was issued specifying additional soil sampling and excavation areas at Former B and D Ranges based on the results from soil sampling prescribed in the February 2016 Fourth Addendum. The Fifth Addendum also included the results from soil sampling prescribed in the February 2016 Fourth Addendum (IAGWSP 2016b).

Soil sampling results used to determine the horizontal extent of excavation, along with soil removal areas (grids) based on the results, were included in the above project notes, with the following exceptions: Results of subsurface soil sampling at Former C Range prescribed in the February 2016 Fourth Addendum were reported in a 29 July 2015 email to EPA and MassDEP and at the 30 June 2015 Technical Update Meeting. Detailed results of surface soil delineation sampling proposed at Former B and D Ranges in the Fifth Addendum, along with additional excavation areas based on these results, are included along with a brief discussion of the results in the aforementioned project note and addendums, in Section 3.1 of this report.

The purpose of these removal actions was reduce lead, antimony and tungsten concentrations remaining in the soil to levels appropriate for unrestricted use of these sites in the future, regardless of their operational status.

2.0 SITE HISTORY AND BACKGROUND

2.1 General Small Arms Ranges History and Background

The SARs at Camp Edwards include locations where small arms ammunition has been used since World War II. The ranges have been used for a variety of small arms training, including pistols, rifles, shotguns, sub-machine guns and machine guns. The SARs are located around the Impact Area with firing generally towards the Impact Area (Figure 1). Typical components of most SARs include one or more firing lines, a range floor, target arrays, and an impact berm. The impact berms usually include the berm face frequently containing bullet pockets and a trough at the base of the berm. The types of small arms ammunition historically used at the ranges included 5.56 millimeter (mm) ball, 9 mm, .30 caliber, .45 caliber, .50 caliber, 7.62 mm ball and tracer rounds. Several of the older SARs at Camp Edwards do not include the typical range features or a formal impact berm. For several of these ranges, natural terrain hillsides were used as backstops in conjunction with or in place of man-made berms. Additional operational and remediation history of the SARs are included in the SAR IR (IAGWSP 2014).

Several response actions have been undertaken at the SARs to reduce propellant and metals impacts to soil and to limit the mobility of the contaminants. A berm maintenance program was implemented in 1998 to remove lead projectiles and to chemically fix leachable lead remaining in soil. In 2006, a berm maintenance project was undertaken to address concerns related to the use of tungsten-containing bullets at certain SARs. Soil removal actions were conducted in 2006, 2007, 2008, and 2009 to eliminate or reduce small arms related propellants and metals. In 2013 additional soil investigations were performed at the SARs, including incremental sampling methodology sampling for laboratory analyses and X-Ray Fluorescence (XRF) screening. Hundreds of soil samples were taken from backstop berms and at firing lines at 28 ranges. Samples were analyzed for small arms range metals and propellants. Analytical results indicate that antimony, lead, and tungsten existed in soil above MCP standards at certain ranges and additional action in these areas, as documented in this report, was determined to be necessary (IAGWSP 2014).

The types of the ranges at Camp Edwards can be divided into three categories; operational and active, operational but inactive and non-operational ranges. Operational and active ranges are ranges where firing is currently permitted and an Operations, Maintenance and Monitoring Plan is in place. The selected SARs included in this report are classified as either operational but inactive or non-operational, as defined below:

Operational Ranges (Inactive): B, C, D, G, KD East, N and Former N Ranges are classified as operational but inactive ranges. These are ranges that are not currently in use, but given their configuration and location could be used again for small arms firing. They would need to go through an approval process in order to resume firing, including the development and implementation of an Operations Maintenance and Monitoring Plan.

Non-operational Ranges: Former B, Former C, Former D and Former M2 Ranges are classified as non-operational ranges. These ranges have not been utilized for decades and are situated in such a manner where development and activities, which now exist within their firing fans, would preclude their use. It is unlikely these ranges will be used again for small arms firing.

Potential sources of SAR contaminants include propellant-related compounds deposited on the surface in the vicinity of firing lines and projectile-related compounds deposited on the surface at, and in the vicinity of, range backstops. Propellant-related compounds consist, in part, of a suite of semi-volatile organic compounds produced by the combustion of small caliber ammunition propellants. Projectile-related residues consist mainly of the metallic constituents of various alloys used in the manufacturing of small caliber rounds. Lead compounds (including lead antimony alloys) are primary constituents of most small arms ammunition. Lead may comprise in excess of 50 percent of the weight of certain small arms ammunition and is the primary metal of environmental concern. Certain additional metals, including antimony, may be present to increase projectile hardness. Copper is often used as a jacket around the projectile's lead core. Tungsten ammunition was also used at B, C and G Ranges at Camp Edwards during the time period from 2000-2006 (IAGWSP 2014).

Propellant-related contamination was addressed during previous soil removal actions. This report summarizes remedial actions performed to remove projectile-related contamination, specifically lead, antimony and/or tungsten contaminated soil, from select SARs to facilitate site closure.

Except for tungsten, the SAR DD based target cleanup levels for the operational ranges on the MCP Upper Concentration Limits (UCLs). However, in most cases, exceedances of stricter MCP S-1/GW-1 standards were used to determine areas for soil removal during this action to allow for unrestricted use, regardless of the operational status of the range. The Massachusetts Interim Guidance Level was used to determine areas for tungsten. Listed below are the standards used to determine soil removal during this action:

- Antimony - 20 mg/Kg (MassDEP S-1/GW-1)
- Lead - 200 mg/Kg (MassDEP S-1/GW-1)
- Tungsten - 160 mg/Kg (Massachusetts Interim Guidance Level)

2.2 Specific Range History and Background

B Range

B Range is an inactive operational 25-meter rifle and pistol range located on Burgoyne Road just south of Wood Road. It was constructed in 1991 for M16 rifle and pistol training. Ammunition authorized for this range includes 5.56 mm ball and tracer rounds (M16 rifles) and .45 caliber and 9 mm ball rounds (pistols). The range last supported 55 firing points. The firing points were evenly spaced at 11-foot intervals along the 615-foot long firing line. The target line was positioned 82 feet (25 meters) from the firing line. Numerous plastic 5.56 mm projectiles were present in the backstop berm, which was located approximately 5 feet beyond wooden target frames. This backstop was treated during the 1998 Berm Maintenance Program and soil removal was performed under the 2006 Berm Maintenance – Tungsten Removal Project. Stressed vegetation at the former firing line and erosional features in the former backstop berm suggest that the central firing points were the most frequently used during training activities at this range (IAGWSP 2014).

Former B Range

Former B Range is a non-operational small arms range located on the northern side of Monument Beach Road in Training Area B-8. The range, originally referred to as the Monument Beach Road 1000-inch range and the 1000-inch Machine Gun "A" Range, was constructed sometime between 1935 and 1941 for use as a machine gun and pistol training range. It continued to be used in this manner until sometime in the 1950s. The existing natural hillside used as a backstop at this range was reworked sometime after 1941 to increase the size of the range. A dividing earthen berm was constructed to separate the range into two portions so that training activities on either side could be performed independently. Machine gun targets were positioned at the base and on the slope of the hillside. Pistol targets were located at 15 and 25 yards from the firing line. Documented ordnance use during the first 15 years of use includes .30, .38, .45, and .50 caliber ball rounds (IAGWSP 2014).

Between 1955 and 1967 Former B Range was used exclusively as a pistol range and was configured with 30 firing points at both 15 and 25 yards from targets. Records indicate .38 and .45 caliber rounds were fired during this time. In 1967, the range was converted to a 1,000-inch rifle range with 25 to 27 firing points along the firing line. Former B Range was used in this manner until the early 1980s, when it was converted to a mortar firing position (Old Mortar Position-2). Reported ammunition use during this period includes .30 caliber, 5.56 mm, and 7.62 mm rounds. Physical evidence of the Former B Range firing line has been obscured by a subsequently-operated composting area. A hillside and earthen berm described in historical documents remain visible and are located to the east beyond the compost stockpiles. The presence of small arms projectiles discovered in the hillside and pockmarked boulders is consistent with historical records. Soil removal at Former B Range was included in the 2009 and 2010 lead removal actions (IAGWSP 2014).

C Range

C Range is an inactive operational rifle and pistol range located on Burgoyne Road just south of B Range. The range is nearly identical in construction to the B Range and was built sometime between 1986 and 1989. Ammunition authorized for this range includes 5.56 mm ball rounds (M16 rifle) and all caliber pistol rounds (IAGWSP 2014).

The range was comprised of 55 evenly spaced firing points along a 615-foot-long firing line. Like the B Range, targets were positioned 82 feet (25 meters) downrange. An earthen backstop berm was present behind target frames on the southern half of the range; the northern half of the range (firing points 1 through 29) had no backstop. Numerous plastic 5.56 mm rounds were present on the surface of the backstop. The most frequently used firing points appear to be concentrated in the center of the range. The existing backstop berm was treated during the 1998 Berm Maintenance Program and soil removal at the range was performed under the 2006 Berm Maintenance – Tungsten Removal Project (IAGWSP 2014).

Former C Range

Former C Range is a non-operational small arms range located on the northern side of Frank Perkins Road on the western side of Training Area B-7 southeast of Former B Range. The range, originally referred to as Machine Gun "B" Range, was constructed sometime between 1935 and 1941, and used until the 1950s for machine gun training. Reported ammunition use at this range

between the 1940s and 1950s includes .30 and .50 caliber ball and tracers rounds (IAGWSP 2014).

Between the 1950s and early 1960s Former C Range was converted to a 1000-inch machine gun range. During this time .50 caliber ball rounds were fired from 20 separate firing points. In the early 1960s the range was again converted to a 1000-inch rifle range and was configured with 40 firing points. Ammunition fired during this period included .30 caliber, 5.56mm, and 7.62mm ball rounds. It continued to be used in this manner until the early 1980s at which time 15 additional firing points were added to the firing line. Training activities ceased at Former C Range sometime between 1986 and 1989. Based on topography and historical aerial photographs, it appears that weapons were fired from a southwestern firing line somewhere near the current parking area towards a bowl-shaped, natural embankment located in the northeastern portion of the range. Numerous bullet fragments consisting mostly of 7.62 mm (or possibly .30 caliber) and .50 caliber have been discovered at the top of this embankment. Boulders in the face at the top of this slope also exhibit significant pockmarking similar to that discovered at Former B Range and presumed to be the result of past bullet impacts. Few projectile fragments have been found on the middle and lower portions of the embankment suggesting targets were positioned at the top of the slope (IAGWSP 2014).

D Range

D Range is an inactive operational M60 machine gun training range located just south of C Range on Burgoyne Road. The range was established sometime between 1986 and 1989 as a machine gun zeroing range designed to accommodate 7.62 mm ball rounds. The range had eight firing points positioned along an 83-foot long firing line. Target frames were located 33 feet (10 meters) downrange of the firing line, and the backstop, which was treated during the 1998 Berm Maintenance Project, appears to have been constructed out of the natural hillside just beyond the target frames. Approximately 4,150 cubic yards of soil associated with the 2009 Lead Removal Program at various SARs were stockpiled directly in front of the D Range backstop berm in 2011 (IAGWSP 2014).

Former D Range

The Former D Range is a non-operational small arms range located on the northern side of Frank Perkins Road at Pine Hill just northwest of the Camp Edwards Range Control building. The range, also referred to in the past as the Anti-Aircraft Miniature Range, was originally constructed sometime between 1935 and 1941 for use as an anti-aircraft miniature rifle range. It continued to be used this way until the 1950s. Ammunition used during this time was limited to .22 caliber ball rounds (IAGWSP 2014).

As with Former C Range, the range was converted in the 1950s to a 1,000-inch machine gun range. During this time, the range was configured with 20 firing points from which .50 caliber ball rounds were fired. Former D Range continued to be used as a machine gun range until the early 1960s. Between the early 1960s and late 1980s, the range was converted to a rifle range. Ammunition fired from the 44 firing points included .30 caliber and 7.62 mm ball rounds (IAGWSP 2014).

The clearing located at the southern end of this range was most recently used as a pistol range. An earthen berm constructed a short distance from the parking area served as a backstop to this range. There are several cleared areas located downrange of the original firing line that are

arranged in a semicircular arc leading from one end of the former firing line, downrange, and back to the other. The terrain surrounding these clearings consists of a scrub pine forested area. Several of the clearings are located on the southwestern slopes of small topographic rises within the downrange area. Numerous .30 caliber bullet fragments, consistent with past range use, have been found on the ground surface within several of these clearings. Soil removal at Former D Range was included in the 2009 lead removal action (IAGWSP 2014).

G Range

G Range is an inactive operational rifle and machine gun training range located on Pocasset-Forestdale Road. The range, which was constructed in the late 1980s, was designed for M16 rifle and M60 machine gun training. Ammunition authorized for use at this range includes 5.56 mm and 7.62 mm ball rounds (IAGWSP 2014).

There were 27 firing points positioned along the range's 185-foot long firing line. The distance from firing line to target frames measured 85 feet (approximately 25 meters). An earthen backstop berm, which extended the full length of the range, was situated 23 feet downrange of the target frames. Plastic 5.56 mm projectiles existed on the up-range face of the berm. Further downrange, in a cleared area beyond the backstop berm, metallic small arms projectiles and projectile fragments were also been discovered. Bare spots at the firing line and erosion in the face of the backstop at the firing line suggested the centrally located firing points were most frequently used. The backstop berm was treated during the 1998 Berm Maintenance Program and soil removal was included in the 2006 Tungsten Removal Project (IAGWSP 2014).

KD Range East

KD Range is an active operational range located on Pocasset-Forestdale Road east of the K Range. This range, originally known as the CTR-1 and CTR-2 Aerial Gunnery Range, was constructed in the mid-1970s. It received its KD (known distance) designation in the mid-to late-1980s and was used for rifle, grenade launcher, and missile training exercises. KD Range consists of two separate parallel ranges: KD Range (East) and KD Range (West). KD Range (West) was used for a variety of types of ordnance, including TOW missiles and 90 mm recoilless rifle HEAT rounds, and it was evaluated under the Training Areas Operable Unit (IAGWSP 2014).

A 600-meter known distance rifle range is situated on KD Range (East). The range consists of six mounded firing lines, each having 20 firing points, positioned at various distances from a raised target line. Five firing lines are spaced at regular 100-yard intervals from the target line (i.e., positioned 100 through 500 yards from the targets). The sixth firing line berm was situated between the 300- and 400-yard firing lines at 100 meters from the targets. Known ordnance use at this range includes 5.56 mm and 7.62 mm ball and tracer rounds. Shell casings (5.56 mm) are present on most of the raised firing lines. Target frames are positioned at the top of a 12-foot high earthen berm located at the end of the range. The face of this target berm was treated during the 1998 Berm Maintenance Program (IAGWSP 2014).

Several abandoned Coast Guard boat hulls were discovered during the inspection of a vegetated area located downrange of the target berm. Other items found with the boat hulls included several empty 55-gallon steel drums, a junked diesel generator, scrap metal, and a cluster of expended teargas grenades. The larger items discovered (i.e., boat hulls, a generator and drums) are thought to have been intended for use as future targets for the Camp Edwards Impact Area (IAGWSP 2014).

Former M2 Range

The Former M2 Range is a non-operational small arms training site located on the original Greenway Road northeast of the Former M-1 Range. Records indicate this range was also used for .45 caliber submachine gun, rifle grenade, and mortar training in the 1940s. The range has been used to stockpile soil and construction debris. The remnants of a north-south-trending earthen berm are located on the western side of the stockpiling area. It measures approximately 10 feet in elevation at its highest point and runs for approximately 250 feet. It is presumed, based on the presence of numerous .45 caliber projectiles on the surface, to be the original backstop to the Former M2 Range. This particular backstop was not treated during the 1998 Berm Maintenance Program. Steel pole brackets spaced at 8-foot intervals positioned on the eastern side of the berm are presumed to be the original target mounts. Based on this spacing and the length of the berm, the range may have accommodated as many as 30 firing points. The firing line was likely located in what is now an open area where construction materials have been stockpiled. Soil removal at the Former M2 Range was included in the 2009 lead removal action (IAGWSP 2014).

N Range

N Range is an inactive operational 25-meter rifle training range located on the western side of Greenway Road near the J-2 Range. Sometime between 1986 and 1989 the N Range was constructed at its present location. The range has 55 firing points positioned along its 378-foot long northeast–southwest trending firing line and target frames are located 25 meters downrange. An 8-foot high backstop berm, which was treated during the 1998 Berm Maintenance Program, is located approximately 13 feet west of the target frames. Records indicate that 5.56 mm ball and tracer rounds have been authorized for use there. Numerous plastic 5.56 mm projectiles are present on the up-range face of the backstop (IAGWSP 2014).

Former N Range

Former N Range is an inactive operational range that is located to the immediate east of Sierra East Range, to the south of Gibbs Road. It was designated as a night assault course until the early 1970s and utilized only blank small arms ammunition. Site reconnaissance on this range in 2013 indicated the presence of several target mounds Historic aerial photography (1977) and a range map indicate that this range was used as an individual reaction course which included a total of six or seven target mounds. Two of the target mounds were removed when Sierra East range was constructed (IAGWSP 2014).

3.0 FIELD ACTIVITIES

Soil removal fieldwork at the SARs was performed from October 2015 through October 2019. Activities included delineation sampling, vegetation clearance, excavation and stockpiling, post-excavation sampling, waste characterization sampling, off-site transportation and disposal of soil and site improvements. In addition, a stockpile of approximately 4,150 cubic yards of soil staged at D Range resulting from soil sifting performed at the Former D Range, and which was associated with the 2009 Lead Removal Program at various SARs, was characterized for waste disposal parameters and disposed off-site. These activities are summarized below.

3.1 Delineation Soil Sampling

Delineation soil sampling performed to determine the extent of soil removal at the SARs was included in the SAR IR, the aforementioned project note and project note addendums. A summary this sampling and any additional sampling used to determine the extent of excavation at each of the SARs where soil was removed is discussed below. A summary of confirmation sampling performed at KD Range East, where soil removal was not necessary during this action, is also included. As discussed above, results of surface soil delineation sampling proposed in the Fifth Addendum at Former B and D ranges, along with additional sampling and excavation areas based on the sampling results are also discussed below. These results, along with previous delineation sampling results used to determine the areas for soil removal at the specific SARs as part of this action are included on Figures 2-12. (Note that sampling results for XRF sampling grids shown on Figures 2, 4 and 8 and discussed below are included in Table 1.)

<u>B Range</u>

The face of the B Range backstop berm and the area behind the berm were sampled to determine metals concentrations in grids spanning the length of the berm in 2013. Sampling consisted of XRF screening (with confirmatory off-site laboratory analyses) in the face of the berm and incremental sampling methodology (ISM) samples directly in back of the berm. The results indicated elevated (above applicable standards) lead concentrations in the center and southern portion of the berm face and in the three grids spanning the back of the berm, with the highest concentration in the center grid (grid BR02A). The SAR IR recommended limited soil removal on the face of the berm and in back of the berm. To define the extent of excavation additional delineation samples were collected from a grid (BR02DR), established directly in back of grid BR02A, where lead concentration were again observed at elevated, although lower concentrations. Samples collected from a grid established directly in back of grid BR02DR contained lead and other metals concentrations below applicable standards. The establishment of additional sampling grids was limited to the center of the berm, as 2013 results from the samples collected on the northern and southern grids directly in back of the berm indicated that the highest metals concentrations were located in the center section. It was determined that soil would be removed from five grids on the face and in back of the backstop berm. Associated delineation sampling grids and ISM sampling results are shown on Figure 2. Results for XRF grids shown on Figure 2 are included in Table1.

<u>Former B Range</u>

The soil excavation project to remove bullets from Former B Range in 2009 did not include the location of sample SS140L at the base of the hillside slope on the southern end of the range which, in 2002, had elevated lead concentrations in discrete samples. In accordance with recommendations in the SAR IR additional ISM samples were collected to confirm that the soil

removal action was complete. An ISM sample was collected from a grid (FBR140L) subsequently established over this location. A second ISM sample was collected from a grid (FBR140QR) established north of grid FBR140L and at the base of the slope where lead was also reported at elevated concentrations in discrete samples collected in 2002.

Lead concentrations in ISM samples collected from grids FBR140L and FBR140QR were elevated so additional grids were sampled to determine the horizontal extent of contamination in these areas. The grids included FBR03 to the east of FBR140QR and FBR04, 05 and 06 to the north, south and east of FBR140L. Based on the lead concentrations observed in these samples additional grids (FBR07-23) were established and sampled in an iterative process to delineate the horizontal extent of contamination along the base of the hillside and on the hillside backstop, as detailed in the aforementioned project note addendums, with the exception of the sampling described in more detail below, which was performed after the fifth and final project note was issued. Additional delineation surface soil samples were collected from six grids (FBR18-23) at Former B Range, shown on Figure 3, in order to define the extent of lead contaminated soil observed in adjacent grids and to confirm historic discrete sampling results in the area. ISM samples (50-point) were collected from grids FBR18 and FBR19, and 100-point ISM samples were collected from grids FBR20-23. Replicate samples (three samples total) were collected from grid FBR18. All samples were collected from a depth of 0-3 inches below ground surface (bgs) and submitted for lead analysis.

Lead concentrations in the samples collected from grids FBR18 and FBR20 exceeded the actionable level and excavation was required. Lead concentrations in the other four grids were below the actionable level and no further action was required. Associated soil sampling results are presented in Table 2.

Based on the relatively lower lead concentrations observed in samples collected from the outer-most extents of the base of the hillside and hillside backstop of the range it was determined that the horizontal extent of contamination had been adequately defined and that soil would be removed from a total of 18 grids on and at the base of the hillside backstop. All associated delineation sampling grids and associated ISM sampling results are shown on Figure 3.

C Range

The face of the C Range backstop berm and the area behind the berm were sampled to determine metals concentrations in grids spanning the length of the berm in 2013. Sampling consisted of XRF screening (with confirmatory off-site laboratory analyses) on the face of the berm and ISM samples directly in back of the berm. Elevated concentration of lead were observed in the samples collected from grids extending from the center to the southern extent of the berm face and in the center directly in back of the berm. Based on this, limited soil removal on the berm face and behind the berm was recommended in the SAR IR. To determine the horizontal extent of soil removal in back of the berm an ISM sample was collected from a grid (CR02DR) located south of 2013 sample grid CR04A, and grid CR04 was divided into two smaller grids (CR04N and CR04S) and sampled to better characterize concentrations of lead and tungsten. Based on declining lead and tungsten concentrations observed from the additional samples collected in back of the berm it was determined that the limits of soil removal had been adequately defined and that soil would be removed from a total of nine grids on and behind the backstop berm. Associated delineation sampling grids and ISM sampling results are shown on Figure 4. Results for XRF grids shown on Figure 4 are included Table1.

Former C Range

No further action was recommended at Former C Range in the SAR IR, however, in anticipation of a future change in the status of the range, ISM samples were collected from a grid (FCR136) established along the top of the bowl-shaped, natural target embankment located in the northeastern portion of the range, in an area where elevated concentrations of lead were observed in discrete sample collected in 2002. Based on the elevated lead concentrations observed in these samples, grids (FCR02-06) surrounding FCR136 were established and sampled to better define the extent of elevated lead concentrations, as detailed in the aforementioned project note addendums. Sub-surface samples were also collected from grids FCR136, FCR02, FCR03 and FCR07 as shown on Figure 5. Based on the average concentrations observed it was determined horizontal delineation was complete and that soil removal would be performed in grid FCR136. Associated delineation sampling grids and ISM sampling results are shown on Figure 5.

D Range

The SAR IR recommended no further action at D Range, assuming it's status would remain operational and would continue to be used as a SAR. However, in anticipation of a future change to the status and use of the range, additional delineation sampling to determine areas for soil removal was performed. A discrete sample collected in 2002 from directly in front of the backstop berm, where soil from the 2009 Lead Removal Program was subsequently stockpiled, showed elevated concentrations of lead. An ISM sample collected in 2013 from a grid (DR01) directly behind the backstop berm also contained elevated lead concentrations. Based on this, additional ISM samples were collected for lead analysis from a grid (DR02) located directly behind grid DR01. The results showed declining, although still elevated, concentrations of lead, so additional grids (DR03-09) directly in back of and on each side of grid DR02 were established and sampled in an iterative process to determine the horizontal extent of elevated lead concentrations in the soil. This sampling is detailed in the aforementioned project note addendums, except for the sampling described in more detail below, which was performed after the fifth and final addendum was issued.

Additional delineation surface soil samples were collected from four grids (DR06-09) at D Range, shown on Figure 6, to further define the extent of lead contaminated soil. Grids DR07-09 were sampled to determine the extent of contamination associated with grids DR03 and DR04. However, to determine the extent of contamination associated with grid DR05, which extends beyond the southern boundary of the D Range and into the adjacent E Range (based the location of a steep berm separating the two ranges), a new grid, DR06, bordering grids DR01 and DR02, and extending to the range's southern boundary, as defined by the ridge line of the berm separating the two ranges, was sampled. This newly established grid replaced DR05 for determining follow-up actions.

A 50-point ISM sample was collected from grid DR07 and 30-point ISM samples were collected from grids DR06, DR08 and DR09. Replicate samples (three samples total) were collected from DR08. All samples were collected from a depth of 0-3 inches bgs and submitted for lead analysis.

The lead concentration in the sample collected from DR06 was elevated, and excavation was required. Lead concentrations in the other three grids were all below the actionable level, and no

further action was required. Associated soil sampling results are presented in Table 2 and included on Figure 6.

In addition to the aforementioned delineation sampling, samples were collected from a low-lying area at western end of D Range, where sediment had deposited by erosion from D Range and the newly constructed E Range berm along the southern border of D Range. Initially, a single 100-point ISM surface (0-3 inches bgs) soil sample was collected for lead analysis from this area, designated as grid DRNG02. The lead concentration from this sample was below the actionable level.

To confirm the results of the initial sampling, two additional multi-increment samples were collected for lead analysis from grid DRNG02. One 100-point sample was again collected from the surface (0-3 inches bgs) and one 30-point multi-increment sample was collected from the bottom 3 inches of the vertical extent of the sediment, which ranged from approximately 6 inches to 12 inches bgs. Lead concentrations in the additional 100-point surface sample and the 30-point subsurface sample were below actionable levels and no further action was required. Associated soil sampling results are presented in Table 2 and included on Figure 6.

Based on the relatively lower lead concentrations observed in samples collected from the outer-most extents from in back of the backstop berm it was determined that the horizontal extent of contamination had been adequately defined and that soil would be removed from a total of six grids in front of (including the stockpiled soil), on and behind the backstop berm. All associated delineation sampling grids and associated ISM sampling results are shown on Figure 6

Former D Range

The SAR IR recommended additional ISM sampling at Former D Range to confirm that soil removal at D Range was complete. The soil excavation project to remove bullets from Former D Range in 2009 did not extend to certain down range discrete sample locations, which in 2002 had elevated lead concentrations. Based on the elevated lead ISM sample concentration from two grids (FDR135GT and FDR135U) established over these locations additional grids (FDR05-07) were established and ISM samples were collected to determine the extent of lead contamination in areas that had not previously been excavated. It was also determined that previously excavated grids D1-AA, D1-AB and D1-AC required further excavation based on 2010 post-excavation sampling results exceeding the newly established lead standard. It was determined that soil would be removed from a total of eight grids on and downrange from the backstop berm. This sampling along with the sampling results are detailed in the aforementioned project note and addendums. Associated delineation sampling grids and ISM sampling results are shown along with post-excavation sampling results from adjacent previously excavated areas on Figure 7.

G Range

Based on the G Range status being operational and maximum lead concentrations in soil exceeding the MCP UCL for lead on operational ranges at the time (3,000 mg/Kg), additional delineation sampling and some localized soil removal behind the backstop berm were recommended in the SAR IR. Elevated concentrations (above S-1/GW-1 standards) of lead and antimony were observed in an ISM samples collected from grid GR01A in 2013. Based on these elevated concentrations, additional grids (GR01DR and GR04) were established and sampled to

determine the extent of soil removal. Relatively lower, although elevated, lead concentrations were observed in samples collected from the outer-most grid (GR04) behind the backstop berm, so it was determined that the horizontal extent of contamination had been adequately defined and that soil would be removed from three grids in back of the berm. This sampling along with the sampling results are detailed in the aforementioned project note and addendums. Associated delineation sampling grids and ISM sampling results are shown on Figure 8. Results for XRF grids shown on Figure 8 are included in Table1.

It should be noted that soil was not removed from the G Range target berm grids where XRF screening results were below the revised UCL (6,000 mg/Kg) but exceeded the S-1/GW-1 standard for lead. Soil removal and sampling at this range was originally intended to address metals concentration behind the berm where sampling results exceeded the lead UCL, which was 3,000 mg/Kg for operational ranges at the time. During delineation and prior to excavation the UCL for lead was revised to 6,000 mg/Kg and excavation was no longer required based on the operational status of the range. Ultimately, it was decided that soil from grids with lead concentrations above the S-1/GW-1 standard behind the berm would be excavated as much as possible and were eventually removed to below the S-1/GW-1 standard. However, no additional soil removal was performed at the target berm, which meets the operational range standard based on metals concentration being below the revised UCL, but not for unrestricted future use based on XRF screening results for lead exceeding the associated S-1/GW-1 standard.

KD Range East

KD Range East is considered operational and there were no exceedances of MCP UCLs. However, the SAR IR recommended resampling at one location near the parking area at the front of the range to determine if the range could be closed under the MCP. An ISM sample was collected from a newly established grid (KDR44) were chromium was observed at elevated concentrations in a discrete sample collected in 1999. Chromium concentrations in the ISM sample were below the MCP S-1/GW-1 standard and no further action was required. This sampling along with the sampling results are detailed in the aforementioned project note and addendums. The associated sampling grid and ISM sampling results are shown on Figure 9.

Former M2 Range

Based on elevated maximum lead concentrations additional delineation sampling and some localized soil removal on the hillside behind the backstop berm were recommended in the SAR IR. Elevated concentrations of lead were observed in samples collected from five grids (FRM202-05) established along the bottom of the downrange hillside backstop berm in 2013. Based on these results, additional grids (FMR02DR-05DR) were established further up the hillside directly behind the grids with elevated lead concentrations. Although lead concentrations were considered elevated in two of the southern-most grids, lower lead concentrations were observed, so it was determined that the horizontal extent of contamination had been adequately defined and that soil would be removed from a total of six grids on the range hillside. This sampling along with the sampling results are detailed in the aforementioned project note and addendums. The associated sampling grids and ISM sampling results are shown on Figure 10.

N Range

In 2013, two grids (NRNG01 and 02) were established and ISM samples were collected to determine metals concentrations in the soil behind the N Range backstop berm. The two grids extended along the length of the berm. The range is considered operational and the MCP UCLs were not exceeded, however, the SAR IR recommended soil removal to facilitate possible future closure. Based on this, additional grids (NR01DR and 02 DR) were established and ISM soil samples were collected from grids further downrange. Additional grids (NR03 and 04) were established and ISM samples were collected until it was determined that the horizontal extent of elevated lead concentrations had been adequately defined and that soil would be removed from five grids in back of the backstop berm. This sampling along with the sampling results are detailed in the aforementioned project note and addendums. The associated sampling grids and ISM sampling results are shown on Figure 11.

Former N Range

Upon an overall review of the investigation results and the fact that the range is inactive but designated as operational, the SAR IR recommended further investigation and soil removal in support of potential future development at N Range. Based on this, a follow-up site reconnaissance was performed, and two remaining potential target mounds were identified for removal. Prior to their removal, an XRF screening instrument was used to determine soil concentrations of lead and antimony within each berm and from the 25-foot perimeter around each berm to delineate the horizontal extent of contamination. The 25-foot perimeter around each berm was divided into two sampling grids for a total of four grids. The results of XRF screening indicated lead concentrations of 173 parts per million (ppm) in Berm 1 and 220 ppm in Berm 2. Antimony was non-detect. (This data was for informational purposes only, as the berms were being removed regardless of the XRF results.) The XRF screening results from the 25-foot perimeter around each berm indicated lead concentrations ranging from 36 ppm to 59 ppm at Berm 1 and from 24 ppm to 38 ppm at Berm 2. Antimony was again non-detect. To verify the XRF results, 100-point ISM samples were collected for laboratory analysis from the 25-foot perimeter around each berm. Lead was reported at concentrations below applicable standards and antimony was non-detect in all samples. All results were below applicable standards. Results for XRF screening at Former N Range are included in Table 5. Berm perimeter sampling results are included along with post-berm-removal sampling laboratory results in Table 3 and on Figure 12. In addition, three ISM sampling grids (FRN01FL, 02FL and 03FL) on the range floor were established and sampled for lead and antimony to characterize the portions of the range where there were no target mounds. All results were below applicable MCP S-1/GW-1 standards. This sampling along with the associated results are detailed in the aforementioned project note and addendums. The associated sampling grids and ISM sampling results are shown on Figure 12.

3.2 Vegetation Clearance

Where necessary, vegetation clearance was performed in soil removal areas prior excavation at all ten of the ranges. Clearance involved the removal of brush and trees, including the roots. The removed vegetation was chipped and spread onsite.

3.3 Soil Excavation and Post-Excavation Sampling

A total of approximately 20,500 cubic yards (CY) of soil were excavated from the ten SARs, including approximately 4,150 CY of previously staged soil at D Range and approximately 300 CY of soil associated with removal of two target berms Former N Range. In most cases, soil from grids with concentrations of antimony, lead or tungsten (primarily lead) above applicable standards, based on previous soil sampling results, was excavated in 0.5-foot lifts. However, in some grids 1-foot to 2-foot lifts were excavated to expedite removal. After excavation of each lift post-excavation multi-increment soil samples were collected from a depth of 0-3 inches below the excavation floor for antimony, lead and/or tungsten analyses based on initial surface soil sampling results or post-excavation sampling results from the previous lift. When post-excavation sample results exceeded the applicable standards for antimony (20 mg/Kg), lead (200 mg/Kg) and/or tungsten (160 mg/Kg) an additional lift of soil was excavated and the process was repeated until post-excavation sample results were below the standards. Replicate samples were collected at of rate of 25 percent per event (i.e., each lift at each range) with minimum of one set of replicates per event. Replicate samples consisted of three samples total from a grid except in one case in which only two were collected due to contract limitations at the time. All samples were processed in accordance with EPA Method 8330B. Post-excavation sampling results are provided in Table 3. The number of lifts, excavation depths and volume of soil removed at each grid are provided in Table 4. Below is a summary of soil excavation at each range:

B Range

Based on delineation sampling results included on Figure 2 soil was excavated from six grids at B Range. The grids requiring soil removal were located within and behind the target backstop berm. A total of approximately 1,950 CY of soil with elevated concentrations of antimony, lead, and/or tungsten were removed. Final excavation depths ranged from 0.5 feet to 4 feet. The location of each soil removal grid along with final excavation depths are included on Figure 13.

Former B Range

A total of approximately 3,350 CY of soil with elevated concentrations of lead were removed from 18 grids at Former B Range. The grids requiring soil removal were located within and at the base of the natural hillside target backstop. Final excavation depths ranged from 0.5 feet to 10.5 feet. X-Ray fluorescence screening was used in the final grid excavated (FBR140QR) to better ensure that soil with elevated concentrations of lead were removed prior to final post-excavation sampling to expedite soil removal. The location of each grid along with final excavation depths are included on Figure 14.

C Range

A total of approximately 3,800 CY of soil with elevated concentrations of lead and/or tungsten were removed from nine grids at C Range. The grids requiring soil removal were located within and behind the target backstop berm. Final excavation depths ranged from 0.5 feet to 5.5 feet. The location of each grid along with final excavation depths are included on Figure 15.

Former C Range

A total of approximately 400 CY of soil with elevated concentrations of lead were removed from one grid at Former C Range. The final excavation depth was 1 foot. The grid requiring soil removal was located within the upper portion of a natural bowl-shaped embankment presumed to be a target area. The grid location along with the final excavation depth is included on Figure 16.

D Range

A total of approximately 2,150 CY of soil with elevated concentration of lead were removed from six grids at D Range. Final excavation depths ranged from 0.5 feet to 6 feet. The grids requiring soil removal were located in front of, within and behind the target backstop berm. The location of each grid along with final excavation depths are included on Figure 17. (Figure 17 shows a total of seven grids, as Grid DR158 was divided into two grids, DR158EAST and DR158WEST, after the 5th lift.) The boundary of grid DR158 was revised prior to excavation to account for the range road on the north side of the grid and the E Range berm on the south side of the grid, while still including the entire footprint of the staged soil and the area represented by discrete sample locations SS158A and SS158B. An additional approximately 4,150 CY of previously staged soil with elevated concentrations of lead (associated with 2009 SAR lead removal program bullet sifting operations), of which approximately 1,200 CY was considered characteristically hazardous based on waste characterization sampling, was also removed from D Range. After removal, soil from the underlying grid (DR158) was excavated. The general location of the previously staged soil is shown on Figure 6. X-Ray Fluorescence screening was used in the final grid excavated (DR158EAST) to better ensure that soil with elevated concentrations of lead were removed prior to final post excavation sampling to expedite soil removal.

Former D Range

A total of approximately 1,500 CY of soil with elevated concentrations of lead were removed from eight grids at Former D Range. Final excavation depths ranged from 0.5 feet to 2.5 feet. The grids requiring soil removal were located within the target area in front of the presumed backstop berm. The location of each grid along with final excavation depths are included on Figure 18.

G Range

A total of approximately 1,700 CY of soil with elevated concentrations of antimony, lead and/or tungsten were removed from three grids at G Range. The grids requiring soil removal were located within and behind the target backstop berm. Final excavation depths ranged from 1 foot to 3.5 feet. The location of each grid along with final excavation depths are included on Figure 19.

Former M2 Range

A total of approximately 450 CY of soil with elevated concentrations of antimony and/or lead were removed from six grids at Former M2 Range. The grids requiring soil removal were located on the hillside behind the target backstop berm. The final excavation depth for all six grids was 0.5 feet. The location of each grid along with final excavation depths are included on Figure 20.

N Range

A total of approximately 750 CY of soil with elevated concentrations of antimony, lead and/or tungsten were removed from five grids at N Range. The grids requiring soil removal were located behind the target backstop berm. The final excavation depth for all five grids was 0.5 feet. The location of each grid along with final excavation depths are included on Figure 21.

Former N Range

At Former N Range, two target berms (a total of approximately 300 CY of soil) were removed to grade in accordance with the approved project notes. After removal of the berms, post-excavation samples were collected from the berm footprints for antimony and lead analyses. All result were below applicable standards. Post-berm-removal sampling laboratory results are included in Table 3. The location of the two berms and the sampling areas are included on Figure 22.

3.4 Excavated Soil Disposition

All soil excavated from the SARs (approximately 20,500 CY) was staged on and covered with impermeable plastic sheeting awaiting offsite transportation and disposal. To determine the appropriate disposal facility, waste characterization samples were collected at a minimum rate of approximately one per 300 CY of soil and submitted for analyses, including volatile organic compounds, semi-volatile organic compounds, total petroleum hydrocarbons, waste characteristics (conductivity, ignitability, corrosivity, and reactivity), pesticides, polychlorinated biphenyls, herbicides, Resource Conservation and Recovery Act metals, and toxicity characteristic leaching procedure (TCLP) metals. Waste characterization results are included in Appendix B. All excavated soil was transported and disposed of in accordance with local, state and federal regulations. Based on the waste characterization sampling results, soil excavated from the SARs was disposed of as follows:

Approximately 4,000 CY of soil was classified and managed as hazardous waste based on TCLP exceedances for lead (TCLP limit = 5 mg/L). All soil classified as hazardous waste was transported to the Stablex Canada, Inc. facility in Quebec Canada for disposal. The hazardous waste soil originated from B, Former B, D, Former D and G Ranges.

Approximately 1,500 CY of non-hazardous soil was disposed of out of state (outside Massachusetts) based on total lead concentrations exceeding MassDEP landfill soil reuse criteria for lined landfills (reuse criteria = 2,000 mg/Kg). The soil was disposed of at the Waste Management of New Hampshire Turnkey Landfill, Rochester, NH. This soil originated from C, Former B and D Ranges. The soil from Former B Range with a total lead concentration exceeding Massachusetts lined landfill reuse criteria also contained a total arsenic concentration exceeding Massachusetts lined landfill reuse criteria (reuse criteria = 40 mg/Kg).

The remaining approximately 15,000 CY of non-hazardous soil met MassDEP landfill soil reuse criteria and was disposed of at the Bourne Integrated Solid Waste Management facility in Bourne, MA or the BFI Fall River Landfill in Fall River, MA. All soil was transported and disposed of in accordance with local, state and federal regulations. Associated shipping documents are included in Appendix C.

3.5 Site Improvements and Restoration

Site improvement and restoration fieldwork was performed at multiple SARs upon completion of soil excavation and disposal. Fieldwork included:

- Building, including wooden storage shed and observations tower, demolition and disposal at B, C, D, and G Ranges
- Backfilling and grading of excavation footprints and/or surrounding areas at B, Former B, C, D, Former D, G and Former M2 Ranges
- Vegetation removal at D Range
- Gravel installation in access roads, parking areas and paths at B, C and D Ranges
- Bollard installation around groundwater monitoring wells at B, C, Former D, G and Former M2 Ranges.
- Wooden guard rail installation for parking areas and paths at B, C and D Ranges
- Retaining wall installation at D Range
- Seeding at B, Former B, C, Former C and G Ranges

4.0 CONCLUSIONS

Fieldwork to address soil contamination at ten Small Arms Ranges, including six inactive operational ranges (B, C, D, G, N and Former N) and four non-operational ranges (Former B, Former C, Former D and Former M2), is complete. Approximately 20,500 CY of soil from these ranges with elevated concentrations of lead (200 mg/Kg), antimony (20 mg/Kg) and tungsten (160 mg/Kg) has been excavated, transported, and disposed of at approved off-site facilities. Delineation and confirmation samples have been collected to verify that soil with elevated concentrations has been removed. Based on the post-excavation sampling results noted herein, no further action is recommended at these ranges except for as discussed below.

As discussed in Section 3.1, all soil from grids behind the G Range berm with metal concentrations exceeding the MCP S-1/GW-1 was removed during this effort, meeting the requirements for unrestricted use. However, soil from grids established on the backstop berm with XRF lead concentrations below the updated UCL for operational ranges but exceeding the S-1/GW-1 standard for unrestricted use was not removed. Additional fieldwork would be required at G Range to achieve unrestricted use status.

5.0 REFERENCES

EPA 2015. Decision Document Small Arms Ranges Operable Unit. United States Environmental Protection Agency Region 1. September 2015. [Environmental Data Management System.

IAGWSP 2014. Final Small Arms Ranges Investigation Report. Impact Area Groundwater Study Program, Massachusetts Military Reservation Cape Cod, Massachusetts, January 2014.

IAGWSP 2014b. Final Project Note – Sampling, Soil Removal and Monitoring at Small Arms Ranges. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, May 2014.

IAGWSP 2014c. Final Project Note - Addendum to the May 2014 Project Note for “Sampling, Soil Removal, and Monitoring at the Small Arms Ranges”. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, August 2014.

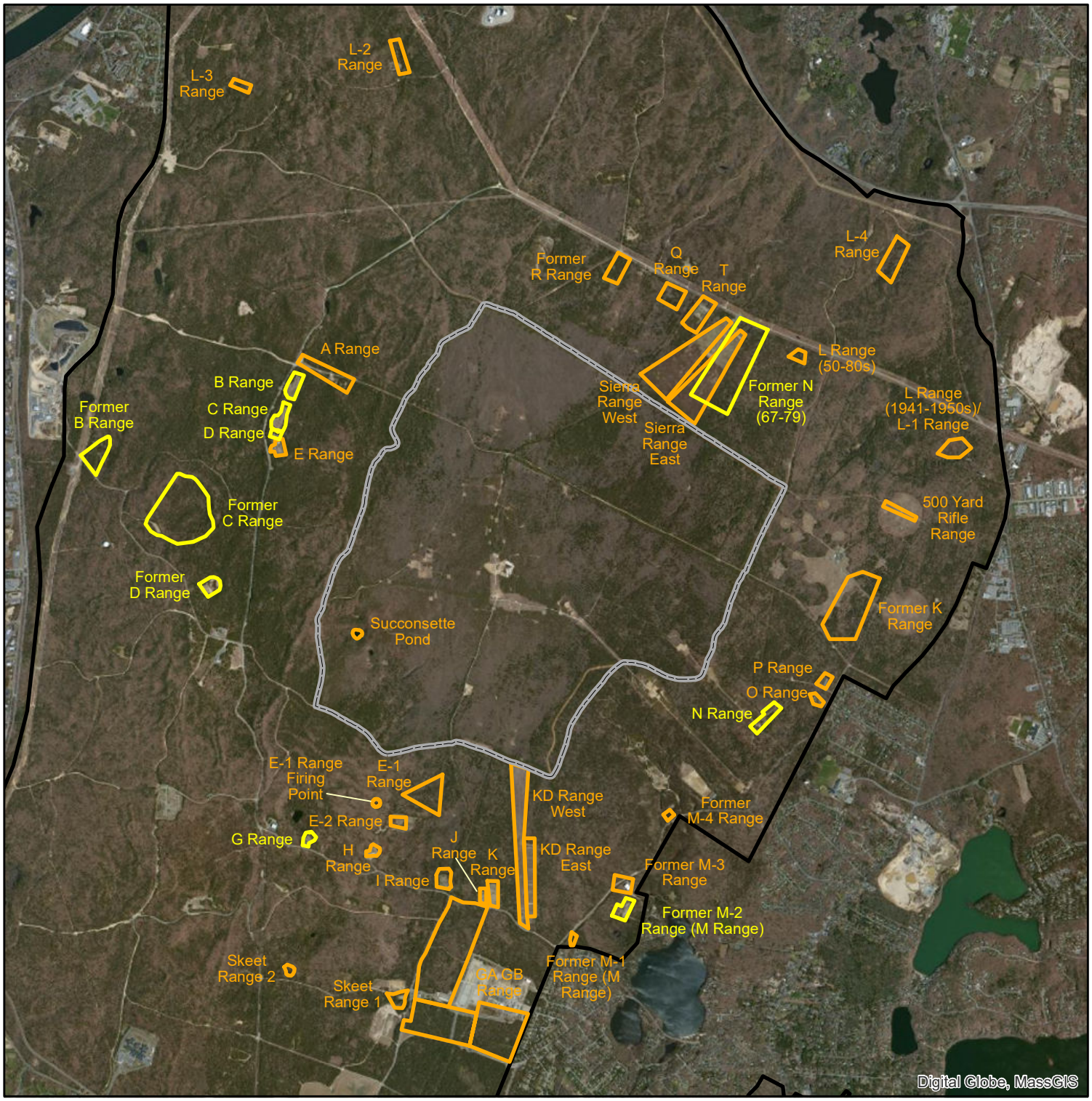
IAGWSP 2014d. Final Project Note – Second Addendum to the May 2014 Project Note for “Sampling, Soil Removal, and Monitoring at the Small Arms Ranges”. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, December 2014.

IAGWSP 2015b. Final Project Note – Third Addendum to the May 2014 Project Note for “Sampling, Soil Removal, and Monitoring at the Small Arms Ranges”. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, June 2015.

IAGWSP 2016. Final Project Note – Fourth Addendum to the May 2014 Project Note for “Sampling, Soil Removal, and Monitoring at the Small Arms Ranges”. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, February 2016.

IAGWSP 2016b. Final Project Note – Fifth Addendum to the May 2014 Project Note for “Sampling, Soil Removal, and Monitoring at the Small Arms Ranges”. Impact Area Groundwater Study Program, Camp Edwards, Massachusetts, March 2016.

FIGURES



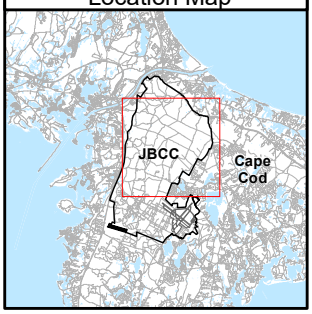
Legend

- JBCC Boundary
- Impact Area Boundary

Small Arms Ranges

- Soil Removal Performed
- No Soil Removal Performed

Location Map



0 1,750 3,500 Feet

US Army Corps of Engineers
New England District

Location of Small Arms Ranges

FIGURE 1

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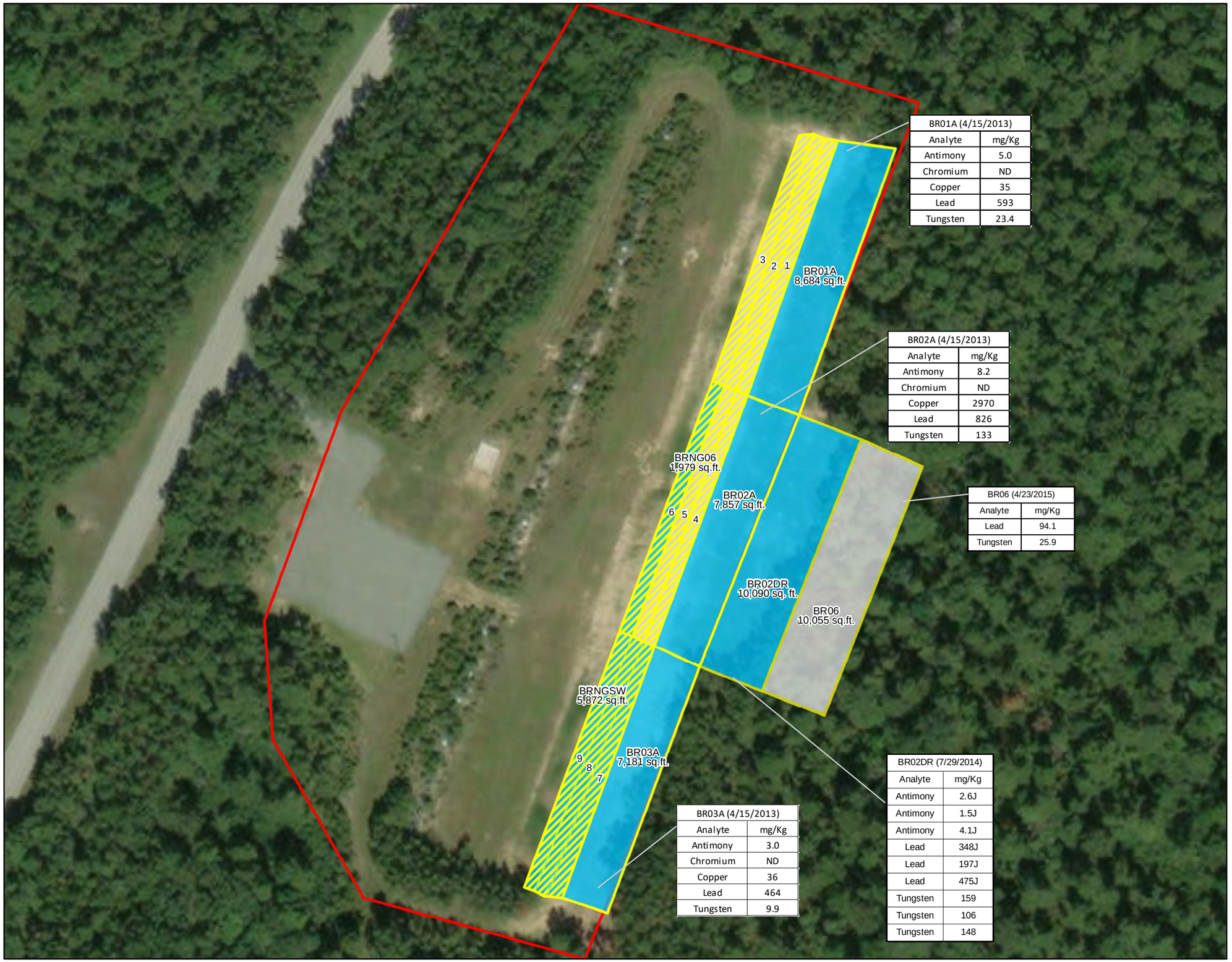
January 29, 2018 DWN: MTW CHKD: DRS

Impact Area Groundwater Study Program

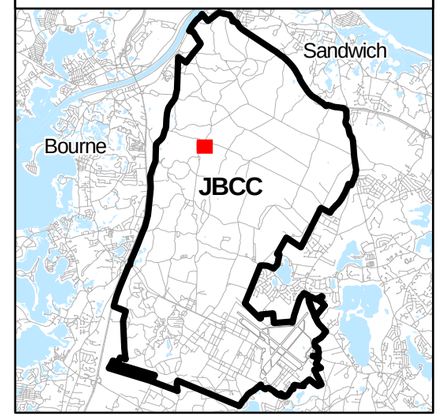


Impact Area Groundwater Study Program

LEGEND

- B Range
- XRF Sampling Area
- Excavation Area
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
B Range

0 70 Feet

N

US Army Corps of Engineers
New England District

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September 29, 2020 DWN: SAW CHKD: DRS

FIGURE
2

FBR07 (7/1/2015)	
Analyte	mg/Kg
Lead	937

FBR140QR (8/1/2014)	
Analyte	mg/Kg
Antimony	6.4
Lead	664

FBR03 (4/28/2015)	
Analyte	mg/Kg
Lead	2250

FBR09 (7/1/2015)	
Analyte	mg/Kg
Lead	2310

FBR18 (3/30/2016)	
Analyte	mg/Kg
Lead	563
Lead	328
Lead	511

FBR04 (4/27/2015)	
Analyte	mg/Kg
Lead	3.1

FBR140L (7/31/2014)	
Analyte	mg/Kg
Lead	224
Lead	228
Lead	180
Lead	623 (1.75 - 2 ft)
Antimony	4.8J
Antimony	2.3J
Antimony	2.7J
Antimony	9.9J (1.75 - 2 ft)

FBR05 (4/27/2015)	
Analyte	mg/Kg
Lead	175J

FBR06 (4/27/2015)	
Analyte	mg/Kg
Lead	234
Lead	266
Lead	356

FBR10 (9/8/2015)	
Analyte	mg/Kg
Lead	220

FBR13 (12/14/2015)	
Analyte	mg/Kg
Lead	243

FBR08 (7/1/2015)	
Analyte	mg/Kg
Lead	3350
Lead	3400
Lead	2860

FBR11 (9/8/2015)	
Analyte	mg/Kg
Lead	595
Lead	1310J
Lead	1600

FBR12 (9/8/2015)	
Analyte	mg/Kg
Lead	2060

FBR14 (12/14/2015)	
Analyte	mg/Kg
Lead	204

FBR15 (12/14/2015)	
Analyte	mg/Kg
Lead	868

FBR16 (12/14/2015)	
Analyte	mg/Kg
Lead	578

FBR17 (3/2/2016)	
Analyte	mg/Kg
Lead	525
Lead	1060
Lead	573

FBR19 (3/30/2016)	
Analyte	mg/Kg
Lead	113

FBR20 (3/30/2016)	
Analyte	mg/Kg
Lead	204

FBR21 (3/30/2016)	
Analyte	mg/Kg
Lead	81.3

FBR22 (3/30/2016)	
Analyte	mg/Kg
Lead	56.7

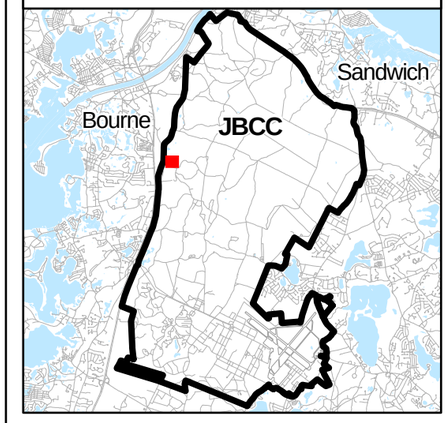
FBR23 (3/30/2016)	
Analyte	mg/Kg
Lead	52.6

Impact Area Groundwater Study Program

LEGEND

- Former B Range
- Excavation Area
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation Sampling Results
Former B Range

0 50 Feet

N

US Army Corps of Engineers
New England District

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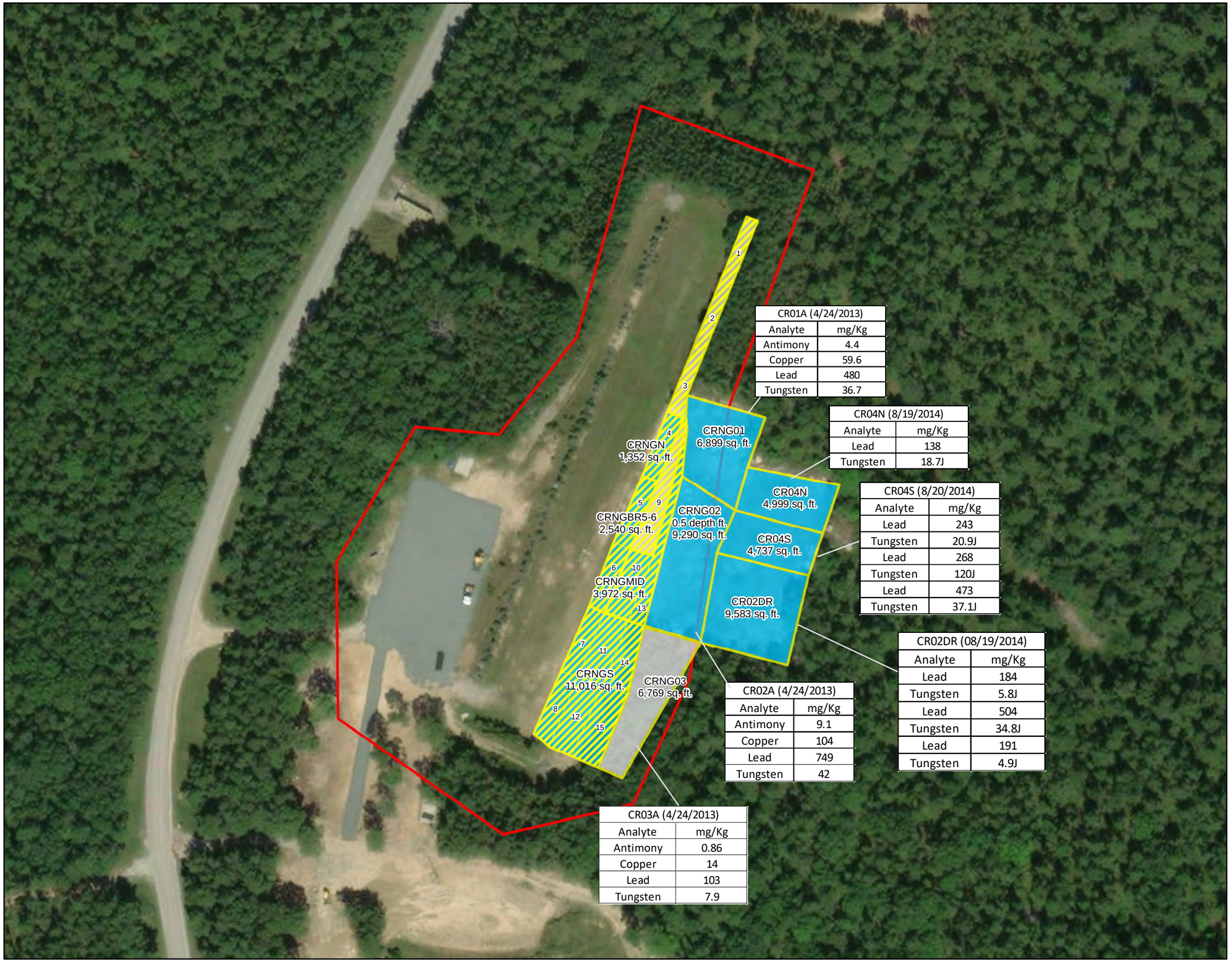
October 4, 2020 DWN: SAW CHKD: DRS

FIGURE
3



CR01A (4/24/2013)	
Analyte	mg/Kg
Antimony	4.4
Copper	59.6
Lead	480
Tungsten	36.7

CR04N (8/19/2014)	
Analyte	mg/Kg
Lead	138
Tungsten	18.7J

CR04S (8/20/2014)	
Analyte	mg/Kg
Lead	243
Tungsten	20.9J
Tungsten	268
Lead	120J
Tungsten	473
Lead	37.1J

CR02DR (08/19/2014)	
Analyte	mg/Kg
Lead	184
Tungsten	5.8J
Lead	504
Tungsten	34.8J
Lead	191
Tungsten	4.9J

CR02A (4/24/2013)	
Analyte	mg/Kg
Antimony	9.1
Copper	104
Lead	749
Tungsten	42

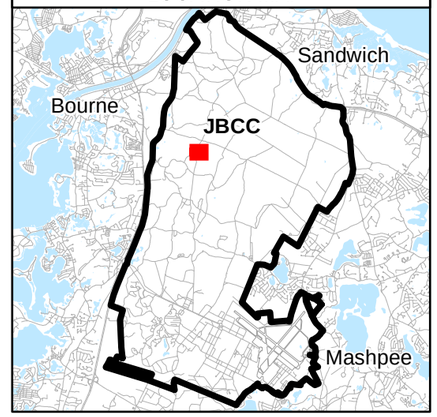
CR03A (4/24/2013)	
Analyte	mg/Kg
Antimony	0.86
Copper	14
Lead	103
Tungsten	7.9

Impact Area Groundwater Study Program

LEGEND

- C Range
- XRF Sampling Area
- Excavation Area
- No Action Required

LOCATION MAP



TITLE

Surface Soil Delineation
Sampling Results
C Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig4_C_range_100720.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig4_C_range_100720.mxd
October 7, 2020 DWN: SAW CHKD: DRS

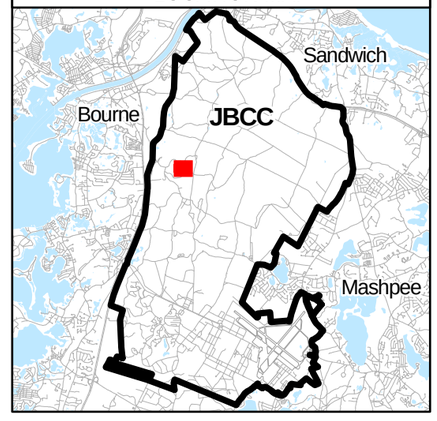
FIGURE
4

Impact Area Groundwater Study Program

LEGEND

- Former C Range
- No Action Required
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
Former C Range

0 100 Feet

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig5_100720.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig5_100720.mpk
October 7, 2020 DWN: SAE CHKD: DRS

FIGURE
5

SS158A (3/29/2002)	
Analyte	mg/Kg
Antimony	9.5
Chromium	9.8
Copper	214
Lead	1030

DR01A (4/16/2013)	
Analyte	mg/Kg
Antimony	12.1
Copper	31.8
Lead	1840
Tungsten	0.25

DR09 (3/30/2016)	
Analyte	mg/Kg
Lead	125

DR04 (3/2/2016)	
Analyte	mg/Kg
Lead	1010

DR07 (3/30/2016)	
Analyte	mg/Kg
Lead	187

DR08 (3/30/2016)	
Analyte	mg/Kg
Lead	83.2
Lead	66.3
Lead	62.9

DRNG02 (5/21/2018)	
Analyte	mg/Kg
Lead	44.8

DRNG02 (8/2/2018)	
Analyte	mg/Kg
Lead	43.7
Lead (subsurface)	72.6

SS158B (3/29/2002)	
Analyte	mg/Kg
Antimony	1.3
Chromium	6.9
Copper	15.6
Lead	29.5

DR06 (3/30/2016)	
Analyte	mg/Kg
Lead	355

DR05 (3/2/2016)	
Analyte	mg/Kg
Lead	221

DR03 (3/2/2016)	
Analyte	mg/Kg
Lead	252J
Lead	41.2J
Lead	112J

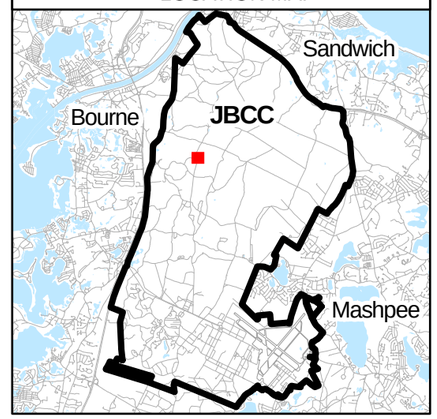
DR02 (11/18/2015)	
Analyte	mg/Kg
Lead	591
Lead	1020
Lead	580

Impact Area Groundwater Study Program

LEGEND

- D Range
- Excavation Area
- No Action Required
- Limits of Grid DR05
- Soil Sample Location

LOCATION MAP



TITLE

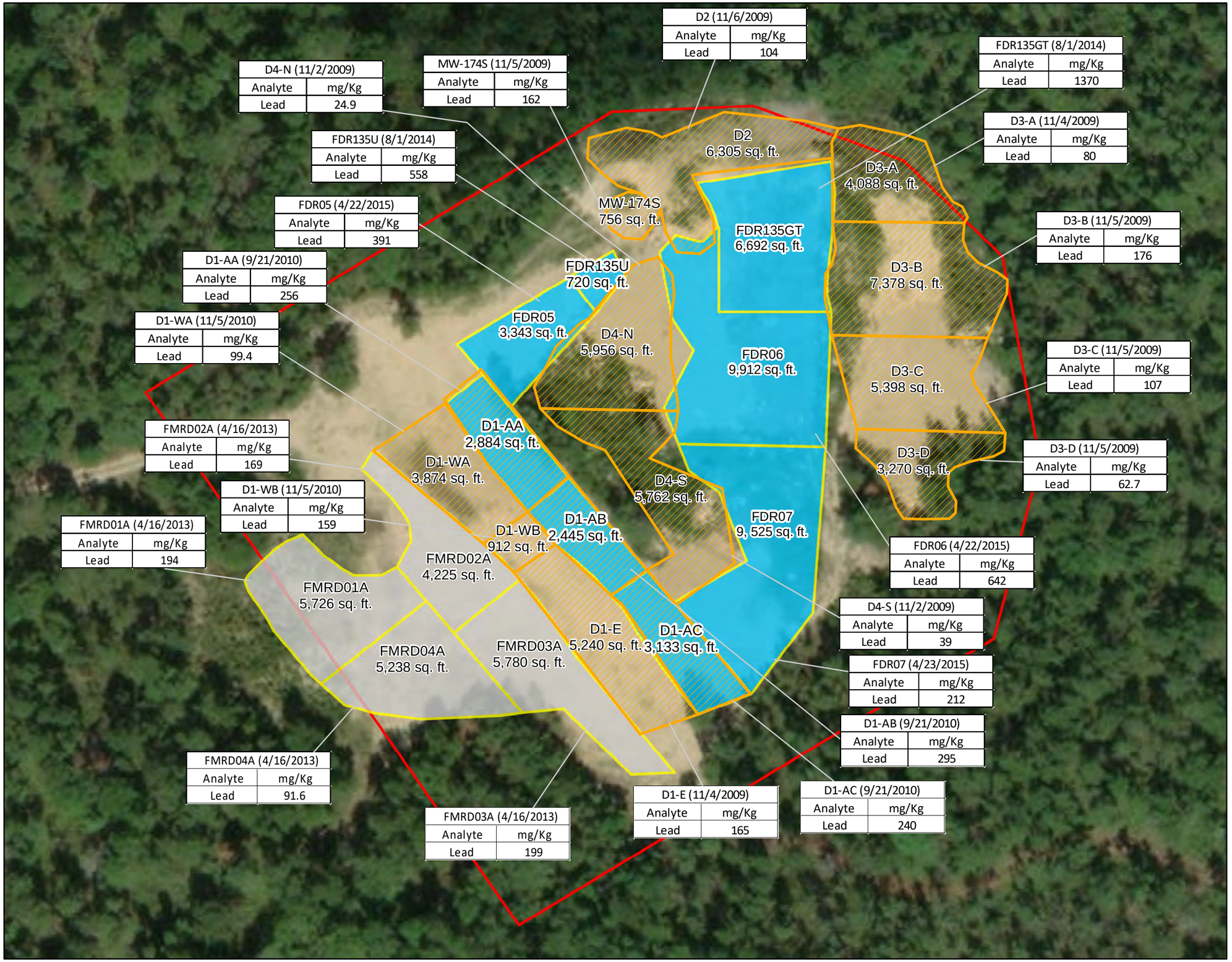
Surface Soil Delineation
Sampling Results
D Range

0 40 Feet

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig6_D_Range_100520.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig6_D_Range_100520.mpk
October 5, 2020 DWN: SAW CHKD: DRS

FIGURE
6

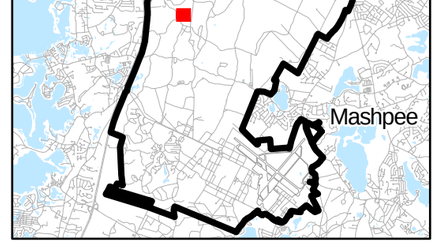


Impact Area Groundwater Study Program

LEGEND

- Former D Range
- Excavation Area
- No Action Required
- 2009/2010 Excavation Areas & Post-Excavation Sampling Results

LOCATION MAP



NOTES & SOURCES

Only the highest concentration is reported for any analyte at locations where multiple samples were collected

TITLE

Surface Soil Delineation Sampling Results Former D Range

0 60 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figure\Fig7_FmrD_100920.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig7_FmrD_100920.mpk
October 9, 2020 DWN: SAW CHKD: DRS

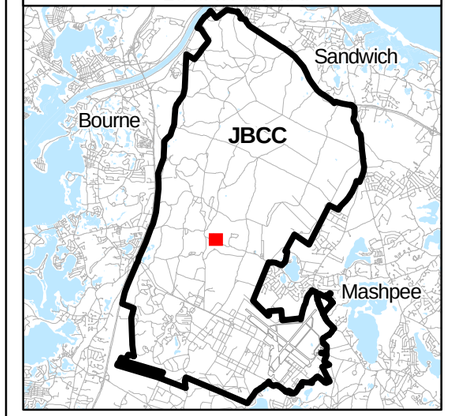
FIGURE 7

Impact Area Groundwater Study Program

LEGEND

- G Range
- Excavation Area
- No Action Required
- XRF Sampling Area

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
G Range

0 50 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig8_G_Range_101420.pdf
M:\MMR\2020\SmallArmsRanges\MXD\Fig8_G_Range_101420.mpk
October 14, 2020 DWN: SAW CHKD: DRS

FIGURE
8

KDR44 (7/28/2014)	
Analyte	mg/Kg
Chromium	52.2
Chromium	54.0
Chromium	53.7

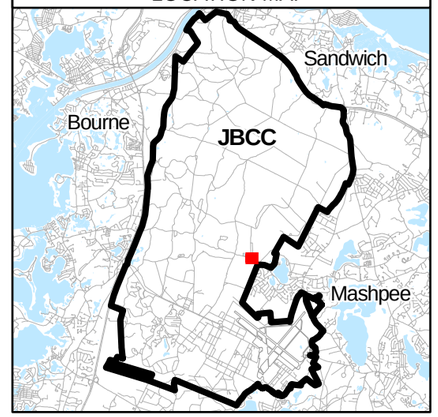
44A
400sq.ft.

Impact Area Groundwater Study Program

LEGEND

- KD Range East
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Confirmation
Sampling Results
KD Range East

0 50 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig9_KD_RangeEast_101620.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig9_KD_RangeEast_101620.mpk
October 16, 2020 DWN: SAW CHKD: DRS

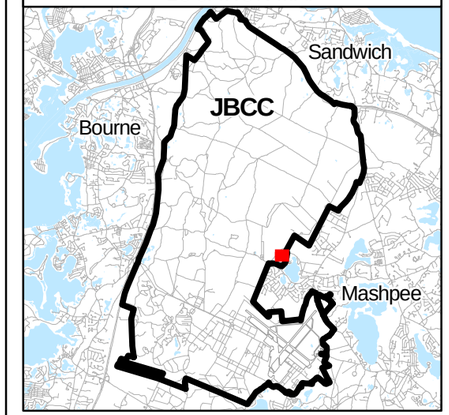
FIGURE
9

Impact Area Groundwater Study Program

LEGEND

- Former M2 Range
- Excavation Area
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
Former M2 Range

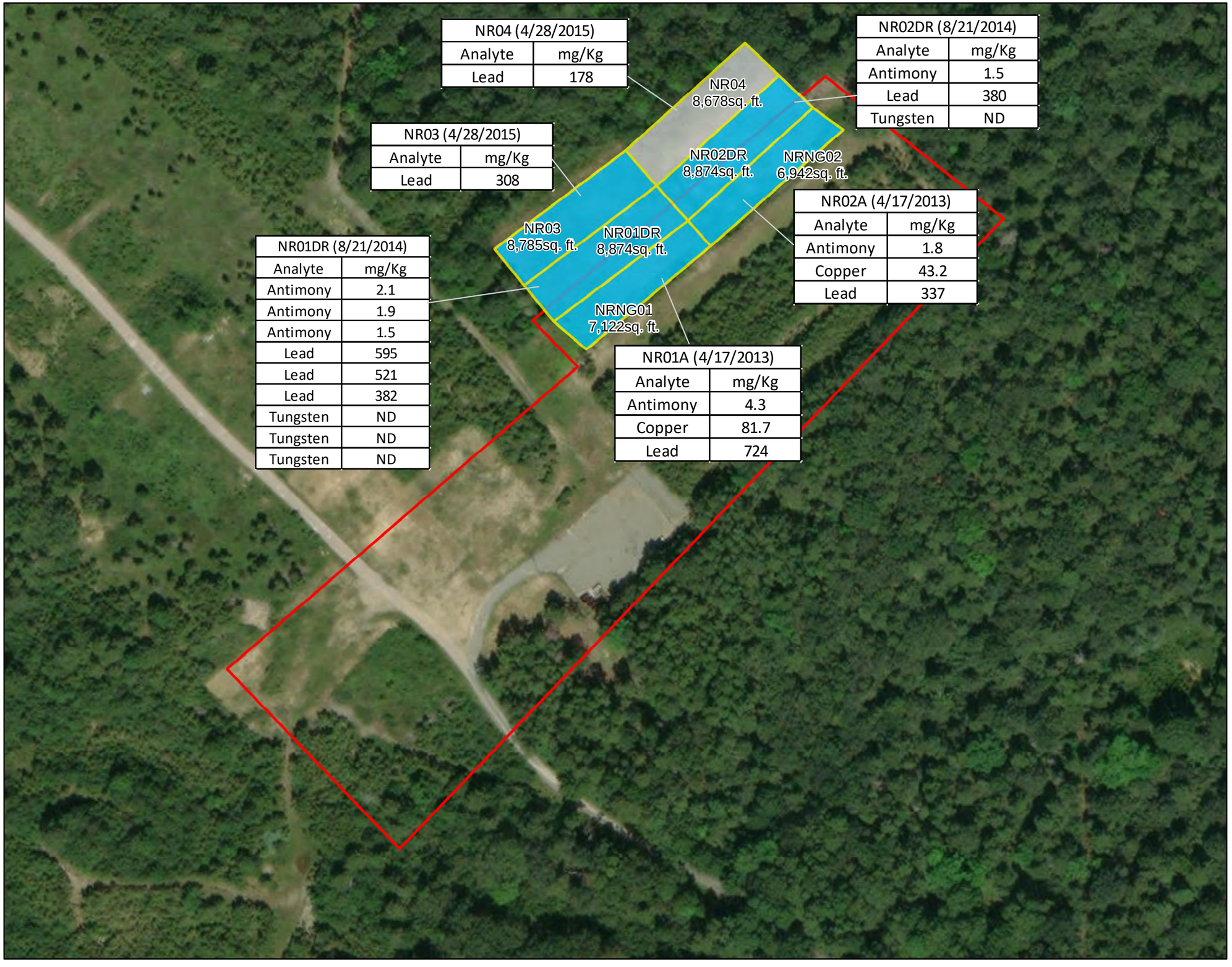
0 60 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig10_FmrM2_101620.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig10_FmrM2_101620.mpk
October 16, 2020 DWN: SAW CHKD: DRS

FIGURE
10

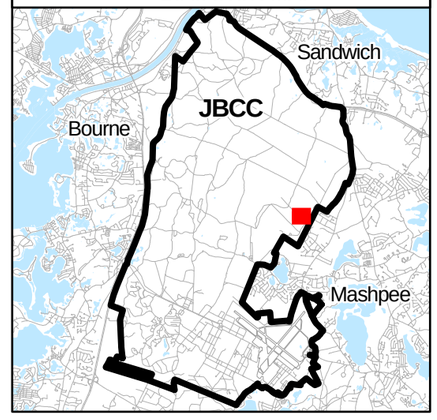


Impact Area Groundwater Study Program

LEGEND

- N Range
- Excavation Area
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
N Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig11_N_Range101920.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig11_N_Range_101920.mpk
October 19, 2020 DWN: SAW CHKD: DRS

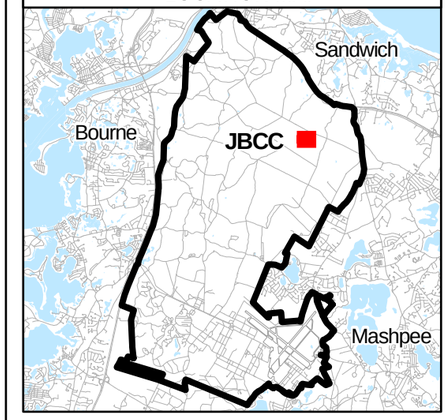
FIGURE
11

Impact Area Groundwater Study Program

LEGEND

- Former N Range
- Berm Removal Area
- No Action Required

LOCATION MAP



NOTES & SOURCES

TITLE

Surface Soil Delineation
Sampling Results
Former N Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig12_FmrN_102020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig12_FmrN_102020.mpk
October 20, 2020 DWN: SAW CHKD: DRS

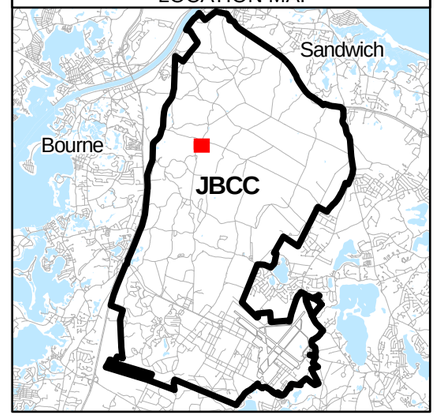
FIGURE
12

Impact Area Groundwater Study Program

LEGEND

- B Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
B Range

0 70 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig13_B_Range_093020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig13_B_Range_093020.mpk
September 30, 2020 DWN: SAW CHKD: DRS

FIGURE
13

Impact Area Groundwater Study Program

LEGEND

- Former B Range
- Excavation Area

LOCATION MAP

TITLE

Excavation Areas
Former B Range

0 50 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig14_FmrB_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig14_FmrB_091020.mpk
September 10, 2020 DWN: SAW CHKD: DRS

FIGURE
14

Impact Area Groundwater Study Program

LEGEND

- C Range
- Excavation Area

LOCATION MAP

TITLE

Excavation Areas
C Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig15_C_Range_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig15_C_Range_091020.mpk
September 10, 2020 DWN: SAW CHKD: DRS

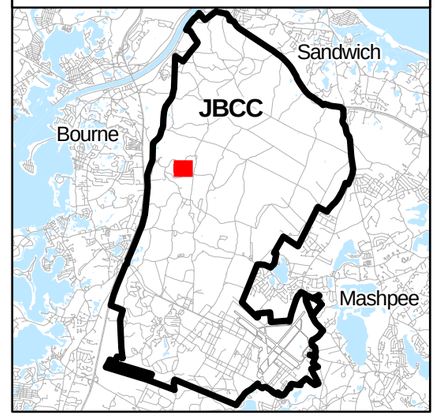
FIGURE
15

Impact Area Groundwater Study Program

LEGEND

- Former C Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
Former C Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig16_FmrC_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig16_FmrC_091020.mpk
September 10, 2020 DWN: SAW CHKD: DRS

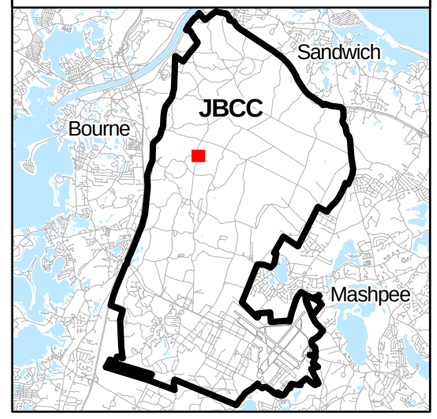
FIGURE
16

Impact Area Groundwater Study Program

LEGEND

- D Range
- Excavation Area

LOCATION MAP



TITLE

Excavation Areas
D Range

0 40 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig17_D_Range_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig17_D_Range_091020.mpk
September 10, 2020 DWN: SAW CHKD: DRS

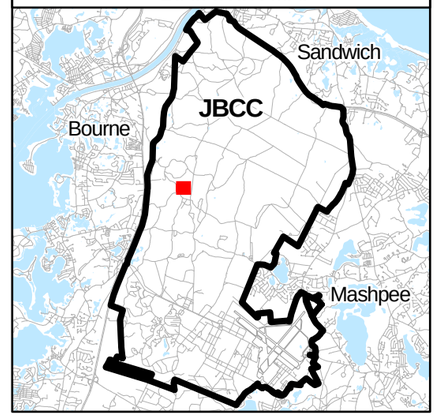
FIGURE
17

Impact Area Groundwater Study Program

LEGEND

- Former D Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
Former D Range

0 60 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig18_FmrD_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig18_FmrD_091020.mpk
September 10, 2020 DWN: SAW CHKD: DRS

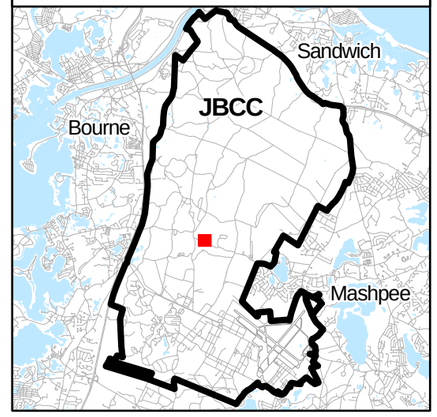
FIGURE
18

Impact Area Groundwater Study Program

LEGEND

- G Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
G Range

0 50 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig19_G_Range_091020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig19_G_Range_091020.mpk
September 10,2020 DWN: SAW CHKD: DRS

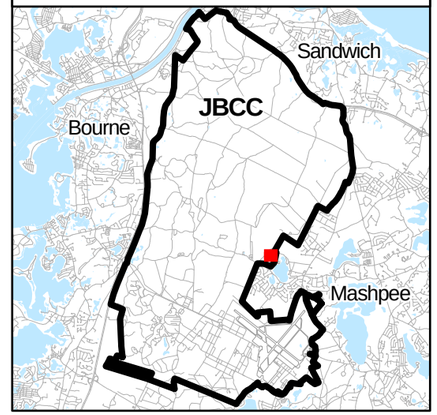
FIGURE
19

Impact Area Groundwater Study Program

LEGEND

- Former M2 Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
Former M2 Range

0 60 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig20_FmrM2_091220.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig20_FmrM2_091220.mpk
September 10, 2020 DWN: SAW CHKD: DRS

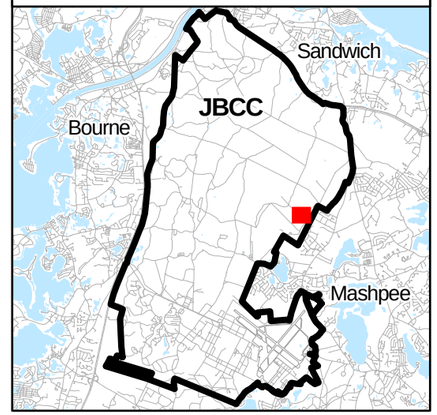
FIGURE
20

Impact Area Groundwater Study Program

LEGEND

- N Range
- Excavation Area

LOCATION MAP



NOTES & SOURCES

TITLE

Excavation Areas
N Range

0 100 Feet

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig21_N_Range_091220.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig21_N_Range_091220.mpk
October 19, 2020 DWN: SAW CHKD: DRS

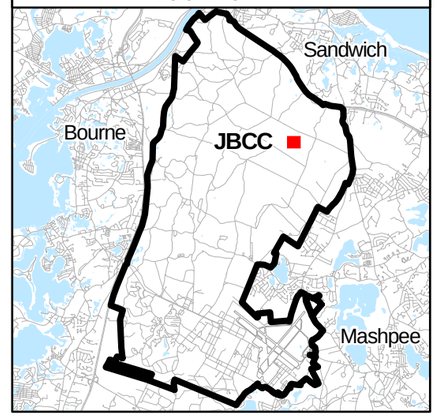
FIGURE
21

Impact Area Groundwater Study Program

LEGEND

- Former N Range
- Berm Removal Area

LOCATION MAP



NOTES & SOURCES

TITLE

Berm Removal
Former N Range

0 100 Feet

N

US Army Corps of Engineers
New England District

M:\MMR\2020\SmallArmsRanges\Figures\Fig22_FmrN_102020.pdf
M:\MMR\2020\SmallArmsRanges\MXDs\Fig22_FmrN_102020.mpk
October 21, 2020 DWN: SAW CHKD: DRS

FIGURE
22

TABLES

Table 1
B, C and G Ranges
2013 Surface Berm Samples
XRF Screening Results

Range	Description	Sample ID	XRF Result1*				XRF Result2*				XRF Result3*			
			Pb	Sb	W	Cr	Pb	Sb	W	Cr	Pb	Sb	W	Cr
B Range Berms	Top (NE)	B1A	79±4	ND<69	ND<8	ND<67	94±5	ND<68	ND<7	ND<66	82±5	ND<69	12±3	ND<66
B Range Berms	Mid (NE)	B2A	98±5	ND<70	13±3	ND<66	52±4	ND<69	11±3	ND<65	90±5	ND<69	15±3	ND<69
B Range Berms	Bot (NE)	B3A	73±4	ND<68	14±3	ND<63	63±4	ND<68	15±3	ND<63	92±5	ND<67	11±3	ND<58
B Range Berms	Top (MID)	B4A	191±7	ND<69	18±4	ND<69	193±7	ND<69	15±3	ND<61	125±5	ND<68	15±3	ND<66
B Range Berms	Mid (MID)	B5A	129±5	ND<69	10±3	ND<59	142±6	ND<68	11±3	ND<66	198±7	ND<68	21±4	81±24
B Range Berms	Mid R1	B5B	175±6	ND<69	16±3	ND<68	143±6	ND<68	25±4	ND<65	149±6	ND<68	13±3	ND<63
B Range Berms	Mid R2	B5C	110±5	ND<69	18±3	ND<66	132±5	ND<69	15±3	ND<64	201±7	ND<69	13±3	ND<68
B Range Berms	Bot (MID)	B6A	120±5	ND<68	10±3	ND<66	132±5	ND<67	17±3	ND<63	116±5	ND<67	21±4	ND<67
B Range Berms	Top (SW)	B7A	183±6	ND<68	ND<8	ND<66	205±7	ND<69	ND<9	ND<69	256±8	ND<69	ND<9	ND<69
B Range Berms	Mid (SW)	B8A	257±8	ND<70	13±3	ND<73	408±10	ND<70	ND<9	ND<69	245±7	ND<69	14±3	ND<65
B Range Berms	Bot (SW)	B9A	202±7	ND<69	9±3	ND<65	206±7	ND<69	ND<9	ND<72	359±9	ND<72	ND<9	ND<72
B Range Berms	Bot R1	B9B	170±6	ND<69	12±3	ND<66	230±7	ND<68	14±3	ND<70	200±7	ND<69	ND<9	ND<66
B Range Berms	Bot R2	B9C	414±10	ND<68	10±3	ND<70	226±7	ND<69	14±3	ND<68	232±7	ND<69	10±3	ND<63
C Range Berms	Bot1	C1A	28±3	ND<68	ND<8	NA	22±3	ND<69	ND<8	NA	69±4	ND<68	ND<7	NA
C Range Berms	Bot2	C2A	72±5	ND<70	ND<9	NA	30±3	ND<71	ND<8	NA	50±4	ND<69	ND<8	NA
C Range Berms	Bot3	C3A	62±4	ND<68	ND<8	NA	71±4	ND<69	ND<8	NA	75±4	ND<69	ND<8	NA
C Range Berms	Bot3 R1	C3B	64±4	ND<69	18±4	NA	72±4	ND<69	25±4	NA	74±4	ND<68	20±4	NA
C Range Berms	Bot3 R2	C3C	71±4	ND<67	ND<8	NA	73±4	ND<68	ND<8	NA	102±5	ND<68	ND<8	NA
C Range Berms	Bot4	C4A	210±7	ND<70	11±3	NA	191±6	ND<68	ND<8	NA	220±7	ND<68	11±3	NA
C Range Berms	Bot4 R1	C4B	205±7	ND<68	11±3	NA	213±7	ND<69	11±3	NA	203±7	ND<67	11±3	NA
C Range Berms	Bot4 R2	C4C	248±7	ND<66	ND<8	NA	296±8	ND<71	ND<9	NA	225±7	ND<69	12±3	NA
C Range Berms	Bot5	C5A	286±8	ND<69	23±4	NA	267±8	ND<69	24±4	NA	291±8	ND<69	73±6	NA
C Range Berms	Bot6	C6A	332±9	ND<68	29±4	NA	275±7	ND<64	30±4	NA	392±9	ND<69	34±4	NA
C Range Berms	Bot7	C7A	298±8	ND<68	11±3	NA	341±9	ND<69	10±3	NA	253±7	ND<68	10±3	NA
C Range Berms	Bot8	C8A	235±7	ND<69	ND<9	NA	208±7	ND<68	10±3	NA	209±7	ND<67	ND<9	NA
C Range Berms	Mid9	C9A	160±8	ND<95	15±5	NA	184±7	ND<73	19±4	NA	184±6	ND<68	16±3	NA
C Range Berms	Mid10	C10A	465±10	ND<70	21±4	NA	446±10	ND<70	14±3	NA	429±10	ND<68	20±4	NA
C Range Berms	Mid11	C11A	221±7	ND<71	13±3	NA	172±6	ND<70	ND<9	NA	185±6	ND<70	10±3	NA
C Range Berms	Mid12	C12A	253±7	ND<68	13±3	NA	292±8	ND<70	11±3	NA	228±7	ND<69	16±3	NA
C Range Berms	Back13	C13A	416±10	ND<67	13±3	NA	584±12	ND<70	25±4	NA	421±10	ND<68	15±3	NA
C Range Berms	Back14	C14A	356±9	ND<70	ND<9	NA	638±13	ND<70	ND<9	NA	331±9	ND<69	ND<8	NA
C Range Berms	Back15	C15A	418±10	ND<68	ND<8	NA	378±9	ND<70	ND<9	NA	370±9	ND<68	ND<9	NA
C Range Berms	Back15 R1	C15B	3252±41	ND<74	ND<10	NA	404±9	ND<66	ND<8	NA	384±9	ND<69	ND<8	NA
C Range Berms	Back15 R2	C15C	405±10	ND<68	ND<8	NA	334±8	ND<67	ND<8	NA	360±9	ND<69	ND<9	NA
G Range Berms	Top	G1A	432±10	ND<69	12±3	NA	427±10	ND<70	ND<10	NA	450±10	ND<70	ND<10	NA
G Range Berms	Mid	G2A	500±11	ND<70	29±4	NA	481±11	ND<72	28±4	NA	443±10	ND<70	27±4	NA

Table 1
B, C and G Ranges
2013 Surface Berm Samples
XRF Screening Results

Range	Description	Sample ID	XRF Result1*				XRF Result2*				XRF Result3*			
			Pb	Sb	W	Cr	Pb	Sb	W	Cr	Pb	Sb	W	Cr
G Range Berms	Mid R1	G2B	475±11	ND<71	18±4	NA	430±10	ND<72	21±4	NA	378±10	ND<73	23±4	NA
G Range Berms	Mid R2	G2C	385±9	ND<68	24±4	NA	379±9	ND<71	20±4	NA	926±16	ND<72	28±4	NA
G Range Berms	Bot	G3A	276±8	ND<71	30±4	NA	289±8	ND<72	31±4	NA	319±9	ND<71	28±4	NA
G Range Berms	Top	G4A	404±10	ND<70	ND<9	NA	414±20	ND<71	ND<9	NA	359±10	ND<74	ND<9	NA
G Range Berms	Mid	G5A	520±11	ND<68	ND<9	NA	466±10	ND<70	11±3	NA	432±10	ND<71	ND<10	NA
G Range Berms	Bot	G6A	287±8	ND<71	15±4	NA	260±8	ND<69	15±3	NA	273±8	ND<69	15±3	NA
G Range Berms	Bot R1	G6B	283±8	ND<69	17±4	NA	354±9	ND<69	18±4	NA	342±9	ND<70	22±4	NA
G Range Berms	Bot R2	G6C	285±8	ND<70	13±3	NA	273±8	ND<69	13±3	NA	334±9	ND<71	25±4	NA

Notes:

XRF = X-Ray Fluorescense

* = Three one minute readings were recorded for each sample.

R1/R2 = Replicate Samples

ND = Non-Detect

NA = Not Analyzed

Pb = lead

Sb = antimony

W = tungsten

Cr = chromium

TABLE 2
Former B Range and D Range Delineation Soil Sampling Results

Grid ID	Field Sample ID	Sample Depth (feet)	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
Former B Range											
FBR18	FBR18_A	0 - 0.25	03/30/2016	SW6010C	Lead	**563**		mg/Kg	0.99	200	50-point Composite Sample
FBR18	FBR18_B	0 - 0.25	03/30/2016	SW6010C	Lead	**328**		mg/Kg	0.50	200	50-point Composite Sample - Rep 1
FBR18	FBR18_C	0 - 0.25	03/30/2016	SW6010C	Lead	**511**		mg/Kg	0.99	200	50-point Composite Sample - Rep 2
FBR19	FBR19_A	0 - 0.25	03/30/2016	SW6010C	Lead	113		mg/Kg	0.49	200	50-point Composite Sample
FBR20	FBR20_A	0 - 0.25	03/30/2016	SW6010C	Lead	**204**		mg/Kg	0.49	200	100-point Composite Sample
FBR21	FBR21_A	0 - 0.25	03/30/2016	SW6010C	Lead	81.3		mg/Kg	0.49	200	100-point Composite Sample
FBR22	FBR22_A	0 - 0.25	03/30/2016	SW6010C	Lead	56.7		mg/Kg	0.50	200	100-point Composite Sample
FBR23	FBR23_A	0 - 0.25	03/30/2016	SW6010C	Lead	52.6		mg/Kg	0.48	200	100-point Composite Sample
D Range											
DR06	DR06_A	0 - 0.25	03/30/2016	SW6010C	Lead	**355**		mg/Kg	0.50	200	30-point Composite Sample
DR07	DR07_A	0 - 0.25	03/30/2016	SW6010C	Lead	187		mg/Kg	0.49	200	50-point Composite Sample
DR08	DR08_A	0 - 0.25	03/30/2016	SW6010C	Lead	83.2		mg/Kg	0.48	200	30-point Composite Sample
DR08	DR08_B	0 - 0.25	03/30/2016	SW6010C	Lead	66.3		mg/Kg	0.47	200	30-point Composite Sample - Rep 1
DR08	DR08_C	0 - 0.25	03/30/2016	SW6010C	Lead	62.9		mg/Kg	0.49	200	30-point Composite Sample - Rep 2
DR09	DR09_A	0 - 0.25	03/30/2016	SW6010C	Lead	125		mg/Kg	0.48	200	30-point Composite Sample
DRNG02	DRNG02_A	0 - 0.25	05/21/2018	SW6010C	Lead	44.8		mg/Kg	0.49	200	100-point Composite Sample
DRNG02	DRNG02_B	0 - 0.25	08/02/2018	SW6010C	Lead	43.7		mg/Kg	0.49	200	100-point Composite Sample
DRNG02	DRNG02_C	0.50 - 0.75	08/02/2018	SW6010C	Lead	72.6		mg/Kg	0.50	200	30-point Composite Sample

NOTES:

J = Estimated result

mg/Kg = milligrams per kilogram

Rep = Field Replicate Sample

RL - Reporting Limit

Values bolded and shaded in yellow exceed one or more applicable criteria

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
B Range - Lift 1										
BR02DR	BR02ADR-PEA	11/21/2015	SW6010C	Lead	**451**		mg/Kg	0.48	200	100-point Composite sample
BR02DR	BR02ADR-PEB	11/21/2015	SW6010C	Lead	**200**		mg/Kg	0.45	200	100-point Composite Sample - Rep 1
BR02DR	BR02ADR-PEC	11/21/2015	SW6010C	Lead	**319**		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
BR02DR	BR02ADR-PEA	11/21/2015	SW6020A	Tungsten	58.4		mg/Kg	1.6		100-point Composite Sample
BR02DR	BR02ADR-PEB	11/21/2015	SW6020A	Tungsten	27.4		mg/Kg	0.80		100-point Composite Sample - Rep 1
BR02DR	BR02ADR-PEC	11/21/2015	SW6020A	Tungsten	52.6		mg/Kg	1.6		100-point Composite Sample - Rep 2
BRNG02	BR-BR02A	11/21/2015	SW6010C	Antimony	ND	U	mg/Kg	4.9	20	100-point Composite Sample
BRNG02	BR-BR02A	11/21/2015	SW6010C	Lead	133		mg/Kg	0.49	200	100-point Composite Sample
BRNG02	BR-BR02A	11/21/2015	SW6020A	Tungsten	16.8		mg/Kg	0.38		100-point Composite Sample
BRNG06	BR-B6	11/21/2015	SW6010C	Antimony	ND	U	mg/Kg	2.8	20	50-point Composite Sample
BRNG06	BR-B6	11/21/2015	SW6010C	Lead	116		mg/Kg	0.47	200	50-point Composite Sample
BRNG06	BR-B6	11/21/2015	SW6020A	Tungsten	35.3		mg/Kg	0.78		50-point Composite Sample
BRNGN	BR NG	11/21/2015	SW6010C	Lead	112		mg/Kg	0.46	200	100-point Composite Sample
BRNGSE	BR-SEG-PEA	11/21/2015	SW6010C	Lead	**326**		mg/Kg	0.48	200	100-point Composite Sample
BRNGSE	BR-SEG-PEB	11/21/2015	SW6010C	Lead	161		mg/Kg	0.46	200	100-point Composite Sample - Rep 1
BRNGSE	BR-SEG-PEC	11/21/2015	SW6010C	Lead	**204**		mg/Kg	0.47	200	100-point Composite Sample - Rep 2
BRNGSW	BR SW	11/21/2015	SW6010C	Lead	**794**		mg/Kg	0.49	200	100-point Composite Sample
B Range - Lift 2										
BR02DR	BR02DRA_A	05/18/2016	SW6020A	Lead	57.6		mg/Kg	0.046	200	100-point Composite Sample
BR02DR	BR02DRA_B	05/18/2016	SW6020A	Lead	55.4		mg/Kg	0.05	200	100-point Composite Sample - Rep 1
BR02DR	BR02DRA_C	05/18/2016	SW6020A	Lead	44.4		mg/Kg	0.048	200	100-point Composite Sample - Rep 2
BR02DR	BR02DRA_A	05/18/2016	SW6020A	Tungsten	14.4	J	mg/Kg	0.37		100-point Composite Sample
BR02DR	BR02DRA_B	05/18/2016	SW6020A	Tungsten	11.7	J	mg/Kg	0.4		100-point Composite Sample - Rep 1
BR02DR	BR02DRA_C	05/18/2016	SW6020A	Tungsten	10.6	J	mg/Kg	0.39		100-point Composite Sample - Rep 2
BRNGSE	BRNGSE01_A	05/18/2016	SW6010C	Lead	57.5		mg/Kg	0.47	200	100-point Composite Sample
BRNGSW	BRNGSW01_A	05/18/2016	SW6010C	Lead	**517**		mg/Kg	1.8	200	100-point Composite Sample
B Range - Lift 3										
BRNGSW	BRNGSW02_A	08/08/2016	SW6010C	Lead	**493**		mg/Kg	0.99	200	100-point Composite Sample
BRNGSW	BRNGSW02_B	08/08/2016	SW6010C	Lead	**383**		mg/Kg	0.97	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_C	08/08/2016	SW6010C	Lead	**332**		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
B Range - Lift 4										
BRNGSW	BRNGSW02_D	10/13/2016	SW6010C	Lead	**387**		mg/Kg	0.97	200	100-point Composite Sample
BRNGSW	BRNGSW02_E	10/13/2016	SW6010C	Lead	**447**		mg/Kg	1	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_F	10/13/2016	SW6010C	Lead	**378**		mg/Kg	0.99	200	100-point Composite Sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
B Range - Lift 5										
BRNGSW	BRNGSW02_G	12/13/2016	SW6010C	Lead	**312**		mg/Kg	0.49	200	100-point Composite Sample
BRNGSW	BRNGSW02_H	12/13/2016	SW6010C	Lead	155		mg/Kg	0.5	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_I	12/13/2016	SW6010C	Lead	**464**		mg/Kg	0.96	200	100-point Composite Sample - Rep 2
B Range - Lift 6										
BRNGSW	BRNGSW02_J	02/08/2017	SW6010C	Lead	**259**		mg/Kg	0.46	200	100-point Composite Sample
BRNGSW	BRNGSW02_K	02/08/2017	SW6010C	Lead	**429**		mg/Kg	1	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_L	02/08/2017	SW6010C	Lead	**277**		mg/Kg	0.43	200	100-point Composite Sample - Rep 2
B Range - Lift 7										
BRNGSW	BRNGSW02_M	03/30/2017	SW6010C	Lead	124	J	mg/Kg	0.49	200	100-point Composite Sample
BRNGSW	BRNGSW02_N	03/30/2017	SW6010C	Lead	126	J	mg/Kg	0.49	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_P	03/30/2017	SW6010C	Lead	**333**	J	mg/Kg	0.49	200	100-point Composite Sample - Rep 2
B Range - Lift 8										
BRNGSW	BRNGSW02_Q	05/10/2017	SW6010C	Lead	117		mg/Kg	0.47	200	100-point Composite Sample
BRNGSW	BRNGSW02_R	05/10/2017	SW6010C	Lead	95.4		mg/Kg	0.5	200	100-point Composite Sample - Rep 1
BRNGSW	BRNGSW02_S	05/10/2017	SW6010C	Lead	196		mg/Kg	0.5	200	100-point Composite Sample - Rep 2
Former B Range - Lift 1										
B-1	B-1_A	06/27/2016	SW6010C	Lead	112		mg/Kg	0.47	200	30-point Composite Sample
B-1	B-1_B	06/27/2016	SW6010C	Lead	136		mg/Kg	0.47	200	30-point Composite Sample - Rep 1
B-1	B-1_C	06/27/2016	SW6010C	Lead	137		mg/Kg	0.45	200	30-point Composite Sample - Rep 2
FBR03	FBR03_A	06/27/2016	SW6010C	Lead	**649**		mg/Kg	0.98	200	50-point Composite Sample
FBR06	FBR06_A	06/27/2016	SW6010C	Lead	129		mg/Kg	0.45	200	100-point Composite Sample
FBR06	FBR06_B	06/27/2016	SW6010C	Lead	157		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FBR06	FBR06_C	06/27/2016	SW6010C	Lead	180		mg/Kg	0.5	200	100-point Composite Sample - Rep 2
FBR07	FBR07_A	06/27/2016	SW6010C	Lead	**329**		mg/Kg	0.49	200	50-point Composite Sample
FBR08	FBR08_A	06/27/2016	SW6010C	Lead	**983**		mg/Kg	1.9	200	50-point Composite Sample
FBR09	FBR09_A	06/27/2016	SW6010C	Lead	**572**		mg/Kg	0.97	200	50-point Composite Sample
FBR10	FBR10_A	06/27/2016	SW6010C	Lead	94		mg/Kg	0.49	200	50-point Composite Sample
FBR10	FBR10_B	06/27/2016	SW6010C	Lead	129		mg/Kg	0.49	200	50-point Composite Sample - Rep 1
FBR10	FBR10_C	06/27/2016	SW6010C	Lead	120		mg/Kg	0.47	200	50-point Composite Sample - Rep 2
FBR11	FBR11_A	06/27/2016	SW6010C	Lead	166		mg/Kg	0.47	200	50-point Composite Sample
FBR12	FBR12_A	06/27/2016	SW6010C	Lead	**581**		mg/Kg	0.95	200	50-point Composite Sample
FBR13	FBR13_A	06/27/2016	SW6010C	Lead	75		mg/Kg	0.48	200	50-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
FBR14	FBR14_A	06/27/2016	SW6010C	Lead	54.8		mg/Kg	0.49	200	50-point Composite Sample
FBR14	FBR14_B	06/27/2016	SW6010C	Lead	62.6		mg/Kg	0.5	200	50-point Composite Sample - Rep 1
FBR14	FBR14_C	06/27/2016	SW6010C	Lead	70		mg/Kg	0.5	200	50-point Composite Sample - Rep 2
FBR140L	FBR140L_A	06/27/2016	SW6010C	Lead	**770**		mg/Kg	2	200	100-point Composite Sample
FBR140QR	FBR140QR_A	06/27/2016	SW6010C	Lead	**608**		mg/Kg	0.97	200	50-point Composite Sample
FBR15	FBR15_A	06/27/2016	SW6010C	Lead	**404**		mg/Kg	1	200	50-point Composite Sample
FBR16	FBR16_A	06/27/2016	SW6010C	Lead	**284**		mg/Kg	0.48	200	50-point Composite Sample
FBR17	FBR17_A	06/27/2016	SW6010C	Lead	**250**		mg/Kg	0.5	200	50-point Composite Sample
FBR18	FBR18A_A	06/27/2016	SW6010C	Lead	**218**		mg/Kg	0.44	200	50-point Composite Sample
FBR18	FBR18A_B	06/27/2016	SW6010C	Lead	173		mg/Kg	0.48	200	50-point Composite Sample - Rep 1
FBR18	FBR18A_C	06/27/2016	SW6010C	Lead	166		mg/Kg	0.45	200	50-point Composite Sample - Rep 2
FBR20	FBR20A_A	06/27/2016	SW6010C	Lead	16.4		mg/Kg	0.48	200	100-point Composite Sample
Former B Range - Lift 2										
FBR03	FBR03A_A	09/22/2016	SW6010C	Lead	**657**		mg/Kg	1.9	200	50-point Composite Sample
FBR07	FBR07A_A	09/22/2016	SW6010C	Lead	**338**		mg/Kg	0.5	200	50-point Composite Sample
FBR08	FBR08A_A	09/22/2016	SW6010C	Lead	**817**		mg/Kg	2	200	50-point Composite Sample
FBR08	FBR08A_B	09/22/2016	SW6010C	Lead	**750**		mg/Kg	2	200	50-point Composite Sample - Rep 1
FBR08	FBR08A_C	09/22/2016	SW6010C	Lead	**743**		mg/Kg	2	200	50-point Composite Sample - Rep 2
FBR09	FBR09A_A	09/22/2016	SW6010C	Lead	**647**		mg/Kg	1	200	50-point Composite Sample
FBR12	FBR12A_A	09/22/2016	SW6010C	Lead	**564**		mg/Kg	1	200	50-point Composite Sample
FBR140L	FBR140LA_A	09/22/2016	SW6010C	Lead	**382**		mg/Kg	1	200	100-point Composite Sample
FBR140L	FBR140LA_B	09/22/2016	SW6010C	Lead	**394**		mg/Kg	0.99	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_C	09/22/2016	SW6010C	Lead	**469**		mg/Kg	0.98	200	100-point Composite Sample - Rep 2
FBR140QR	SSFBR140QRA_A	09/29/2016	SW6010C	Lead	**490**		mg/Kg	0.98	200	50-point Composite Sample
FBR15	FBR15A_A	09/22/2016	SW6010C	Lead	**614**		mg/Kg	2	200	50-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
FBR16	FBR16A_A	09/22/2016	SW6010C	Lead	**462**		mg/Kg	2	200	50-point Composite Sample
FBR16	FBR16A_B	09/22/2016	SW6010C	Lead	**210**		mg/Kg	1	200	50-point Composite Sample - Rep 1
FBR16	FBR16A_C	09/22/2016	SW6010C	Lead	**308**		mg/Kg	1	200	50-point Composite Sample - Rep 2
FBR17	FBR17A_A	09/22/2016	SW6010C	Lead	200		mg/Kg	1	200	50-point Composite Sample
FBR18	FBR18A_A	09/22/2016	SW6010C	Lead	**269**		mg/Kg	1	200	50-point Composite Sample
Former B Range - Lift 3										
FBR03	FBR03A_B	11/10/2016	SW6010C	Lead	**585**		mg/Kg	0.97	200	50-point Composite Sample
FBR07	FBR07A_B	11/10/2016	SW6010C	Lead	**207**		mg/Kg	0.49	200	50-point Composite Sample
FBR08	FBR08A_D	11/10/2016	SW6010C	Lead	**404**		mg/Kg	0.94	200	50-point Composite Sample
FBR08	FBR08A_E	11/10/2016	SW6010C	Lead	**384**		mg/Kg	0.99	200	50-point Composite Sample - Rep 1
FBR08	FBR08A_F	11/10/2016	SW6010C	Lead	**406**		mg/Kg	0.91	200	50-point Composite Sample - Rep 2
FBR09	FBR09A_B	11/10/2016	SW6010C	Lead	**407**		mg/Kg	0.92	200	50-point Composite Sample
FBR12	FBR12A_B	11/10/2016	SW6010C	Lead	**708**		mg/Kg	2	200	50-point Composite Sample
FBR140L	FBR140LA_D	11/10/2016	SW6010C	Lead	**968**		mg/Kg	2	200	100-point Composite Sample
FBR140L	FBR140LA_E	11/10/2016	SW6010C	Lead	**828**		mg/Kg	2	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_F	11/10/2016	SW6010C	Lead	**817**		mg/Kg	2	200	100-point Composite Sample - Rep 2
FBR140QR	SSFBR140QRA_B	11/10/2016	SW6010C	Lead	**584**		mg/Kg	1	200	50-point Composite Sample
FBR15	FBR15A_B	11/10/2016	SW6010C	Lead	**241**		mg/Kg	0.49	200	50-point Composite Sample
FBR16	FBR16A_D	11/10/2016	SW6010C	Lead	184		mg/Kg	0.48	200	50-point Composite Sample
FBR16	FBR16A_E	11/10/2016	SW6010C	Lead	**281**		mg/Kg	0.49	200	50-point Composite Sample - Rep 1
FBR16	FBR16A_F	11/10/2016	SW6010C	Lead	**346**		mg/Kg	0.48	200	50-point Composite Sample - Rep 2
FBR18	FBR18A_B	11/10/2016	SW6010C	Lead	75.8		mg/Kg	0.49	200	50-point Composite Sample
Former B Range - Lift 4										
FBR03	FBR03A_C	02/08/2017	SW6010C	Lead	**289**		mg/Kg	0.47	200	50-point Composite Sample
FBR07	FBR07A_C	02/08/2017	SW6010C	Lead	135		mg/Kg	0.5	200	50-point Composite Sample
FBR08	FBR08A_G	02/08/2017	SW6010C	Lead	179		mg/Kg	0.49	200	50-point Composite Sample
FBR08	FBR08A_H	02/08/2017	SW6010C	Lead	119		mg/Kg	0.47	200	50-point Composite Sample - Rep 1
FBR08	FBR08A_I	02/08/2017	SW6010C	Lead	138		mg/Kg	0.5	200	50-point Composite Sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
FBR09	FBR09A_C	02/08/2017	SW6010C	Lead	122		mg/Kg	0.5	200	50-point Composite Sample
FBR12	FBR12A_C	02/08/2017	SW6010C	Lead	106		mg/Kg	0.5	200	50-point Composite Sample
FBR140L	FBR140LA_G	02/08/2017	SW6010C	Lead	**576**		mg/Kg	0.99	200	100-point Composite Sample
FBR140L	FBR140LA_H	02/08/2017	SW6010C	Lead	**685**		mg/Kg	1	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_I	02/08/2017	SW6010C	Lead	**625**		mg/Kg	0.98	200	100-point Composite Sample - Rep 2
FBR140QR	FBR140QRA_C	02/08/2017	SW6010C	Lead	**390**		mg/Kg	0.89	200	50-point Composite Sample
FBR15	FBR15A_C	02/08/2017	SW6010C	Lead	130		mg/Kg	0.5	200	50-point Composite Sample
FBR16	FBR16A_G	02/08/2017	SW6010C	Lead	190	J	mg/Kg	0.5	200	50-point Composite Sample
FBR16	FBR16A_H	02/08/2017	SW6010C	Lead	86.6	J	mg/Kg	0.5	200	50-point Composite Sample - Rep 1
FBR16	FBR16A_I	02/08/2017	SW6010C	Lead	78.8	J	mg/Kg	0.49	200	50-point Composite Sample - Rep 2
Former B Range - Lift 5										
FBR03	FBR03A_D	03/30/2017	SW6010C	Lead	54.9		mg/Kg	0.5	200	50-point Composite Sample
FBR140L	FBR140LA_J	03/30/2017	SW6010C	Lead	**357**		mg/Kg	0.49	200	100-point Composite Sample
FBR140L	FBR140LA_K	03/30/2017	SW6010C	Lead	**382**		mg/Kg	0.98	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_L	03/30/2017	SW6010C	Lead	**297**		mg/Kg	0.48	200	100-point Composite Sample - Rep 2
FBR140QR	FBR140QRA_D	03/30/2017	SW6010C	Lead	**403**		mg/Kg	0.96	200	50-point Composite Sample
Former B Range - Lift 6										
FBR140L	FBR140LA_M	05/10/2017	SW6010C	Lead	**220**		mg/Kg	0.49	200	100-point Composite Sample
FBR140L	FBR140LA_N	05/10/2017	SW6010C	Lead	177		mg/Kg	0.98	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_P	05/10/2017	SW6010C	Lead	**228**		mg/Kg	0.48	200	100-point Composite Sample - Rep 2
FBR140QR	FBR140QRA_E	05/10/2017	SW6010C	Lead	**472**		mg/Kg	0.96	200	50-point Composite Sample
Former B Range - Lift 7										
FBR140L	FBR140LA_Q	11/12/2017	SW6010C	Lead	119		mg/Kg	0.5	200	100-point Composite Sample
FBR140L	FBR140LA_R	11/12/2017	SW6010C	Lead	133		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FBR140L	FBR140LA_S	11/12/2017	SW6010C	Lead	118		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
FBR140QR	FBR140QRA_F	11/12/2017	SW6010C	Lead	**514**		mg/Kg	1.9	200	50-point Composite Sample
Former B Range - Lift 8										
FBR140QR	FBR140QRA_G	05/22/2018	SW6010C	Lead	**229**		mg/Kg	0.5	200	50-point MIS sample
FBR140QR	FBR140QRA_H	05/22/2018	SW6010C	Lead	**277**		mg/Kg	0.48	200	50-point MIS sample - Rep 1
FBR140QR	FBR140QRA_I	05/22/2018	SW6010C	Lead	144		mg/Kg	0.5	200	50-point MIS sample - Rep 2
Former B Range - Lift 9										
FBR140QR	FBR140QRA_J	06/22/2018	SW6010C	Lead	**309**		mg/Kg	0.48	200	50-point MIS sample
FBR140QR	FBR140QRA_K	06/22/2018	SW6010C	Lead	**672**		mg/Kg	1.9	200	50-point MIS sample - Rep 1
FBR140QR	FBR140QRA_L	06/22/2018	SW6010C	Lead	**730**		mg/Kg	2	200	50-point MIS sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
Former B Range - Lift 10										
FBR140QR	FBR140QR_M	11/19/2018	SW6010C	Lead	**455**		mg/Kg	0.96	200	50-Point MIS Sample
FBR140QR	FBR140QR_MR1	11/19/2018	SW6010C	Lead	**479**		mg/Kg	0.92	200	50-Point MIS Sample - Rep 1
FBR140QR	FBR140QR_MR2	11/19/2018	SW6010C	Lead	**401**		mg/Kg	0.92	200	50-Point MIS Sample - Rep 2
Former B Range - Lift 11										
FBR140QR	FBR140QR_L11	05/09/2019	SW6010D	Lead	29.8		mg/Kg	0.96	200	50-Point MIS Sample
FBR140QR	FBR140QR_L11R1	05/09/2019	SW6010D	Lead	30.5		mg/Kg	0.92	200	50-Point MIS Sample - Rep 1
FBR140QR	FBR140QR_L11R2	05/09/2019	SW6010D	Lead	34.2		mg/Kg	0.92	200	50-Point MIS Sample - Rep 2
C Range - Lift 1										
CR02DR	CR02DR_PEA	01/11/2016	SW6010C	Lead	18.1		mg/Kg	0.49		100-point Composite Sample
CR02DR	CR02DR_PEA	01/11/2016	SW6020A	Tungsten	0.27		mg/Kg	0.096		100-point Composite Sample
CR04N	CR04N_PEA	01/11/2016	SW6010C	Lead	18.4		mg/Kg	0.49		100-point Composite Sample
CR04N	CR04N_PEB	01/11/2016	SW6010C	Lead	23		mg/Kg	0.49		100-point Composite Sample - Rep 1
CR04N	CR04N_PEC	01/11/2016	SW6010C	Lead	14.4		mg/Kg	0.49		100-point Composite Sample - Rep 2
CR04N	CR04N_PEA	01/11/2016	SW6020A	Tungsten	0.66		mg/Kg	0.098		100-point Composite Sample
CR04N	CR04N_PEB	01/11/2016	SW6020A	Tungsten	1		mg/Kg	0.096		100-point Composite Sample - Rep 1
CR04N	CR04N_PEC	01/11/2016	SW6020A	Tungsten	1		mg/Kg	0.097		100-point Composite Sample - Rep 2
CR04S	CR04S_PEA	01/11/2016	SW6010C	Lead	78.8		mg/Kg	0.50		100-point Composite Sample
CR04S	CR04S_PEB	01/11/2016	SW6010C	Lead	31.4		mg/Kg	0.49		100-point Composite Sample - Rep 1
CR04S	CR04S_PEC	01/11/2016	SW6010C	Lead	16.5		mg/Kg	0.50		100-point Composite Sample - Rep 2
CR04S	CR04S_PEA	01/11/2016	SW6020A	Tungsten	0.81		mg/Kg	0.096		100-point Composite Sample
CR04S	CR04S_PEB	01/11/2016	SW6020A	Tungsten	0.77		mg/Kg	0.099		100-point Composite Sample - Rep 1
CR04S	CR04S_PEC	01/11/2016	SW6020A	Tungsten	0.43		mg/Kg	0.098		100-point Composite Sample - Rep 2
CRNG01	CR01A_PEA	01/11/2016	SW6010C	Lead	25.4		mg/Kg	0.50		100-point Composite Sample
CRNG01	CR01A_PEA	01/11/2016	SW6020A	Tungsten	1.6	J	mg/Kg	0.099		100-point Composite Sample
CRNG02	CR02A_PEA	01/11/2016	SW6010C	Lead	127		mg/Kg	0.48		100-point Composite Sample
CRNG02	CR02A_PEA	01/11/2016	SW6020A	Tungsten	7.9		mg/Kg	0.39		100-point Composite Sample
CRNGBR5-6	BERM_AREAS5/6_PEA	01/11/2016	SW6010C	Lead	**433**		mg/Kg	0.48		50-point Composite Sample
CRNGBR5-6	BERM_AREAS5/6_PEA	01/11/2016	SW6020A	Tungsten	11.1		mg/Kg	0.39		50-point Composite Sample
CRNGMID	CRNG_MIDGRID_PEA	01/11/2016	SW6010C	Lead	**961**		mg/Kg	0.50		100-point Composite Sample
CRNGMID	CRNG_MIDGRID_PEB	01/11/2016	SW6010C	Lead	**491**		mg/Kg	0.48		100-point Composite Sample - Rep 1
CRNGMID	CRNG_MIDGRID_PEC	01/11/2016	SW6010C	Lead	**834**		mg/Kg	0.49		100-point Composite Sample - Rep 2
CRNGN	CRNG_NORTHGRID_PEA	01/11/2016	SW6010C	Lead	**274**		mg/Kg	2.0		50-point Composite Sample
CRNGS	CRNG_SOUTHGRID_PEA	01/11/2016	SW6010C	Lead	**561**		mg/Kg	0.49		200-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
C Range - Lift 2										
CRNGBR5-6	CRNGBRM5-6_A	05/18/2016	SW6010C	Lead	**559**		mg/Kg	1.9	200	50-point Composite Sample
CRNGBR5-6	CRNGBRM5-6_B	05/18/2016	SW6010C	Lead	**528**		mg/Kg	1.7	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBRM5-6_C	05/18/2016	SW6010C	Lead	**793**		mg/Kg	1.9	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID01_A	05/18/2016	SW6010C	Lead	**880**		mg/Kg	1.9	200	100-point Composite Sample
CRNGN	CRNGN01_A	05/18/2016	SW6010C	Lead	182		mg/Kg	1.9	200	50-point Composite Sample
CRNGS	CRNGS01_A	05/18/2016	SW6010C	Lead	**746**		mg/Kg	2.0	200	200-point Composite Sample
C Range - Lift 3										
CRNGBR5-6	CRNGBR5-6A_A	08/08/2016	SW6010C	Lead	**518**		mg/Kg	0.96	200	50-point Composite Sample
CRNGBR5-6	CRNGBR5-6A_B	08/08/2016	SW6010C	Lead	**519**		mg/Kg	0.98	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBR5-6A_C	08/08/2016	SW6010C	Lead	**890**		mg/Kg	2	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID02_A	08/08/2016	SW6010C	Lead	**510**		mg/Kg	0.98	200	100-point Composite Sample
CRNGS	CRNGS02_A	08/08/2016	SW6010C	Lead	**440**		mg/Kg	0.98	200	200-point Composite Sample
C Range - Lift 4										
CRNGBR5-6	CRNGBR5-6A_D	10/13/2016	SW6010C	Lead	**330**		mg/Kg	0.93	200	50-point Composite Sample
CRNGBR5-6	CRNGBR5-6A_E	10/13/2016	SW6010C	Lead	**339**		mg/Kg	0.48	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBR5-6A_F	10/13/2016	SW6010C	Lead	**485**		mg/Kg	0.98	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID02_B	10/13/2016	SW6010C	Lead	**874**		mg/Kg	1.9	200	100-point Composite Sample
CRNGS	CRNGS02_B	10/13/2016	SW6010C	Lead	**458**		mg/Kg	0.94	200	200-point Composite Sample
C Range - Lift 5										
CRNGBR5-6	CRNGBR5-6A_G	12/13/2016	SW6010C	Lead	**422**	**J**	mg/Kg	0.93	200	50-point Composite Sample
CRNGBR5-6	CRNGBR5-6A_H	12/13/2016	SW6010C	Lead	**867**	**J**	mg/Kg	2	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBR5-6A_I	12/13/2016	SW6010C	Lead	**342**	**J**	mg/Kg	0.49	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID02_C	12/13/2016	SW6010C	Lead	**738**		mg/Kg	2	200	100-point Composite Sample
CRNGS	CRNGS02_C	12/13/2016	SW6010C	Lead	**264**		mg/Kg	0.47	200	200-point Composite Sample
C Range - Lift 6										
CRNGBR5-6	CRNGBR5-6A_J	02/23/2017	SW6010C	Lead	**203**		mg/Kg	0.5	200	50-point Composite Sample
CRNGBR5-6	CRNGBR5-6A_K	02/23/2017	SW6010C	Lead	181		mg/Kg	0.49	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBR5-6A_L	02/23/2017	SW6010C	Lead	103		mg/Kg	0.48	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID02_D	02/23/2017	SW6010C	Lead	**251**		mg/Kg	0.5	200	100-point Composite Sample
CRNGS	CRNGS02_D	02/23/2017	SW6010C	Lead	**545**		mg/Kg	0.96	200	200-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
C Range - Lift 7										
CRNGBR5-6	CRNGBR5-6A_M	03/21/2017	SW6010C	Lead	41.4	J	mg/Kg	0.5	200	50-point Composite Sample
CRNGBR5-6	CRNGBR5-6A_N	03/21/2017	SW6010C	Lead	102	J	mg/Kg	0.49	200	50-point Composite Sample - Rep 1
CRNGBR5-6	CRNGBR5-6A_P	03/21/2017	SW6010C	Lead	171	J	mg/Kg	0.49	200	50-point Composite Sample - Rep 2
CRNGMID	CRNGMID02_E	03/21/2017	SW6010C	Lead	194		mg/Kg	0.48	200	100-point Composite Sample
CRNGS	CRNGS02_E	03/21/2017	SW6010C	Lead	**462**		mg/Kg	0.99	200	200-point Composite Sample
C Range - Lift 8										
CRNGS	CRNGS02_F	05/10/2017	SW6010C	Lead	183		mg/Kg	0.5	200	200-point Composite Sample
CRNGS	CRNGS02_G	05/10/2017	SW6010C	Lead	182		mg/Kg	0.49	200	200-point Composite Sample - Rep 1
CRNGS	CRNGS02_H	05/10/2017	SW6010C	Lead	**251**		mg/Kg	0.5	200	200-point Composite Sample - Rep 2
C Range - Lift 9										
CRNGS	CRNGS02_I	11/02/2017	SW6010C	Lead	**223**		mg/Kg	0.49	200	200-point Composite Sample
CRNGS	CRNGS02_J	11/02/2017	SW6010C	Lead	178		mg/Kg	0.49	200	200-point Composite Sample - Duplicate
C Range - Lift 10										
CRNGS	CRNGS02_K	05/21/2018	SW6010C	Lead	**307**		mg/Kg	0.5	200	200-point MIS sample
CRNGS	CRNGS02_L	05/21/2018	SW6010C	Lead	**312**		mg/Kg	0.5	200	200-point MIS sample - Rep 1
CRNGS	CRNGS02_M	05/21/2018	SW6010C	Lead	157		mg/Kg	0.49	200	200-point MIS sample - Rep 2
C Range - Lift 11										
CRNGS	CRNGS_N	11/20/2018	SW6010C	Lead	167		mg/Kg	0.50	200	200-Point MIS Sample
CRNGS	CRNGS_NR1	11/20/2018	SW6010C	Lead	183		mg/Kg	0.48	200	200-Point MIS Sample - Rep 1
CRNGS	CRNGS_NR2	11/20/2018	SW6010C	Lead	118		mg/Kg	0.47	200	200-Point MIS Sample - Rep 2
Former C Range - Lift 1										
FCR136	FCR136-A_A	05/18/2016	SW6010C	Lead	**286**		mg/Kg	0.46	200	100-point Composite Sample
FCR136	FCR136-A_B	05/18/2016	SW6010C	Lead	**295**		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FCR136	FCR136-A_C	05/18/2016	SW6010C	Lead	**263**		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
Former C Range - Lift 2										
FCR136	FCR136-B_A	08/08/2016	SW6010C	Lead	94.5		mg/Kg	0.5	200	100-point Composite Sample
FCR136	FCR136-B_B	08/08/2016	SW6010C	Lead	89.1		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FCR136	FCR136-B_C	08/08/2016	SW6010C	Lead	91.1		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
D Range - Lift 1										
DR01	DR01_A	07/20/2016	SW6010C	Lead	**1,300**		mg/Kg	2.3	200	50-point Composite Sample
DR02	DR02A_A	07/20/2016	SW6010C	Lead	200		mg/Kg	0.5	200	50-point Composite Sample
DR03	DR03A_A	07/20/2016	SW6010C	Lead	13.7		mg/Kg	0.49	200	50-point Composite Sample
DR04	DR04_A	07/20/2016	SW6010C	Lead	166		mg/Kg	0.47	200	30-point Composite Sample
DR04	DR04_B	07/20/2016	SW6010C	Lead	116		mg/Kg	0.47	200	30-point Composite Sample - Rep 1
DR04	DR04_C	07/20/2016	SW6010C	Lead	171		mg/Kg	0.49	200	30-point Composite Sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
DR06	DR06A_A	07/20/2016	SW6010C	Lead	30.4		mg/Kg	0.47	200	30-point Composite Sample
DR158	DR158_A	03/21/2017	SW6010C	Lead	**355**		mg/Kg	0.5	200	100-point Composite Sample
DR158	DR158_B	03/21/2017	SW6010C	Lead	**338**		mg/Kg	0.49	200	100-point Composite Sample - Rep 1
DR158	DR158_C	03/21/2017	SW6010C	Lead	**371**		mg/Kg	0.5	200	100-point Composite Sample - Rep 2
D Range - Lift 2										
DR01	DR01A_A	08/25/2016	SW6010C	Lead	**1,320**		mg/Kg	2.5	200	50-point Composite Sample
DR01	DR01A_B	08/25/2016	SW6010C	Lead	**1,040**		mg/Kg	2	200	50-point Composite Sample - Rep 1
DR01	DR01A_C	08/25/2016	SW6010C	Lead	**1,150**		mg/Kg	2	200	50-point Composite Sample - Rep 2
DR158	DR158_D	05/10/2017	SW6010C	Lead	**274**		mg/Kg	0.49	200	100-point Composite Sample
DR158	DR158_E	05/10/2017	SW6010C	Lead	**389**		mg/Kg	0.99	200	100-point Composite Sample - Rep 1
DR158	DR158_F	05/10/2017	SW6010C	Lead	**316**		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
D Range - Lift 3										
DR01	DR01A_D	10/04/2016	SW6010C	Lead	131	J	mg/Kg	0.46	200	50-point Composite Sample
DR01	DR01A_E	10/04/2016	SW6010C	Lead	**497**	**J**	mg/Kg	1	200	50-point Composite Sample - Rep 1
DR01	DR01A_F	10/04/2016	SW6010C	Lead	**281**	**J**	mg/Kg	0.47	200	50-point Composite Sample - Rep 2
DR158	DR158_G	11/01/2017	SW6010C	Lead	183		mg/Kg	0.48	200	100-point Composite Sample
DR158	DR158_H	11/01/2017	SW6010C	Lead	**260**		mg/Kg	0.49	200	100-point Composite Sample - Rep 1
DR158	DR158_I	11/01/2017	SW6010C	Lead	185		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
D Range - Lift 4										
DR01	DR01A_G	12/13/2016	SW6010C	Lead	57	J	mg/Kg	0.44	200	50-point Composite Sample
DR01	DR01A_H	12/13/2016	SW6010C	Lead	17	J	mg/Kg	0.49	200	50-point Composite Sample - Rep 1
DR01	DR01A_I	12/13/2016	SW6010C	Lead	91	J	mg/Kg	0.5	200	50-point Composite Sample - Rep 2
DR158	DR158_J	05/21/2018	SW6010C	Lead	**222**		mg/Kg	0.48	200	100-point MIS sample
DR158	DR158_K	05/21/2018	SW6010C	Lead	170		mg/Kg	0.5	200	100-point MIS sample - Rep 1
DR158	DR158_L	05/21/2018	SW6010C	Lead	112		mg/Kg	0.49	200	100-point MIS sample - Rep 2
D Range - Lift 5										
DR158	DR158_M	08/06/2018	SW6010C	Lead	**240**		mg/Kg	0.5	200	100-point MIS sample
DR158	DR158_N	08/06/2018	SW6010C	Lead	199		mg/Kg	0.5	200	100-point MIS sample - Rep 1
DR158	DR158_O	08/06/2018	SW6010C	Lead	**204**		mg/Kg	0.5	200	100-point MIS sample - Rep 2
*DR158EAST	DR158E_A	09/05/2018	SW6010C	Lead	**283**		mg/Kg	0.48	200	50-point MIS sample
*DR158WEST	DR158W_A	09/05/2018	SW6010C	Lead	86		mg/Kg	0.48	200	50-point MIS sample
*DR158WEST	DR158W_B	10/24/2018	SW6010C	Lead	94	J	mg/Kg	0.5	200	50-point MIS sample
D Range - Lift 6										
*DR158EAST	DR158E_B	11/21/2018	SW6010C	Lead	**288**		mg/Kg	0.46	200	50-Point MIS Sample
*DR158EAST	DR158E_BR1	11/21/2018	SW6010C	Lead	**217**		mg/Kg	0.5	200	50-Point MIS Sample - Rep1
*DR158EAST	DR158E_BR2	11/21/2018	SW6010C	Lead	**210**		mg/Kg	0.44	200	50-Point MIS Sample - Rep2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
D Range - Lift 7										
*DR158EAST	DR158E_L7	05/09/2019	SW6010D	Lead	**284**		mg/Kg	0.46	200	50-Point MIS Sample
*DR158EAST	DR158E_L7R1	05/09/2019	SW6010D	Lead	**222**		mg/Kg	0.5	200	50-Point MIS Sample - Rep 1
*DR158EAST	DR158E_L7R2	05/09/2019	SW6010D	Lead	198		mg/Kg	0.44	200	50-Point MIS Sample - Rep 2
D Range - Lift 8										
*DR158EAST	DR158E_L8	06/26/2019	SW6010D	Lead	88.4		mg/Kg	0.36	200	50-Point MIS Sample
*DR158EAST	DR158E_L8R1	06/26/2019	SW6010D	Lead	113		mg/Kg	0.50	200	50-Point MIS Sample - Rep 1
*DR158EAST	DR158E_L8R2	06/26/2019	SW6010D	Lead	111		mg/Kg	0.39	200	50-Point MIS Sample - Rep 2
Former D Range - Lift 1										
FDRD1-Aa	D1-AA	11/19/2015	SW6010C	Lead	**361**		mg/Kg	0.47	200	100-point Composite Sample
FDR05	FDR05_PEA	11/19/2015	SW6010C	Lead	**233**		mg/Kg	0.47	200	50-point Composite Sample
FDR06	FDR06_PEA	11/19/2015	SW6010C	Lead	**278**		mg/Kg	0.45	200	100-point Composite Sample
FDR06	FDR06_PEB	11/19/2015	SW6010C	Lead	**280**		mg/Kg	0.50	200	100-point Composite Sample - Rep 1
FDR06	FDR06_PEC	11/19/2015	SW6010C	Lead	**551**		mg/Kg	0.47	200	100-point Composite Sample - Rep 2
FDR07	FDR07_PEA	11/19/2015	SW6010C	Lead	120		mg/Kg	0.45	200	100-point Composite Sample
FDR135GT	FDR135GT_PEA	11/17/2015	SW6010C	Lead	**626**		mg/Kg	0.50	200	100-point Composite Sample
FDR135GT	FDR135GT_PEB	11/17/2015	SW6010C	Lead	**421**		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FDR135GT	FDR135GT_PEC	11/17/2015	SW6010C	Lead	**515**		mg/Kg	0.44	200	100-point Composite Sample - Rep 2
FDR135U	FDR135U_PEA	11/17/2015	SW6010C	Lead	**388**		mg/Kg	0.45	200	50-point Composite Sample
FDRD1-Ab	FMRD1-AB-PEA	11/21/2015	SW6010C	Lead	195		mg/Kg	0.48	200	100-point Composite Sample
FDRD1-Ac	FMRD1-AC-PEA	11/21/2015	SW6010C	Lead	102		mg/Kg	0.45	200	100-point Composite Sample
FDRD1-Ac	FMRD1-AC-PEB	11/21/2015	SW6010C	Lead	110		mg/Kg	0.50	200	100-point Composite Sample - Rep 1
FDRD1-Ac	FMRD1-AC-PEC	11/21/2015	SW6010C	Lead	98.4		mg/Kg	0.47	200	100-point Composite Sample - Rep 2
Former D Range - Lift 2										
FDRD1-Aa	D-AA_A	07/11/2016	SW6010C	Lead	**242**		mg/Kg	0.45	200	100-point Composite Sample
FDR05	FDR05_A	07/11/2016	SW6010C	Lead	128		mg/Kg	0.47	200	50-point Composite Sample
FDR06	FDR06_A	07/11/2016	SW6010C	Lead	**246**		mg/Kg	0.46	200	100-point Composite Sample
FDR135GT	FDR135GT_A	07/11/2016	SW6010C	Lead	175		mg/Kg	0.47	200	100-point Composite Sample
FDR135U	FDR135U_A	07/11/2016	SW6010C	Lead	109	J	mg/Kg	0.48	200	50-point Composite Sample
FDR135U	FDR135U_B	07/11/2016	SW6010C	Lead	151	J	mg/Kg	0.47	200	50-point Composite Sample - Rep 1
FDR135U	FDR135U_C	07/11/2016	SW6010C	Lead	**378**	J	mg/Kg	0.91	200	50-point Composite Sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
Former D Range - Lift 3										
FDRD1-Aa	D-1AA_A	08/25/2016	SW6010C	Lead	**203**		mg/Kg	0.5	200	100-point Composite Sample
FDR06	FDR06A_A	08/25/2016	SW6010C	Lead	130		mg/Kg	0.48	200	100-point Composite Sample
FDR135U	FDR135UA_A	08/25/2016	SW6010C	Lead	171		mg/Kg	0.47	200	50-point Composite Sample
FDR135U	FDR135UA_B	08/25/2016	SW6010C	Lead	149		mg/Kg	0.49	200	50-point Composite Sample - Rep 1
FDR135U	FDR135UA_C	08/25/2016	SW6010C	Lead	120		mg/Kg	0.5	200	50-point Composite Sample - Rep 2
Former D Range - Lift 4										
FDRD1-Aa	D-1AA-A_A	09/22/2016	SW6010C	Lead	**308**		mg/Kg	0.47	200	100-point Composite Sample
FDRD1-Aa	D-1AA-A_B	09/22/2016	SW6010C	Lead	**209**		mg/Kg	0.5	200	100-point Composite Sample - Rep 1
FDRD1-Aa	D-1AA-A_C	09/22/2016	SW6010C	Lead	**389**		mg/Kg	0.98	200	100-point Composite Sample - Rep 2
Former D Range - Lift 5										
FDRD1-Aa	D-1AA-A_D	11/17/2016	SW6010C	Lead	134		mg/Kg	0.47	200	100-point Composite Sample
FDRD1-Aa	D-1AA-A_E	11/17/2016	SW6010C	Lead	127		mg/Kg	0.47	200	100-point Composite Sample - Rep 1
FDRD1-Aa	D-1AA-A_F	11/17/2016	SW6010C	Lead	150		mg/Kg	0.48	200	100-point Composite Sample - Rep 2
G Range - Lift 1										
GRNG01	GR01A_PEA	11/23/2015	SW6010C	Antimony	19.4		mg/Kg	0.95	20	100-point Composite Sample
GRNG01	GR01A_PEA	11/23/2015	SW6010C	Lead	**2350**		mg/Kg	0.95	200	100-point Composite Sample
GRNG01	GR01A_PEA	11/23/2015	SW6020A	Tungsten	4.6		mg/Kg	0.39		100-point Composite Sample
GR01DR	GR01DR_PEA	12/16/2015	SW6010C	Lead	**1120**		mg/Kg	0.49	200	100-point Composite Sample
GR01DR	GR01DR_PEB	12/16/2015	SW6010C	Lead	**543**		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
GR01DR	GR01DR_PEC	12/16/2015	SW6010C	Lead	**438**		mg/Kg	0.50	200	100-point Composite Sample - Rep 2
GR01DR	GR01DR_PEA	12/16/2015	SW6020A	Tungsten	0.83		mg/Kg	0.10		100-point Composite Sample
GR01DR	GR01DR_PEB	12/16/2015	SW6020A	Tungsten	0.79		mg/Kg	0.10		100-point Composite Sample - Rep 1
GR01DR	GR01DR_PEC	12/16/2015	SW6020A	Tungsten	0.83		mg/Kg	0.10		100-point Composite Sample - Rep 2
GR04	GR04 PEA	11/23/2015	SW6010C	Lead	**264**		mg/Kg	0.46	200	100-point Composite Sample
GR04	GR04 PEB	11/23/2015	SW6010C	Lead	194		mg/Kg	0.45	200	100-point Composite Sample - Rep 1
GR04	GR04 PEC	11/23/2015	SW6010C	Lead	137		mg/Kg	0.46	200	100-point Composite Sample - Rep 2
G Range - Lift 2										
GR01A	GR01A_A	07/20/2016	SW6010C	Lead	**713**		mg/Kg	2	200	100-point Composite Sample
GR01A	GR01A_B	07/20/2016	SW6010C	Lead	**819**		mg/Kg	1.9	200	100-point Composite Sample - Rep 1
GR01A	GR01A_C	07/20/2016	SW6010C	Lead	**816**		mg/Kg	1.9	200	100-point Composite Sample - Rep 2
GR01DR	GR01DR_A	07/20/2016	SW6010C	Lead	**436**		mg/Kg	0.93	200	100-point Composite Sample
GR04	GR04_A	07/20/2016	SW6010C	Lead	47.5		mg/Kg	0.48	200	100-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
G Range - Lift 3										
GR01A	GR01A_D	10/04/2016	SW6010C	Lead	**590**		mg/Kg	0.99	200	100-point Composite Sample
GR01A	GR01A_E	10/04/2016	SW6010C	Lead	**471**		mg/Kg	1	200	100-point Composite Sample - Rep 1
GR01A	GR01A_F	10/04/2016	SW6010C	Lead	**553**		mg/Kg	0.99	200	100-point Composite Sample - Rep 2
GR01DR	GR01DR_B	10/04/2016	SW6010C	Lead	**331**		mg/Kg	0.5	200	100-point Composite Sample
G Range - Lift 4										
GR01A	GR01A_G	12/13/2016	SW6010C	Lead	**382**		mg/Kg	0.99	200	100-point Composite Sample
GR01A	GR01A_H	12/13/2016	SW6010C	Lead	**331**		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
GR01A	GR01A_I	12/13/2016	SW6010C	Lead	**255**		mg/Kg	0.5	200	100-point Composite Sample - Rep 2
GR01DR	GR01DR_C	12/13/2016	SW6010C	Lead	49.8		mg/Kg	0.49	200	100-point Composite Sample
G Range - Lift 5										
GR01A	GR01A_J	02/08/2017	SW6010C	Lead	**242**		mg/Kg	0.5	200	100-point Composite Sample
GR01A	GR01A_K	02/08/2017	SW6010C	Lead	133		mg/Kg	0.5	200	100-point Composite Sample - Rep 1
GR01A	GR01A_L	02/08/2017	SW6010C	Lead	**220**		mg/Kg	0.48	200	100-point Composite Sample - Rep 2
G Range - Lift 6										
GR01A	GR01A_M	03/22/2017	SW6010C	Lead	144		mg/Kg	0.49	200	100-point Composite Sample
GR01A	GR01A_N	03/22/2017	SW6010C	Lead	184		mg/Kg	0.47	200	100-point Composite Sample - Rep 1
GR01A	GR01A_P	03/22/2017	SW6010C	Lead	**294**		mg/Kg	0.49	200	100-point Composite Sample - Rep 2
G Range - Lift 7										
GR01A	GR01A_Q	05/10/2017	SW6010C	Lead	106		mg/Kg	0.49	200	100-point Composite Sample
GR01A	GR01A_R	05/10/2017	SW6010C	Lead	162		mg/Kg	0.49	200	100-point Composite Sample - Rep 1
GR01A	GR01A_S	05/10/2017	SW6010C	Lead	120		mg/Kg	0.5	200	100-point Composite Sample - Rep 2
Former M2 Range - Lift 1										
FM2R02DR	FM2R02DR-A_PEA	12/16/2015	SW6010C	Lead	67.4		mg/Kg	0.49	200	100-point Composite Sample
FM2R02DR	FM2R02DR-A_PEB	12/16/2015	SW6010C	Lead	71.6		mg/Kg	0.49	200	100-point Composite Sample - Rep 1
FM2R02DR	FM2R02DR-A_PEC	12/16/2015	SW6010C	Lead	95.8		mg/Kg	0.50	200	100-point Composite Sample - Rep 2
FM2R03DR	FM2R03DR-A_PEA	12/17/2015	SW6010C	Lead	39.3		mg/Kg	0.50	200	100-point Composite Sample
FMRM202	FMRM202A-PEA	12/16/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample
FMRM202	FMRM202A-PEB	12/16/2015	SW6010C	Antimony	ND	U	mg/Kg	0.96	20	100-point Composite Sample - Rep 1
FMRM202	FMRM202A-PEC	12/16/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample - Rep 2
FMRM202	FMRM202A-PEA	12/16/2015	SW6010C	Lead	106		mg/Kg	0.50	200	100-point Composite Sample
FMRM202	FMRM202A-PEB	12/16/2015	SW6010C	Lead	200		mg/Kg	0.48	200	100-point Composite Sample - Rep 1
FMRM202	FMRM202A-PEC	12/16/2015	SW6010C	Lead	110		mg/Kg	0.50	200	100-point Composite Sample - Rep 2
FMRM203	FMRM203A_PEA	12/17/2015	SW6010C	Antimony	ND	U	mg/Kg	0.98	20	100-point Composite Sample
FMRM203	FMRM203A_PEA	12/17/2015	SW6010C	Lead	116		mg/Kg	0.49	200	100-point Composite Sample

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
FMRM204	FMRM204A_PEA	12/17/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample
FMRM204	FMRM204A_PEA	12/17/2015	SW6010C	Lead	140		mg/Kg	0.50	200	100-point Composite Sample
FMRM205	FMRM205A_PEA	12/17/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample
FMRM205	FMRM205A_PEA	12/17/2015	SW6010C	Lead	61		mg/Kg	0.50	200	100-point Composite Sample
N Range - Lift 1										
NR01DR	NR01ADR_PEA	12/17/2015	SW6010C	Lead	109		mg/Kg	0.50	200	100-point Composite Sample
NR02DR	NR02ADR_PEA	12/17/2015	SW6010C	Lead	69.9		mg/Kg	0.49	200	100-point Composite Sample
NR02DR	NR02ADR_PEB	12/17/2015	SW6010C	Lead	36.8		mg/Kg	0.49	200	100-point Composite Sample - Rep 1
NR02DR	NR02ADR_PEC	12/17/2015	SW6010C	Lead	45.4		mg/Kg	0.50	200	100-point Composite Sample - Rep 2
NR03	NR03_PEA	12/17/2015	SW6010C	Lead	45.9		mg/Kg	0.50	200	100-point Composite Sample
NR03	NR03_PEB	12/17/2015	SW6010C	Lead	37.1		mg/Kg	0.50	200	100-point Composite Sample - Rep 1
NR03	NR03_PEC	12/17/2015	SW6010C	Lead	46.1		mg/Kg	0.50	200	100-point Composite Sample - Rep 2
NRNG01	NR01A_PEA	12/17/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample
NRNG01	NR01A_PEA	12/17/2015	SW6010C	Lead	133		mg/Kg	0.50	200	100-point Composite Sample
NRNG01	NR01A_PEA	12/17/2015	SW6020A	Tungsten	ND	U	mg/Kg	0.10		100-point Composite Sample
NRNG02	NR02A_PEA	12/17/2015	SW6010C	Antimony	ND	U	mg/Kg	1.0	20	100-point Composite Sample
NRNG02	NR02A_PEA	12/17/2015	SW6010C	Lead	77.4		mg/Kg	0.50	200	100-point Composite Sample
NRNG02	NR02A_PEA	12/17/2015	SW6020A	Tungsten	ND	UJ	mg/Kg	0.10		100-point Composite Sample
Former N Range - Berm Removal Area (Post-Removal)										
FNRBRM01	FNRBRM01_B	04/21/2016	SW6010C	Antimony	0.28	J	mg/Kg	0.98	20	50-point Composite Sample
FNRBRM01	FNRBRM01_B	04/21/2016	SW6010C	Lead	22.3		mg/Kg	0.49	200	50-point Composite Sample
FNRBRM02	FNRBRM02_C	04/21/2016	SW6010C	Antimony	0.68	J	mg/Kg	0.97	20	50-point Composite Sample
FNRBRM02	FNRBRM02_D	04/21/2016	SW6010C	Antimony	0.26	J	mg/Kg	0.94	20	50-point Composite Sample - Rep 1
FNRBRM02	FNRBRM02_D	04/21/2016	SW6010C	Antimony	0.31	J	mg/Kg	0.99	20	50-point Composite Sample - Rep 2
FNRBRM02	FNRBRM02_C	04/21/2016	SW6010C	Lead	31.7		mg/Kg	0.48	200	50-point Composite Sample
FNRBRM02	FNRBRM02_D	04/21/2016	SW6010C	Lead	48.7		mg/Kg	0.47	200	50-point Composite Sample - Rep 1
FNRBRM02	FNRBRM02_D	04/21/2016	SW6010C	Lead	11.9		mg/Kg	0.49	200	50-point Composite Sample - Rep 2

TABLE 3
Post-Excavation Soil Sampling Results

Grid ID	Field Sample ID	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	RL	S-1/GW-1 Value	Description
Former N Range - 25-foot Perimeter Around Berms 1 & 2										
FNRBRM01P	FNRBRM01_A	03/14/2016	SW6010C	Antimony	ND	UJ	mg/Kg	ND	20	100-point Composite Sample
FNRBRM01P	FNRBRM01_A	03/14/2016	SW6010C	Lead	45.5		mg/Kg	0.47	200	100-point Composite Sample
FNRBRM02P	FNRBRM02_A	03/14/2016	SW6010C	Antimony	ND	UJ	mg/Kg	ND	20	100-point Composite Sample
FNRBRM02P	FNRBRM02_B	03/14/2016	SW6010C	Antimony	ND	UJ	mg/Kg	ND	20	100-point Composite Sample - Rep 1
FNRBRM02P	FNRBRM02_C	03/14/2016	SW6010C	Antimony	ND	UJ	mg/Kg	ND	20	100-point Composite Sample - Rep 2
FNRBRM02P	FNRBRM02_A	03/14/2016	SW6010C	Lead	22.6		mg/Kg	0.49	200	100-point Composite Sample
FNRBRM02P	FNRBRM02_B	03/14/2016	SW6010C	Lead	23		mg/Kg	0.47	200	100-point Composite Sample - Rep 1
FNRBRM02P	FNRBRM02_C	03/14/2016	SW6010C	Lead	29.8		mg/Kg	0.48	200	100-point Composite Sample - Rep 2

NOTES:

J = Estimated result

mg/Kg = milligrams per kilogram

Rep = Field Replicate Sample

RL = Reporting Limit

Values bolded and shaded in yellow exceed one or more applicable criteria.

*Grid DR158 was divided into two grids (DR158EAST and DR158WEST) after 5th lift.

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
B Range (Figure 13)						
BRNG06	1	2.0	147			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
BRNG02	1	0.5	146			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
BR02DR	2	1.0	374			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
Lift 2				5/18/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
BRNGN	1	0.5	161			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
BRNGSW	8	4.0	870			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
Lift 2				5/18/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
Lift 3				8/8/16	Fall River Landfill, MA	11/29/16
Lift 4				10/13/16	Fall River Landfill, MA	1/3/17
Lift 5				12/13/16	Fall River Landfill, MA	2/28/17
Lift 6				2/8/17	Fall River Landfill, MA	4/11/17
Lift 7				3/30/17	Fall River Landfill, MA	5/18/17
Lift 8				5/10/17	Stablex, ON	7/17/17
BRNGSE	2	1.0	266			
Lift 1				11/21/15	Bourne Landfill, MA	1/7/16
Lift 2				5/18/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
Range Total			**1,963**			
Former B Range (Figure 14)						
FBR140L	7	6.0	717			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
Lift 5				3/30/17	Stablex, ON	5/11/17
Lift 6				5/10/17	Fall River Landfill, MA	6/13/17
Lift 7				11/12/17	Bourne Landfill, MA	2/15/18
FBR140QR	11	10.5	400			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
Lift 5				3/30/17	Stablex, ON	5/11/17
Lift 6				5/10/17	Fall River Landfill, MA	6/13/17
Lift 7				11/12/17	Bourne Landfill, MA	2/15/18
Lift 8				5/22/18	Bourne Landfill, MA	9/26/18
Lift 9				6/22/18	Bourne Landfill, MA	9/26/18
Lift 10				11/19/18	Bourne Landfill, MA	12/14/18
Lift 11				5/9/19	Bourne Landfill, MA	5/14/19
B-1	1	0.5	5			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
FBR03	5	3.0	112			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
Lift 5				3/30/17	Stablex, ON	5/11/17
FBR06	1	0.5	174			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
FBR07	4	2.0	128			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/2016; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR08	4	2.0	112			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR09	4	2.0	126			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR10	1	0.5	46			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
FBR11	1	0.5	58			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
FBR12	4	2.0	185			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR13	1	0.5	71			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
FBR14	1	0.5	83			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
FBR15	4	2.0	240			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR16	4	2.0	358			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
Lift 4				2/8/17	Fall River Landfill, MA; Stablex, ON	4/12/17; 3/6/17
FBR17	2	1.0	180			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
FBR18	3	1.5	196			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Lift 2				9/22/16	Fall River Landfill, MA; Stablex, ON	12/29/17; 2/7/17
Lift 3				11/10/16	Fall River Landfill, MA; Turnkey, NH	2/2/17; 5/10/17
FBR20	1	0.5	171			
Lift 1				6/27/16	Fall River Landfill, MA; Stablex, ON	12/28/16; 1/23/17
Range Total			**3,362**			
C Range (Figure 15)						
CRNGBR5-6	7	3.5	329			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
Lift 2				5/18/16	Fall River Landfill, MA	8/31/16
Lift 3				8/8/16	Fall River Landfill, MA	12/7/16
Lift 4				10/13/16	Fall River Landfill, MA	12/29/16
Lift 5				12/13/16	Fall River Landfill, MA	2/28/17
Lift 6				2/23/17	Fall River Landfill, MA	5/2/17
Lift 7				3/21/17	Fall River Landfill, MA	5/16/17
CRNG01	1	0.5	128			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
CRNG02	1	0.5	172			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
CR04N	1	0.5	93			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
CR04S	1	0.5	88			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
CR02DR	1	0.5	177			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
CRNGN	2	1.0	50			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
Lift 2						
CRGNMID	7	3.5	515			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
Lift 2				5/18/16	Fall River Landfill, MA	8/31/16
Lift 3				8/8/16	Fall River Landfill, MA	12/7/16
Lift 4				10/13/16	Fall River Landfill, MA	12/29/16
Lift 5				12/13/16	Fall River Landfill, MA	2/28/17
Lift 6				2/23/17	Fall River Landfill, MA	5/2/17
Lift 7				3/21/17	Fall River Landfill, MA	5/16/17

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
CRNGS	11	5.5	2,244			
Lift 1				1/11/16	Turnkey Landfill, NH	1/13/16, 6/9/16
Lift 2				5/18/16	Fall River Landfill, MA	8/31/16
Lift 3				8/8/16	Fall River Landfill, MA	12/7/16
Lift 4				10/13/16	Fall River Landfill, MA	12/29/16
Lift 5				12/13/16	Fall River Landfill, MA	2/28/17
Lift 6				2/23/17	Fall River Landfill, MA	5/2/17
Lift 7				3/21/17	Fall River Landfill, MA	5/16/17
Lift 8				5/10/17	Fall River Landfill, MA	6/12/17
Lift 9				11/2/17	Bourne Landfill, MA	2/14/18
Lift 10				5/21/18	Bourne Landfill, MA	12/5/18
Lift 11				11/20/18	Bourne Landfill, MA	12/14/18
Range Total			**3,796**			
Former C Range (Figure 16)						
FCR136	2	1.0	392			
Lift 1				5/18/16	Fall River Landfill, MA	11/30/16
Lift 2				8/8/16	Stablex, ON	1/26/17
Range Total			**392**			
D Range (Figure 17)						
Stockpiled Soil	NA	NA	4,126	NA	Stablex, ON; Turnkey Landfill NH; Fall River Landfill, MA	2/8/17, 4/19/17; 5/4/17; 5/11/17
DR158 (EAST and WEST)	8	6.0	1,665			
Lift 1				3/21/17	Fall River Landfill, MA	5/18/17
Lift 2				5/10/17	Fall River Landfill, MA	6/13/17
Lift 3				11/1/17	Bourne Landfill, MA	2/14/18
Lift 4				5/21/18	Bourne Landfill, MA	12/5/18
Lift 5				9/5/2018, 10/24/18	Bourne Landfill, MA	12/5/18
Lift 6				11/21/18	Bourne Landfill, MA	12/14/18
Lift 7				5/9/18	Bourne Landfill, MA	5/14/19
Lift 8				6/26/19	Bourne Landfill, MA	7/22/19
DR01	4	2.5	290			
Lift 1				7/20/16	Fall River Landfill, MA	12/19/16
Lift 2				8/25/16	Stablex, ON	1/30/17
Lift 3				10/4/16	Stablex, ON	2/6/17
Lift 4				12/13/16	Fall River Landfill, MA	4/10/17
DR02	1	0.5	66			
Lift 1				7/20/16	Fall River Landfill, MA	12/19/16
DR03	1	0.5	65			
Lift 1				7/20/16	Fall River Landfill, MA	12/19/16
DR04	1	0.5	32			
Lift 1				7/20/16	Fall River Landfill, MA	12/19/16
DR06	1	0.5	52			
Lift 1				7/20/16	Fall River Landfill, MA	12/19/16
Range Total			**6,297**			
Former D Range (Figure 18)						
FDR135U	3	1.5	40			
Lift 1				11/17/15	Bourne Landfill, MA	1/6/16
Lift 2				7/11/16	Fall River Landfill, MA; Stablex, ON	12/21/16; 1/23/17
Lift 3				8/25/16	Fall River Landfill, MA	12/19/16

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
FDR135GT	2	1.0	248			
Lift 1				11/17/15	Bourne Landfill, MA	1/6/16
Lift 2				7/11/16	Fall River Landfill, MA; Stablex, ON	
D-1 Aa	5	2.5	266			
Lift 1				11/17/15	Bourne Landfill, MA	1/6/16
Lift 2				7/11/16	Fall River Landfill, MA; Stablex, ON	12/21/16; 1/23/17
Lift 3				8/25/16	Fall River Landfill, MA	12/19/16
Lift 4				9/22/16	Fall River Landfill, MA	12/20/16
Lift 5				11/17/16	Fall River Landfill, MA	3/2/17
D-1 Ab	1	0.5	45			
Lift 1				11/21/15	Bourne Landfill, MA	1/6/16
D-1 Ac	1	0.5	58			
Lift 1				11/21/15	Bourne Landfill, MA	1/6/16
FDR05	2	1.0	124			
Lift 1				11/19/15	Bourne Landfill, MA	1/6/16
Lift 2				7/11/16	Fall River Landfill, MA; Stablex, ON	
FDR06	3	1.5	551			
Lift 1				11/19/15	Bourne Landfill, MA	1/6/16
Lift 2				7/11/16	Fall River Landfill, MA; Stablex, ON	12/21/16; 1/23/17
Lift 3				8/25/16	Fall River Landfill, MA	12/19/16
FDR07	1	0.5	176			
Lift 1				11/19/15	Bourne Landfill, MA	1/6/16
Range Total			**1,508**			
G Range (Figure 19)						
GR01A	7	3.5	807			
Lift 1				11/23/15	Bourne Landfill, MA	12/22/15
Lift 2				7/20/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
Lift 3				10/4/16	Stablex, ON	2/21/17
Lift 4				12/13/16	Fall River Landfill, MA	3/2/17
Lift 5				2/8/17	Fall River Landfill, MA	4/20/17
Lift 6				3/22/17	Fall River Landfill, MA	5/18/17
Lift 7				5/10/17	Fall River Landfill, MA	6/12/17
GR01DR	4	2.0	602			
Lift 1				12/16/15	Bourne Landfill, MA	12/22/15
Lift 2				7/20/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
Lift 3				10/4/16	Stablex, ON	2/21/17
Lift 4				12/13/16	Fall River Landfill, MA	3/2/17
GR04	2	1.0	299			
Lift 1				11/23/15	Bourne Landfill, MA	12/22/15
Lift 2				7/20/16	Fall River Landfill, MA; Stablex, ON	1/4/17; 1/25/17
Range Total			**1,708**			
Former M2 Range (Figure 20)						
FMRM202	1	0.5	74			
Lift 1				12/16/15	Bourne Landfill, MA	12/22/15
FMRM203	1	0.5	59			
Lift 1				12/17/15	Bourne Landfill, MA	12/22/15
FMRM204	1	0.5	51			
Lift 1				12/17/15	Bourne Landfill, MA	12/22/15

TABLE 4
Soil Excavation Amounts

GRID ID	Number of Lifts	Excavation Depth (ft. bgs)	Grid Excavation Amount (CY)	Post-Excavation Sampling Date	Off-Site Disposal Facility	Off-Site Disposal Completion Date
FMRM205	1	0.5	70			
Lift 1				12/17/15	Bourne Landfill, MA	12/22/15
FM2R02DR	1	0.5	92			
Lift 1				12/16/15	Bourne Landfill, MA	12/22/15
FM2R03DR	1	0.5	102			
Lift 1				12/17/15	Bourne Landfill, MA	12/22/15
Range Total			**448**			
N Range (Figure 21)						
NRNG01	1	0.5	132			
Lift 1				3/14/16	Bourne Landfill, MA	1/4/16
NRNG02	1	0.5	129			
Lift 1				3/14/16	Bourne Landfill, MA	1/4/16
NR01DR	1	0.5	164			
Lift 1				3/14/16	Bourne Landfill, MA	1/4/16
NR02DR	1	0.5	164			
Lift 1				3/14/16	Bourne Landfill, MA	1/4/16
NR03	1	0.5	161			
Lift 1				3/14/16	Bourne Landfill, MA	1/4/16
Range Total			**750**			
Former N Range (Figure 22)						
FNRBRM01	1 berm	NA	92	3/14/16	Fall River Landfill, MA	8/25/16
FNRBRM02	1 berm	NA	217	3/14/16	Fall River Landfill, MA	8/25/16
Range Total			**309**			
Total Combined			**20,531**			

Notes:

CY = Cubic Yards

ft. bgs = Feet Below-Ground-Surface

NA = Not Applicable

*DR158EAST (8 lifts, 6 ft. bgs); DR158WEST (5 lifts, 3 ft. bgs)

TABLE 5
Former N Range Berms XRF Results

Grid ID	Field Sample ID	Area (ft^2)	Depth (feet)	Lead (ppm)	Antimony (ppm)	Description
Berm 1						
FNRBRM01	FNRBRM01_A	1,332	0 - 0.25	173 (+-4)	ND <43	10-point Composite On Berm Sample
FNRBRM01PA	FNRBRM01A_A	1,059	0 - 0.25	36 (+-2)	ND <42	10-point Composite Perimeter Sample
FNRBRM01PA	FNRBRM01A_B	1,059	0 - 0.25	48 (+-2)	ND <40	10-point Composite Perimeter Sample - Rep 1
FNRBRM01PA	FNRBRM01A_C	1,059	0 - 0.25	51 (+-3)	ND <45	10-point Composite Perimeter Sample - Rep 2
FNRBRM01PB	FNRBRM01B_A	1,063	0 - 0.25	40 (+-2)	ND <42	10-point Composite Perimeter Sample
FNRBRM01PB	FNRBRM01B_B	1,063	0 - 0.25	59 (+-3)	ND <43	10-point Composite Perimeter Sample - Rep 1
FNRBRM01PB	FNRBRM01B_C	1,063	0 - 0.25	58 (+-3)	ND <43	10-point Composite Perimeter Sample - Rep 1
Berm 2						
FNRBRM02	FNRBRM02_A	2,722	0 - 0.25	220 (+-2)	ND <46	10-point Composite On Berm Sample
FNRBRM02PA	FNRBRM02A_A	1,136	0 - 0.25	26 (+-2)	ND <42	10-point Composite Perimeter Sample
FNRBRM02PA	FNRBRM02A_B	1,136	0 - 0.25	38 (+-2)	ND <42	10-point Composite Perimeter Sample - Rep 1
FNRBRM02PA	FNRBRM02A_C	1,136	0 - 0.25	30 (+-2)	ND <41	10-point Composite Perimeter Sample - Rep 2
FNRBRM02PB	FNRBRM02B_A	1,154	0 - 0.25	34 (+-2)	ND <42	10-point Composite Perimeter Sample
FNRBRM02PB	FNRBRM02B_B	1,154	0 - 0.25	24 (+-2)	ND <42	10-point Composite Perimeter Sample - Rep 1
FNRBRM02PB	FNRBRM02B_C	1,154	0 - 0.25	27(+-2)	ND <41	10-point Composite Perimeter Sample - Rep 2

Notes:

XRF = x-ray flourescence

ppm = parts per million

ND = Non-Detect

ft^2 = square feet