



To: Town of Hubbardston

Date: December 6, 2022
Project #: 15174.00

Memorandum

From: Katherine Kudzma, VHB
Matt Mazzone, VHB

Re: Remedial Options Memorandum for RTN 2-21771
Lot 57, Off Pitcherville Road
Hubbardston, Massachusetts

VHB has prepared this memorandum for the town of the Hubbardston (the "Client") to outline proposed potential remedial approaches and associated cost opinion to achieve regulatory closure for the Disposal Site assigned Release Tracking Number (RTN) 2-21771. The Disposal Site boundary (i.e., where contamination has come to be located) associated with RTN 2-21771 coincides with the limits of a shooting range located partially on a parcel of land defined by the town of Hubbardston's Assessor's office as Map 3, Lots 57 and extending into the northerly abutting parcel of land identified as Map 3, Lot 39 in Hubbardston, Massachusetts (shown on attached **Figure 2** from the Phase I Initial Site Investigation Report).

Background and Regulatory Submittals to Date

In April 2021, VHB conducted an ASTM Phase II Environmental Site Assessment (ESA) on Map 3, Lot 57. The purpose of the Phase II ESA was to evaluate potential environmental concerns identified on Lot 57 during a previous ASTM Phase I ESA including the historical use of a portion of the property as a shooting range. The Phase II ESA involved the collection and laboratory analysis of soil samples in and around the shooting range backstop berm by hand and by using a Geoprobe® Direct-Push drill rig. The soil analytical results from the subsurface investigation identified concentrations of lead within the backstop berm of the shooting range in excess of the applicable MassDEP Reportable Concentrations (RCS-1), which constituted a 120-day reportable condition per 310 CMR 40.0315(1) of the Massachusetts Contingency Plan (MCP). The concentrations of lead were subsequently reported to MassDEP on November 15, 2021 and assigned RTN 2-21771.

VHB conducted a supplemental environmental investigation in August 2022 to evaluate the extent of lead impacts within the shooting range backstop berm through the implementation of an Incremental Sampling Methodology (ISM) program. The purpose of the ISM program was to obtain representative data regarding the distribution of lead contamination within multiple Decision Units (DUs). Each DU is intended to be representative of soil conditions within a three-dimensional area of soil at the Disposal Site. Based on X-ray Fluorescence (XRF) screening data, the use of a metal detector, and visual observations of the berm, four DUs (DU-1, DU-2, DU-3, and DU-5) were established for the shooting range berm. One additional DU (DU-4) was established outside of the shooting range area as a control unit to establish background lead concentrations in soil. Based on the results of the ISM sampling, the highest concentrations of lead were observed within the surficial foot of soil at DU-1 in the central portion of the backstop berm. Concentrations of lead decreased between the 0- to 1-foot and 1- to 2-foot intervals within DU-1. No concentrations of lead were detected in excess of the applicable RCS-1 standards from composite samples in the remaining four DUs, although some discrete samples were above the RCS-1 standard. VHB submitted several discrete soil samples from within each DU to support future MCP submittals.

The supplemental investigation also included the advancement of soil borings, collection of soil samples from deeper soil intervals, and installation/sampling of three groundwater monitoring wells. Based on the results of the August



2022 groundwater sampling event, no concentrations of dissolved lead were detected in excess of the laboratory detection limit or the most stringent and applicable RCGW-1 standards. Therefore, groundwater has not been impacted by the release of lead to the shooting range berm.

A Phase I Initial Site Investigation (ISI) was submitted for the disposal site on November 15, 2022 to MassDEP in accordance with 310 CMR 40.0480 to provide supporting documentation for the preparation of a Tier Classification Submittal (310 CMR 40.0510) for the Disposal Site. A complete discussion of the Disposal Site history and environmental investigations can be found in the Phase I ISI report.

Summary of Regulatory Deliverable Timeline

The most recent regulatory submittal for RTN 2-21771 was the Phase I ISI and Tier Classification Report submitted on November 15, 2022. The next regulatory deliverable in accordance with the MCP is required to be submitted within three years of submittal of the Phase I ISI by November 15, 2025. The regulatory deliverable due by November 15, 2025 would likely consist of one of the following options to maintain compliance with the MCP:

1. A Phase II Comprehensive Site Assessment (CSA) Report: This regulatory deliverable would be submitted if the Disposal Site has not achieved regulatory closure in accordance with the MCP and requires additional assessment or response actions to achieve a Permanent Solution. The next regulatory deliverable after this submittal would be a Phase III Remedial Alternatives Analysis/Phase IV Remedy Implementation Plan or Permanent Solution that would be required to be submitted by November 15, 2026. If a Phase III/IV is submitted, then a Permanent or Temporary Solution would be due by November 15, 2027.
2. A Permanent Solution Statement with Conditions: This regulatory deliverable would be submitted if a Condition of No Significant Risk was achieved through the implementation of an Activity and Use Limitation (AUL) (i.e., deed restriction) on the property. Achieving a Permanent Solution with Conditions would require remediation of the Disposal Site as discussed in the following section (Option 1). An AUL would restrict the future use of the Disposal Site and would potentially require legal discussions with the owner of Lot 39.
3. A Permanent Solution Statement with No Conditions: This regulatory deliverable would be submitted a Condition of No Significant Risk and regulatory closure is achieved without the need for an AUL. This submittal would likely be completed follow the removal of lead-impacted soils from within the Disposal Site Boundary as outlined in the following section as Option 2.



Remedial Options

In order to achieve a Permanent Solution for the Disposal Site under the MCP, the following remedial options and high-level cost opinions are presented. Please note that these options assume that residential use is the desired use of the Disposal Site and groundwater has not been impacted by the release of lead to soils.

Option 1 – Permanent Solution with Conditions (Restricted Future Site Use) - No Soil Export

A Permanent Solution with Conditions applies to a Disposal Site where a condition of No Significant Risk cannot be achieved without the implementation of restrictions on the future use of the Site, such as the implementation of an Activity and Use Limitation (AUL). An AUL restricts future Site uses and implements special requirements for future work at the Site within the limits of the AUL. Based on VHB's Site investigations conducted to date, a Permanent Solution with Conditions could not be achieved without conducting remedial activities at the Disposal Site.

Achieving a Permanent Solution with Conditions at the Disposal Site could be accomplished by excavation of approximately 100 cubic yards of lead-contaminated soil within the shooting range berm and consolidating the soil beneath a cap/barrier such as pavement, a building, or beneath three feet of clean fill within the Disposal Site. The relocation of lead-contaminated soil would require a Release Abatement Measure (RAM) Plan detailing the proposed soil handling procedures to be submitted to MassDEP. It is assumed that the soil excavation and capping would take place in a less than 120-day period. The remedial contractor would be required to shore the backstop berm to prevent the soil on the hill above the berm from collapsing. Subsequently, approximately 100 cubic yards of soil comprising the backstop berm would be excavated. Please note that this volume is an estimate based on an anticipated depth of contamination of three feet below the surface of the backstop berm and would be refined in the field via post-excavation confirmatory samples.

The primary advantage of this regulatory approach to Site remediation is that off-Site disposal of contaminated soil would not be required, reducing the cost of remediation. However, the AUL would include operational costs post-remediation to maintain and inspect the barrier in accordance with the specifications of the AUL. The AUL would allow for residential uses, assuming the obligations of the AUL are maintained (typically, no disturbance to the cap). Attorney's fees for reviewing and registering the AUL at the registry of deeds are not included in this cost opinion.

Option 2 would be best suited to occur during redevelopment of the property as the proposed site features could be used as the soil barrier. Therefore, the cost of capping the soil is not included in this cost opinion. Based on the results of confirmatory soil sampling and one additional round of groundwater monitoring, VHB would prepare a Permanent Solution Statement documenting the condition of No Significant Risk. The cost presented on the following page assumes that a Permanent Solution with Conditions could be achieved prior to the due date of the next regulatory submittal, the Phase II CSA due on November 15, 2025. The anticipated costs of this remediation method are provided on the following page.

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Task	Consultant Labor	Contractors and Expenses	Total Cost
Release Abatement Measure (RAM) Plan	\$4,000	-	\$4,000
Limited soil sampling program to refine Disposal Site Boundary	\$2,500	\$2,000 (Supplies, Laboratory, Mileage)	\$4,500
Field work preparation, shoring of excavation, and consolidation of contaminated soils	\$5,000	\$34,300 (Contractor)	\$39,300
Post-excavation soil sampling and confirmatory groundwater sampling.	\$2,500	\$2,000 (Supplies, Laboratory, Mileage)	\$4,500
RAM Completion Report	\$3,500	-	\$3,500
Preparation of Permanent Solution Statement with AUL	\$22,000	\$3,000 (AUL Filing Fee, Printing and Public Notices)	\$25,000

Total Cost: \$80,800

Total Cost with 20% Contingency: \$96,960

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Option 2 – Permanent Solution with No Conditions (Unrestricted Future Site Use) - Off-Site Soil Export

A Permanent Solution with No Conditions applies to a Disposal Site where a condition of No Significant Risk to human health and the environment exists without the implementation of restrictions on the future use of the Site, such as the implementation of a deed restriction, or AUL. To achieve a condition of No Significant Risk without restrictions on future Site use, the proposed remedial program would involve removal of the entire shooting range backstop berm soils where concentrations of lead have been detected in excess of the applicable MCP risk-based standards and disposal of the material at an off-Site licensed receiving facility.

It is assumed that the off-Site disposal of the soil would not be conducted during Site redevelopment, therefore, the Project would require the preparation of plans and specifications and a public bidding process in accordance with Massachusetts General Laws (MGL) Chapter 39 and preparation of a RAM Plan. The selected contractor would be required to shore the backstop berm to prevent the soil on the hill above the berm from collapsing. Subsequently, roughly 100 cubic yards of soil comprising the backstop berm would be excavated. Please note that this volume is an estimate and would be refined in the field via post-excavation confirmatory samples.

During VHB's environmental investigations, the soil exhibited Toxicity Characteristic Leaching Procedure (TCLP) lead concentrations that require the soil to be handled as a Hazardous Waste unless they are treated in-situ to reduce the TCLP below the regulatory standard. Treatment of the soil prior to off-Site disposal using a stabilizing additive also typically results in a reduced cost for off-Site disposal, and has been assumed in this case. The stabilizing additive is mixed into the soil, reducing TCLP lead concentrations below the Hazardous Waste characteristic threshold of 5.0 mg/L. Following lead stabilization, the soil would be disposed of at a combination of in-state lined landfill and out-of-state lined landfills, based on lead concentrations present in the soil. An estimate of \$160/ton for T&D to an out-of-state landfill has been used for this cost opinion for all of the soil due to current limited in-state landfill availability. Please note that the cost of soil T&D can vary depending on seasonal availability, fuel costs, and other market factors.

Following the excavation of impacted soil, VHB personnel would collect confirmatory soil samples. The samples would subsequently be submitted for laboratory analysis of lead to confirm that remediation of the shooting range was successful. Based on the results of confirmatory soil sampling and one additional round of groundwater monitoring, VHB would prepare a Permanent Solution Statement documenting the condition of No Significant Risk. The cost presented on the following page assumes that a Permanent Solution with Conditions could be achieved prior to the due date of the next regulatory submittal, the Phase II CSA due on November 15, 2025.



Task	Consultant Labor	Contractors and Expenses	Total Cost
Preparation of RFP, Specifications, Bidding, and Preparation of RAM Plan	\$8,300	\$300 (Printing)	\$8,600
Limited soil sampling program to refine Disposal Site Boundary	\$2,500	\$2,000 (Supplies, Laboratory, Mileage)	\$4,500
Field work preparation, pre-excavation soil sampling, preparation of one soil disposal package for facility	\$5,500	\$1,200 (Supplies, Mileage, Laboratory)	\$6,700
Shoring of excavation, removal, and treatment of contaminated soils	\$3,000	\$47,000 (Contractor)	\$50,000
Loading, transportation, disposal of treated soils to licensed facility	\$3,000	\$27,000 (T&D)	\$30,000
Post-excavation soil sampling and confirmatory groundwater sampling.	\$2,500	\$2,000 (Supplies, Mileage, Laboratory)	\$4,500
RAM Completion Report	\$3,500	-	\$3,500
Preparation of Permanent Solution Statement with No Conditions	\$15,500	\$100 (Printing)	\$15,600

Total Cost: \$123,400

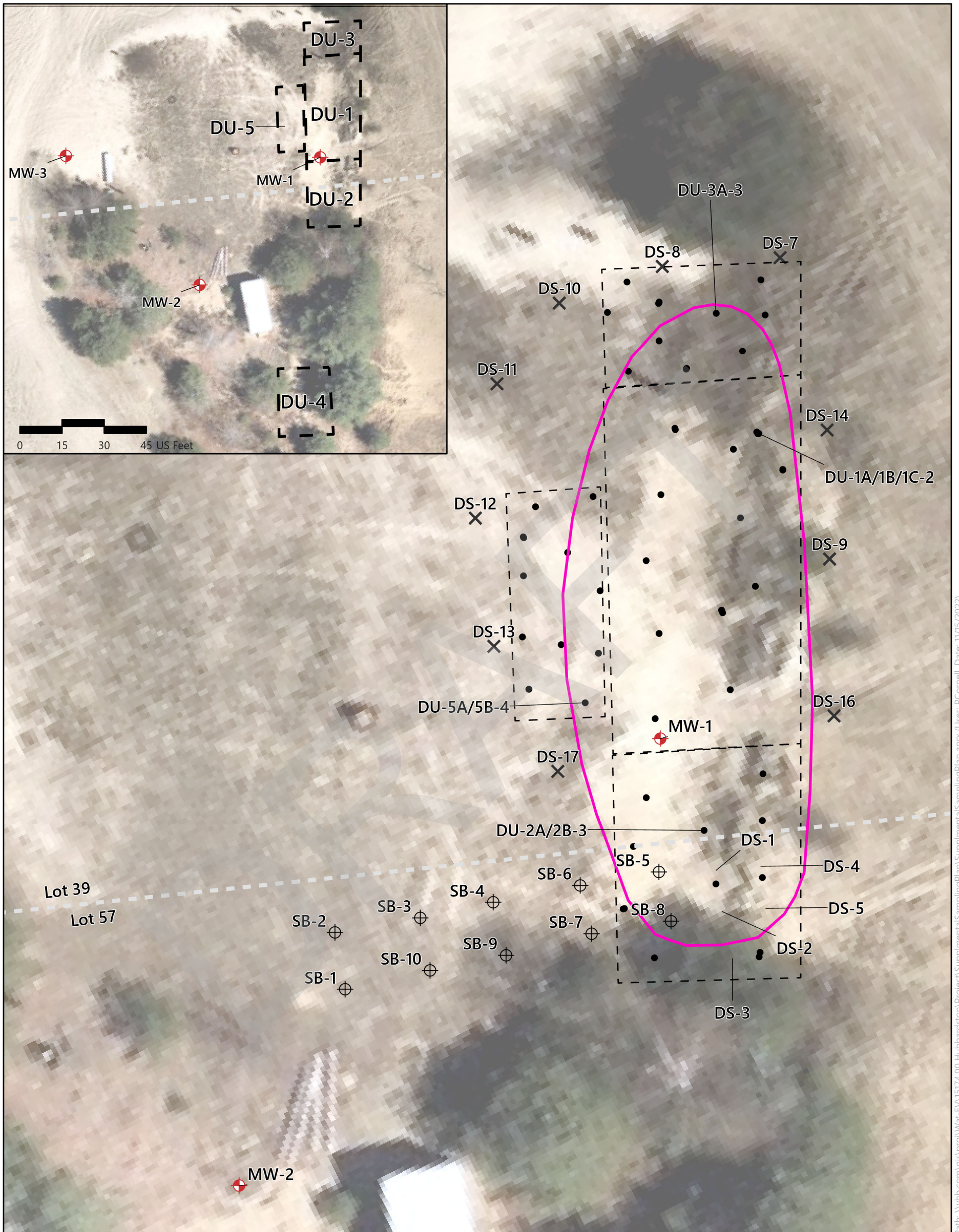
Total Cost with 20% Contingency: \$148,080

Additional Notes:

- > The estimated cost for preparation of a Phase II CSA Report is estimated at \$17,000 if an additional year is needed past November 15, 2025 to complete remedial actions.
- > The above findings and estimated costs are based on fulfilling MCP obligations. These cost assumptions exclude any future construction or soil disposal costs associated with Site redevelopment.
- > This order of magnitude cost opinion was developed using broad assumptions regarding Site conditions and based on the consultant's experience mitigating similar properties without comprehensive Site-specific information or data.

Figure 2: Site Plan

RTN 2-21771 | Off Pitcherville Road, Hubbardston Massachusetts



Path: \\vhb.com\gis\proj\Wate-EV\15174.00 Hubbardston\Project\SupplementalSamplingPlan\SupplementalSamplingPlan.aprx (User: P.Cornell, Date: 11/15/2022)



- Approximate Disposal Site Boundary Associated with RTN 2-21771
- Approximate Limits of ISM Decision Units
- Lot 57 Site Boundary
- Discrete Hand Boring Locations - August 2022
- Phase II ESA Borings - April 2021
- Discrete ISM Sample Locations - August 2022
- Phase II ESA Discrete Sample Location - April 2021
- + Monitoring Well Location - August 2022