JOINT BASE LEWIS-MCCHORD AGREED ORDER
INTERIM ACTION WORK PLAN

FORMER MILLER HILL RANGES AND FORMER SKEET RANGE
JOINT BASE LEWIS-MCCHORD, WASHINGTON

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FINAL

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BGS	Below Ground Surface
CAP	Cleanup Action Plan
COC	Contaminant of Concern
COR	Contracting Officer's Representative
CRZ	Contamination Reduction Zone
CY	Cubic Yards
ECBA	Ecological Cost Benefit Analysis
Ecology	Washington Department of Ecology
EZ	Exclusion Zone
FS	Feasibility Study
GPS	Global Positioning Satellite
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
IAO	Interim Action Objective
IAP	Interim Action Plan
IAWP	Interim Action Work Plan
JBLM	Joint Base-Lewis McChord
JBLMPW	Joint Base Lewis-McChord Public Works
KEMRON	Kemron Environmental Services, Inc.
mg/kg	Milligram/Kilogram
MTCA	Model Toxics Control Act
NEPA	National Environmental Policy Act
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource, Conservation and Recovery Act
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SWPPP	Stormwater Prevention Pollution Plan
SZ	Support Zone
TCLP	Toxicity Characteristics Leaching Procedure
WAC	Washington Administrative Code
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

This plan describes the action for Joint Base Lewis-McChord (JBLM) former Miller Hill Ranges and former Skeet Range located on the south side of Miller Hill off Colorado Avenue and near American Lake on North Fort, respectively. This work is being performed pursuant to Agreed Order No. DE 00HWTRSR-1122 between the Washington Department of Ecology (Ecology) and JBLM Public Works (JBLMPW) as well as Model Toxics Control Act (MTCA) regulations in Chapter 173-340 of the Washington Administrative Code (WAC).

Remediation will entail excavation and potential treatment of soils exceeding interim action or remediation levels from the Flatland portions of the former Miller Hill Ranges and from the former Skeet Range in general accordance with the approved Feasibility Study (FS) (KEMRON 2009) and Interim Action Plan (IAP) (KEMRON 2010). Successful completion of this interim action in combination with institutional controls and public notification and comment is intended to be the final remedy for these sites.

1.1 Purpose

The purpose of this Interim Action Work Plan (IAWP) is to describe the interim action goals and remediation levels for the sites and the details of the work activities planned for remediating the sites.

1.2 Vicinity and Site Locations

JBLM is a major military facility located approximately 6 miles south of Tacoma, Washington (Figure 1A-Vicinity Map). The facility consists of approximately 90,000 acres of cantonment areas, natural prairies, lakes, wetlands, and forest. Weapons qualifications and field training have been conducted since the Fort was established in 1917. In 2010 McChord Air Force Base and Fort Lewis were combined into JBLM.

The former Miller Hill Ranges are located on the south side of Miller Hill about 0.5 miles southeast of the intersection between Route 5 and 41st Division Drive intersection off Colorado Avenue. The former Skeet Range is located about 0.6 miles northwest of the intersection between Route 5 and 41st Division Drive northwest of NCO Beach Road and southeast of American Lake (Figure 1B).

1.3 Site Background

1.3.1 Former Miller Hill Firing Ranges

The site is a collection of former small arms ranges located on the south side of Miller Hill. The site was used for range activity from circa 1917 until the 1960s. Identified former ranges at the site include Ranges 42, 54, 62, 67, and an unnumbered pistol range to the east of former Range 42. The typical small arms ammunition expended at the ranges were the .30, .45, or .50 caliber cartridges. According to the U.S. Army Munitions Items Disposition Action System database, the alloys used in the bullet slugs of these cartridges consisted of 96.4 percent lead and 1.75 percent antimony. At each former range (except for the unnumbered pistol range in which a small berm was constructed), small arms were fired from firing lines on flat ground at targets placed in front of the undisturbed hillside (which served as the backstop). The impact area (i.e., south-facing hillside) is approximately 0.5-miles-long. Lead is the only contaminant of concern (COC) for the site (KEMRON 2009). Figure 2 illustrates the location of the former Miller Hill Ranges.

Miller Hill is located within the Cantonment Area. Miller Hill is a unique area of the base that encompasses several planned uses over 300 acres that is currently zoned for open space, Community Services, and family housing in the JBLM Real Property Master Plan. The descriptions of the future land use as presented in the Master Plan and Feasibility Study (FS) are as follows:

- Open space are areas set aside for training and recreational uses, and preservation of the aesthetics of the post;
- Community Services provide space for administrative functions, primary services, retail activities, educational buildings, and other community support and operations; and
- Family Housing Areas located on the west end of Miller Hill are for housing units owned by the Army and leased to Equity Housing provided for Army personnel on a rental type basis.

Future land use is anticipated to remain the same in each area. Various unmarked trails and roads are located on the hillside of Miller Hill and the area around the site is used for outdoor recreation (e.g., walking). A residential housing area is located west of the site. To limit potential direct contact with surface soil by recreationalists or nearby residents, a 4-strand wire perimeter fence with warning signs was installed in 2004.

In order to more clearly present the distinct areas of Miller Hill, the site has been divided into three distinct work zones for this Work Plan:

1. **Flatlands:** The Flatlands include the low-gradient areas on the southern base of the hill that are easily accessible to humans, construction personnel and equipment, and portions of which may be slated to the Army for future commercial development. The Stone Education Center and the Distance Learning Center with large asphalt paved parking lots sit along the southern boundary in the Flatlands and additional training/support buildings are planned to the west of the Stone Education Center for future use. The Flatlands are mostly vegetated with invasive non-native species such as Himalayan Blackberry and Scot's Broom. This area also served as the impact area, with the base of the hillside acting as the backstop. Grids located in backstop areas (directly behind firing points) generally display the highest concentrations of lead at the site. The relatively small unnumbered pistol range is completely in the Flatlands (Figure

2. **Steep Hillside Area:** The Steep Hillside Area at Miller Hill includes the high-gradient areas progressing up the hillside, is heavily forested, and contains mature native ecosystems. According to the JBLM Integrated Natural Resource Management Plan, the Steep Hillside area of Miller Hill is a rare example of a dry forest dominated by Oregon White Oak and Douglas Firs that once dominated the otherwise prairie areas to the south of the Puget Sound. This area is difficult to access by humans, construction personnel and equipment, and contains a wide variety of local, native wildlife. With the exception of water storage, communications facilities, and some recreational trails, there has been no development of the interior portions of Miller Hill although the Army would like to improve and develop the paths through the area for recreational (e.g. biking and jogging) use. Miller Hill serves as a bridge between habitat areas in the training areas and wetlands to the north and the Army's development plans are sensitive to protecting that use. Portions of these areas served as the ricochet areas for the former firing ranges and were not utilized as impact areas (Figure 2).

3. **Hillside Housing (Equity Housing) and Residential Buffer Area:** Along the west end of Miller Hill, family housing units are located. These housing units begin on the southwestern base of the hill and circle the hill going northward. These housing units

are owned by the Army, but leased to Equity Housing for management and serve as rental type on-base housing for military personnel. The Residential Buffer Area has been designated as the area 200 feet from the Equity Housing Property Line that runs near the backyards of the housing area toward Miller Hill (Figure 2).

1.3.2 Skeet Range

The approximately 16-acre former Skeet Range was used as a recreational skeet range between 1963 and 1972 based on a review of historical maps and aerial photography. Shot was fired toward the northwest on flat land without a backstop. Based on the nature of site use and the composition of lead shot, lead is the only COC for the site (Figures 1B and 11).

The site is currently zoned for residential use in the JBLM Master Plan, but was used for recreational purposes prior to 2004. At that time, a 4-strand wire perimeter fence with warning signs was installed to prevent access to the site.

2.0 INTERIM ACTION GOALS AND OBJECTIVES

The Interim Action Objectives (IAOs) are to provide protection of residents, site users and site workers from exposure to contaminated soil. MTCA requires the soil cleanup and remediation levels be based on estimates of the reasonable maximum exposure expected under both current and future site use conditions. JBLM is an active Army military reservation with controlled access and supports a variety of land uses and functions. Future uses proposed for the former Miller Hill Ranges may include development of additional training or educational buildings in the Flatlands and improvement of the hiking trail network in the Steep Hillside. The proposed future land use for the former Skeet Range will include residential development.

Given these potentially exposed populations and exposure pathways, the IAOs for the sites center around the prevention or minimization of exposure of humans and ecological receptors to impacted soils. Each are described in the following sections. Table 2-1 shows the cleanup/remediation levels for lead in soil at each area.

2.1 Miller Hill

The preferred alternative for Miller Hill involves excavating lead-impacted soils in the proposed grids in the Flatlands only. Except as discussed in Section 3.0, there will be no remediation in the grid areas of the Steep Hillside due to ecological impacts as described in the Ecological Cost Benefit Analysis (ECBA) portion of the FS. The excavated soils will be segregated based on total lead concentration previously identified in the RI and as shown on the figures, and transported to the staging area. Soils in grids with total lead less than 2,000 mg/kg and not in areas considered hot spots for slugs will be screened to remove plus ¾-inch soils. The plus ¾-inch soils will be reused on the site as backfill. The minus ¾-inch soils will be loaded into trucks and transported to active JBLM ranges (i.e. Range 91) to be used for berm construction. Soils in grids with total lead greater than 2,000 mg/kg will be screened to remove plus ¾-inch soils which will be reused on site. The minus ¾-inch soils will be treated to stabilize lead concentrations such that the Toxicity Characteristics Leaching Procedure (TCLP) results for lead will be less than 5 mg/L. Treatment will be achieved by blending the minus ¾-inch soils with ECOBOND™ or approved equal, a phosphate based reagent. This will be accomplished using a front-end loader to mix the reagent within piles of soil. The treated soils will be cured for 24 to 48 hours prior to sampling for the TCLP analyses. Upon successful demonstration that the TCLP lead has been achieved, the pile will be loaded onto a truck and hauled to an active range site. Details of screening and stabilization are in Section 3.3.9.

The excavated areas will be shaped and/or backfilled with excavated cobbles/gravels and clean fill sufficient to support vegetation and to allow surface water drainage to the adjacent undisturbed areas. The majority of the excavated areas will be replanted with grasses. However, the Buffer Zone as well as a one or more strips along the base of Miller Hill will be replanted with Oregon White Oaks. Revegetation is described in Section 3.3.16.

The remediation levels (or cleanup level) for the distinct work zones and sites are summarized below.

1. **Flatlands of Miller Hill:** The IAP selected active remediation for the lead-impacted soils greater than 1,066 mg/kg in the Flatlands. This remediation level is protective of human receptors including excavation workers for future commercial development in the Flatlands based on the results of the Human Health Risk Assessment (HHRA) presented in the FS (KEMRON 2009).

It is estimated that at least one to two feet of material on average will require removal to achieve the remediation level. Furthermore, the biologically active zone at the sites was estimated to be in the first two feet of soils below ground surface (BGS) and this depth was selected as the conditional point of compliance. The remediation level for the Flatlands of Miller Hill will achieve cleanup standards for both human and ecological receptors (Figure 3).

2. **Buffer Zone and Hillside Housing Area:** A 200-foot radius has been established from the Hillside Housing Area property line extending east into the Miller Hill former Ranges 62/67 to be protective of residents in this area. The lead contaminated grids within the 200-foot buffer zone will be excavated to a remediation level equal to the area resident HHRA level of 475 mg/kg lead. The soils generated from this area will be managed with the soils generated from the Flatlands remediation.

   Soils within the Equity Housing area property i.e. under the former access road west of the Buffer Zone, will be remediated to the cleanup level for Method A unrestricted residential use (250 mg/kg lead) (Figure 4).

3. **Steep Hillside Area:** The rare native habitat on the steep hillside will be left intact in accordance with the FS; no lead impacted soil will be removed, except as noted in Section 3.0.

   A portion of the hiking trail along Ranges 62/67 is located in grids that exceed the ecological risk level of 1,066 mg/kg total lead. This portion of the trail will be closed and a new trail will be constructed north of the old trail as shown on Figure 8.

   Land Use Controls (LUCs) consisting of fencing and signage will prevent recreational exposure and unplanned excavation of contaminated soils on the steep hillside. The existing 4-wire strand fence will be relocated at the base and top of the steep hillside once the site has been remediated and restored as shown on Figures 3-6. Warning signs will be placed along the trails in areas of known lead-impacted soils educating recreational users of the environmental risks in accordance with WAC 173-340-440(1)(d). Refer to Appendix F for the LUC Plan.

2.2 Skeet Range

JBLM has indicated that the future use of the Skeet Range will be residential. The preferred alternative for the Skeet Range involves excavating lead-impacted soils in those grids that show exceedances of the MTCA Method A unrestricted residential use threshold of 250 mg/kg lead. It is anticipated that the threshold will be achieved in most areas in the Skeet Range before reaching two feet BGS. The excavated soils will be screened to remove the plus ¾-inch material which will be used as on-site backfill. The minus ¾-inch material will be transported to an active range (Range 91) on JBLM to be used for berm construction. The excavated areas will be backfilled with clean fill, graded and revegetated (Figure 11). The existing 4-wire strand fence will be removed once the site has been remediated and restored.

Table 2-1 Conceptual Site Exposure Model and Associated Cleanup/Remediation Levels for Lead in Soil

Area	Land Use	Soil Direct Contact Exposure Scenario and Exposed Population							Lowest Cleanup Criteria	FS Preferred Alternative	Land Use Controls
		Commercial Worker[1] (Adult)	Construction Worker (Adult)	Trespasser/ Visitor[2] (Child/Adult)	Recreational Visitor[3] (Child/Adult)	Area Resident[4] (Young Child)	Resident (Young Child)	Ecological (Terrestrial Organisms)			
Miller Hill: Hillside Housing	Residential	No	No	No	No	No	Yes 250 mg/kg	Yes 1,066 mg/kg	250 mg/kg	Excavate soil if lead > 250 mg/kg	None
Miller Hill: Buffer Zone	Commercial	Yes 1,130 mg/kg	Yes 1,200 mg/kg	Yes 2,710 mg/kg	No	Yes 475 mg/kg	No	Yes 1,066 mg/kg	475 mg/kg	Excavate soil if lead > 475 mg/kg	Yes[5]
Miller Hill: Flatlands	Commercial	Yes 1,130 mg/kg	Yes 1,200 mg/kg	Yes 2,710 mg/kg	No	No	No	Yes 1,066 mg/kg	1,066 mg/kg	Excavate soil if lead > 1,066 mg/kg	Yes[5]
Miller Hill: Steep Hillside	Open Space	No	No	No	Yes 1,440 mg/kg	No	No	Yes 1,066 mg/kg	1,066 mg/kg	ECBA[7] Cover if walking path lead > 1,440 mg/kg	Yes[5,6]
Skeet Range	Future Residential	No	Yes 1,200 mg/kg	No	No	No	Yes 250 mg/kg	Yes 1,066 mg/kg	250 mg/kg	Excavate soil if lead > 250 mg/kg	None

Notes:
All concentrations are for lead and are in mg/kg.
Residential Buffer Zone is a 200 foot buffer in commercial area surrounding the Hillside Housing Area.
Hillside Housing Area was cleaned up as part of a previous interim action.
ECBA: Area is very steep and established forest with sensitive environment. Environmental Cost Benefit Analysis (ECBA) supports no active cleanup.
[1] Commercial Worker scenario includes adult office workers as well as landscapers.
[2] Trespasser/Visitor at Flatlands and Buffer Zone is assumed to be an older child or adult who is present 52 days per year (1 day per week).
[3] Recreational Visitor is an older child or adult who is assumed to be present 104 days/year (2 days/week).
[4] Area Resident is assumed to be a young child who is present 261 days/year (5 days/week) in the Residential Buffer Zone.
[5] Land Use Controls to prevent future residential land use, unplanned excavation of contaminated soil and maintain boundary signs.
[6] Land Use Controls include signage to prevent off-trail human health exposures.
[7] Work Plan includes closing of existing trail and relocation of new trail outside of lead contaminated areas.

3.0 PROJECT DESCRIPTION

This section of the IAWP describes the process and actions necessary for field implementation of the selected remedy to address contaminated soil at the former Miller Hill Ranges and the former Skeet Range.

3.1 Pre-Construction Activities

Prior to conducting the environmental remediation, coordination with several parties will be performed to ensure an effective and successful remediation to the appropriate cleanup or remediation levels. KEMRON will coordinate with JBLMPW Environmental Division and Ecology prior to initiating field work. Other activities will include:

- Surveying and establishing 50 foot x 50 foot grids at Ranges 62/67, Range 54, Range 42 and the Skeet Range;
- Notifying residents of the Hillside Housing Area of upcoming remediation work;
- Securing access to the fenced and parking lot portions of the work area;
- Requesting and performing a utility locate for all excavation locations by obtaining a JBLMPW Dig Permit;
- Establishing erosion controls;
- Acquire temporary security fencing;
- Rental of a field office and portable XRF instrument;
- Obtaining sampling kits and accessories;
- Establishing traffic control and dust control plans;
- Testing of backfill soils;
- Clearing, mobilization, and marking of utilities;
- Stockpiling of clean backfill soils;
- Mobilizing personnel and equipment;
- Notification to Range Control;
- Notification to Ecology one week prior to start of excavation activities or the resumption of excavation activities following any work stoppage greater than two weeks duration;
- Notification to Ecology one week prior to sampling of any grids, areas, stockpiles, media, etc., if different than the excavation notice in the previous bullet; and
- Ecology will be supplied with a reference table for all grids to be excavated with initial excavation depth, etc.

3.1.1 Surveys

Preconstruction photographs of the work area including parking lots, fences, curbs, and recreational areas will be taken to document the “before” condition and to restore the site appropriately.

Historical Global Positioning Satellite (GPS) coordinates and figures from the RI were used to establish control points for establishing the grids at Ranges 62/67, Range 54, and Range 42. The grids for these ranges will be completely established once vegetation has been cleared. Professional surveyors will be used to establish the 50 foot x 50 foot grids.

3.1.2 Utility Location

KEMRON personnel will follow procedures established in the Standard Operating Procedure (SOP) for Subsurface Utility Clearance (included in Appendix B) for all intrusive work, which is work that breaks the ground surface, such as the excavations planned for this work. No intrusive work will occur without KEMRON present. Any deviations from this procedure require regional management approval. In addition, a JBLMPW Dig Permit will be completed prior to any intrusive work and utilities will be flagged in the field.

3.1.3 Erosion and Sedimentation Control Measures

Refer to Appendix C, Storm Water Pollution Prevention Plan (SWPPP) that has been approved by the Army and EPA Region 10, for a description of how the work will be planned and conducted to control runoff and to reduce soil erosion and sediment transport from construction areas. Frequent periodic inspections of the site and installed erosion and sediment control measures will be made to check effectiveness of the control measures. The sites will be inspected at least once each work shift and during and immediately following each precipitation event exceeding 0.5 inches. Control measures will be maintained to permit full effectiveness during the construction period. It will be the responsibility of the site manager and crew foremen to implement, inspect, repair, and upgrade all erosion control measures. All work will be done in accordance with the approved SWPPP.

3.1.4 Access Control

The proposed remediation is expected to be ongoing for a period of approximately three months from site preparation to site restoration. The excavation areas will be secured during non-working hours with temporary plastic fencing in select areas at the discretion of the site Health and Safety Officer. The fencing will inhibit entrance by residents, workers, and soldiers. All machinery and equipment will be enclosed within the security fence or secured in a location that will not interfere with everyday operations at JBLM.

All personnel will report to a staging area near the site office located near Stone Education Center off Colorado Avenue at the start of each work shift. The site manager and crew foreman will assemble the work crews, prepare a daily log with the names of the personnel on each crew, and will arrange for transportation of the work crews to their work areas. No personal vehicles will be allowed on the site.

No employees will be allowed on the site unless they have the minimum level of personal protective equipment (PPE - hard hat, safety glasses, steel toed boots, safety vest). No personnel will be allowed to enter or work in an area requiring special training (e.g. lead training) or upgraded levels of PPE unless they have that training and the additional PPE is available at the work area.

The crew foreman will arrange for transportation of employees from the work site to the staging area at the end of the work shifts. If the employee needs to leave the work site early, the employee will report to the crew foreman, who will then transport the employee to the staging area. The crew foreman will include when each employee leaves the site on the daily log.

Signs will be posted at the site indicating that unauthorized access to the site is prohibited, that all visitors must report to the site office and that all deliveries must be checked through the site office. All visitors will be briefed with respect to site safety and hazards before being allowed on the site. All visitors will be required to wear the minimum level of PPE when on-site. Visitor access to work areas requiring special training or upgraded levels of PPE will not be allowed unless the visitors have the required training, provided documentation of that training, and have read the Site Specific Health and

Safety Plan. Unescorted visitors will not be allowed on-site. A log of visitors on the site will be maintained. The log will include the time of entry and exit from the site.
Unauthorized personnel and vehicles will not be allowed on the site. All employees will be instructed to report to a supervisor if they notice any unknown person or vehicle on the site. The supervisor will determine if the unknown person of the vehicle is authorized to be on the site. If not, the supervisor will escort the person and vehicle from the site.

3.2 Estimated Excavation Volumes

The estimated volume requiring excavation for Miller Hill and the Skeet Ranges is shown in Table 3-1. The totals take in to account varying excavation depths based on the RI sample results as shown in Figures 7 through 12. Based on sieve tests of the native soil, it is estimated that approximately thirty to forty percent of the excavated material will consist of coarse gravel and cobbles. Based on the Technical Memorandum and recent test results in Appendix E, this material is considered clean soil. Consequently, soil and cobbles that are retained on the ¾-inch sieve screen will remain on-site and used as clean backfill. The general process flow diagrams for material handling and processing are shown at the end of this section.

Table 3-1
Estimated Volume of Soils for Remediation per Site

LOCATION	APPROXIMATE VOLUME FOR REMEDIATION
MILLER HILL/FLATLANDS	
- Hillside Housing Area Stockpile*	2,050 CY
- Former Pistol Ranges 62 and 67	12,640 CY
- Former Tank Range 54	840 CY
- Former Machine Gun Range 42	8,780 CY
- Unnumbered Pistol Range	80 CY
TOTAL MILLER HILL VOLUME	24,390 CY
SKEET RANGE	4,500 CY
TOTAL VOLUME BOTH SITES	28,890 CY

* Hillside Housing Area Interim Action (IA) soils have been stockpiled at Miller Hill and will be managed for final disposition with the soils generated from the Flatlands remediation. Approximately 2,050 CY of soil was removed from the Hillside Housing Area.

3.3 Construction Activities

3.3.1 Miller Hill

The grid areas identified for active remediation are identified on Figures 3-10 and include former Pistol Ranges 62/67; Former Tank Range 54; Former Machine Gun Range 42 and the unnumbered pistol range. Based on human and ecological risks, the cleanup or remediation levels depend on the location of the lead impacted grid along Miller Hill.

- The lead contaminated grids within the 200-foot Buffer Zone will be remediated to the area resident HHRA level of 475 mg/kg lead.

- The lead impacted areas in the Flatlands are designated as commercial use. Accordingly, these areas are identified for active remediation and will be excavated to below the ecological cleanup level established in the TEE of 1,066 mg/kg lead.
- There will be no remediation along the Steep Hillside area due to ecological risks associated with deforestation activities. In addition, the trail network along this area will be relocated to the north (uphill) to further prevent exposure to recreational users (Figure 8). LUCs including fencing will prevent residential exposure and unplanned excavation of subsurface contaminated soils. The existing fence will be relocated as shown on Figure 8. Warning signs will be placed along the trails in areas of known lead-impacted soils educating recreational users of the environmental risks in accordance with WAC 173-340-440(1)(d).

Impacted soils along Miller Hill will be cleared of organic debris, excavated, screened of large gravels and cobbles and transported to active ranges at JBLM to be used on existing berms or to construct new berms. Range Control management will be instructed that this material is not to be scattered or used for ground cover. These soils will be recorded by GPS, mapped and recorded in the Interim Action Report for future reference. Confirmation sampling will be used to confirm that remaining lead concentrations are below designated levels.

3.3.2 Skeet Range

The areas identified for active remediation will be excavated to an approximate depth of six inches to one foot to remove lead impacted soils above the unrestricted use levels of 250 mg/kg lead. An XRF will be used to confirm lead concentrations of remaining soils are below MTCA Method A soil cleanup levels for unrestricted residential use. Impacted soils in the former Skeet Range will be cleared of organic debris, excavated, screened of large gravels and cobbles and transported to active ranges at JBLM to be used for construction of berms

Depending on contractor economics, soils at the Skeet Range may be screened to separate gravel and cobbles above ¾-inch. Based on the Technical Memorandum and recent test results in Appendix E, the soils retained on the ¾-inch sieve is clean and, if screened, will be left on-site for use as backfill.

3.3.3 Clearing and Grubbing

In general, vegetative growth will be cleared from each remediation area to facilitate equipment movement and soil excavation. Vegetative growth and undergrowth will be removed to allow access for excavation equipment to the affected areas at each range. Appropriate equipment will be employed to grub heavy vegetation before excavation begins.

Trees that are considered merchantable have been harvested in accordance with the JBLMPW Forestry Office specifications. Limbs, slash and small trees were chipped and left on-site for mulch.

Other vegetation will be grubbed, chipped or grinded, and piled on-site at the base of Miller Hill and the Skeet Range when remediation begins. Trees or other landscape features that are to remain intact in adjacent clean grids have been identified by site personnel. Identified vegetation and features will be flagged and protected to the degree possible, to avoid inadvertent damage during excavation and hauling. All activities will be conducted in a manner to be as protective as possible to flagged vegetation. Some existing select large trees and heavily vegetated areas with native vegetation would not be disturbed. Stumps will be removed and shaken of soil and ground up for mulch using a tub grinder.

3.3.4 Excavation

3.3.4.1 Miller Hill

Flatlands: The analytical data from the RI characterizes soils to a depth of two feet. In some grids, lead impacts above the remediation level of 1,066 mg/kg were documented to be present in the top foot of soil only. It is estimated that the majority of the lead impacted soils will be present within the top two to three feet of soils, with occasional depths down to five feet. Based on available data, the final excavation depths that will be required are unknown and estimated volumes have been calculated using an estimated excavation depth of two to five feet. However, soils present in the grids identified for remediation will be excavated until confirmation sampling indicates soils in excess of 1,066 mg/kg have been removed. An on-site XRF device will be used to confirm lead concentrations during excavation activities.

Hillside Housing Buffer Area: The lead contaminated grids within the 200-foot Buffer Zone will be excavated to the area resident HHRA level of 475 mg/kg total lead. This Buffer Zone extends from the Equity Housing property line 200 feet eastward as shown on Figure 4.

Access Road near Hillside Housing: The remaining grids (or portions thereof) located west of the Equity Housing property line along the access road to the previously remediated Hillside Housing area will be excavated to the unrestricted cleanup level of 250 mg/kg total lead.

Steep Hillside: Grids within the Steep Hillside area (Figures 3-6, 8, 9, and 10) will not be excavated based on the findings of the ECBA in the FS. An exception will be made for Range 54 where the Army has required additional cleanup along the access road north of the Stone Education Center. Two grids, namely 17-45 and 18-46, as shown on Figure 8 will be excavated to the ecological remediation level of 1,066 mg/kg. This is to provide an additional level of protection to recreational users; however, due to the ecological value of the tall trees, no large trees will be removed. Instead, the soil will be carefully excavated down to the roots of the trees and then backfilled with clean soil. To offer further protection for recreational users, the existing fence will be relocated as shown on Figure 8.

3.3.4.2 Skeet Range

The grid areas identified for active remediation (Figure 11) will be excavated to an approximate depth of six inches to one foot to remove lead impacted soils to below the unrestricted use levels of 250 mg/kg lead. The initial excavation will be approximately six inches. Per Ecology's request, additional grids to be delineated are also identified on Figure 11. Samples for delineation will be made similar to the methodology in the SAP/QAPP used at Miller Hill, with the exception that samples will be obtained in the upper 6-inches of the soil, rather than at 1 and 2 foot depths. An XRF device will be used to confirm lead concentrations during excavation activities as well as to delineate additional grids for total lead concentrations. The estimated volume requiring excavation is approximately 4,500 CY.

Final excavation depths will be determined through performance monitoring sampling (see Section 3.3.6). Additional excavation will be conducted as necessary until documented results of performance monitoring sampling confirm that concentrations of lead in all remaining soils at the Skeet Range are below 250 mg/kg.

3.3.4.3 Safety Measures

During earth moving activities at Miller Hill and the Skeet Range, a misting system will be operational around the perimeter of the excavation areas for dust suppression, if and as needed. Personal and

perimeter air monitoring will also be conducted in accordance with the Health and Safety Plan (HASP) to ensure worker and resident safety. Air monitoring results will be compared to action levels specified in the HASP (KEMRON 2008, Appendix B).

Excavation at both sites will be kept to the manageable size necessary to provide a safe work environment and to accomplish the project objectives. Care will be taken to minimize the disturbance to the surrounding environment, and excavated material will be kept within the excavation limits during excavation and loading, as much as possible. Excavations will also be backfilled in a timely manner to prevent cave-ins. In addition, silt fencing and/or erosion control fabric will be installed in accordance with the SWPPP, to reduce erosion and transport of sediments. At the end of each day, the open excavations will be taped or fenced off, as warranted.

3.3.5 Sampling and Analysis

All sampling and analysis performed for the confirmation that IAOs have been met in each grid for total lead as well as confirmation of treated soil meeting TCLP shall be conducted in accordance with procedures described in the Sampling Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) found in Appendix A.

3.3.6 Compliance Monitoring

Monitoring is one of the threshold requirements for interim actions under MTCA (WAC 173-340-430(7)(d). Compliance monitoring as defined in WAC 173-340-410 requires three types of monitoring: Protection monitoring, performance monitoring, and confirmational monitoring.

- Protection monitoring is performed to "confirm that human health and the environment are adequately protected during the construction and operation and maintenance periods of an 'interim' action as described in the Safety and Health Plan" WAC 173-340-410(1)(a)). This type of monitoring is addressed in the site specific HASP.
- Performance monitoring is completed to "confirm that the 'interim' action has attained cleanup standards and, if appropriate, other remediation levels or performance standards such as construction quality control measurements or monitoring necessary to demonstrate compliance with a permit, or where a permit exemption applies, the substantive requirements of other laws" (WAC 173-340-410(1)(b)). Performance monitoring is described below.
- Confirmational monitoring is performed to "confirm the long-term effectiveness of the 'interim' action once cleanup standards, remediation levels, and if appropriate, other performance standards have been attained" (WAC 173-340-410(1)(c)). Soils above the site specific remediation levels (Table 2-1) will be removed from the site, consequently, long-term monitoring will not be required at Miller Hill or the Skeet Range.

Skeet Range Performance Monitoring

Performance monitoring soil samples will be selected and handled per the SAP/QAPP (KEMRON 2008, Appendix A). Cleanup levels have been defined at the action level of 250 mg/kg of total lead. The soil removal will be deemed complete when performance monitoring samples indicate soils exceeding 250 mg/kg do not remain in the Skeet Range. If the results of the performance monitoring indicate an exceedance of the cleanup level, then the results will be evaluated and a new re-excavation strategy will be developed in concert with Mr. William Myers, the Contracting Officer's Representative (COR). Excavation of all soils in the Skeet Range to below the unrestricted use standard is expected. If the vertical extent of the contaminated soils is grossly underestimated and/or excavation problems occur hindering excavating soils to the cleanup level, Ecology will be consulted and informed in order to

mutually develop a remediation strategy with Army and KEMRON. Otherwise, re-excavation and re-sampling will continue until soils above 250 mg/kg in the identified grids as shown on the figures have been removed. A summary of the sampling rationale provided in the SAP/QAPP is located below.

Miller Hill Performance Monitoring

Performance monitoring soil samples will be selected and handled per the SAP/QAPP, Appendix A). Cleanup and remediation levels have been defined at the action level of 250 mg/kg along the former access road near the Hillside Housing Area to 475 mg/kg within the Buffer Zone and 1,066 mg/kg within the Flatlands and Range 54 for total lead. The soil removal will be deemed complete when performance monitoring samples indicate soils exceeding the cleanup or remediation levels do not remain. If the results of the performance monitoring indicate an exceedance of the cleanup or remediation levels, then the results will be evaluated and a new remediation strategy will be developed in concert with Ecology. Excavation of all soils in the Miller Hill below the site's designated cleanup or remediation levels is expected. If the vertical extent of the contaminated soils is grossly underestimated and/or excavation problems occur hindering excavating soils to below the cleanup or remediation levels, Ecology will be consulted and informed in order to mutually develop a remediation strategy with Army and KEMRON. Otherwise, re-excavation and re-sampling will continue until soils have been removed except in select areas to preserve the trees (e.g. Range 54 or along the demarcation line). A summary of the sampling rationale provided in the SAP/QAPP is located below.

Performance Monitoring Sample Collection

Performance monitoring soil samples will be collected from the completed excavation limits to verify that soil with lead concentrations does not exceed the MTCA cleanup or remediation levels. Performance monitoring soil samples will be collected from the bottom of each excavation area at a frequency of four samples per grid (no grid exceeding 50 feet x 50 feet or 2,500 sf), and composited prior to analysis.

Performance monitoring soil samples will be collected as grab samples using a trowel, hand auger, stainless steel spoon, or other type of hand tool. Quality control samples will be collected at a frequency of ten-percent, consistent with the QC requirements specified in the SAP/QAPP (KEMRON 2010).

On-site XRF analyses will be used to provide the data to determine if the lead concentrations are below the MTCA cleanup or remediation levels. Performance monitoring soil samples will be sent to the off-site lab consistent with the frequency of ten-percent. Performance monitoring soil sample locations will be located by experienced personnel using GPS technology (sub-meter accuracy) with data recorded on each sample and reported in ERIS format for Army use.

3.3.7 Backfill (Miller Hill and Skeet Range)

The excavation areas will be filled with clean on-site materials or screened gravel and cobbles and/or clean imported backfill to original (pre-excavation) grade, or as shown on the figures. To date, much of the backfill needed for the project has been tested, approved, and stockpiled on-site and is ready for use. In addition, screened soil larger than ¾-inch screen size originating from the sites will be used to backfill the excavated grids. This screened material is expected to account for approximately thirty percent of the backfill volume.

The remaining volume of backfill, if required, will be obtained from the JBLM Solid Waste Program from a stockpile designated at the Lincoln Pit, located approximately five miles from the work area or other

Army approved source areas. KEMRON has or will test the backfill soil for TPH (NWTPH-Gx and NWTPH-Dx) and Resource, Conservation and Recovery Act (RCRA) Metals (total As, Ba, Cd, Cr, Pb, Hg, Se, Ag). The analytical results from the backfill will be compared to MTCA standards to determine compliance.

The backfill will be placed and compacted to achieve density results based on visual observations of truck traffic weight on finished areas. The compaction will be made to the satisfaction of the engineer to avoid undesired settlement. A dozer will be used to achieve the initial compaction, using two to three passes over each lift and the finished areas. Additional efforts, including fully loaded truck traffic or vibratory compactor may be needed, as directed by the engineer until a satisfactory density is achieved. The backfill will be placed in 12-inch lifts. All final surfaces will be back-dragged for smoothness with the dozer blade in preparation to applying seed. A minimum cover of 6 inches of imported backfill containing a well graded mix of soils including minus ¾-inch material will be placed over the plus ¾-inch material. The backfill will have sufficient amounts of topsoil to promote vegetative cover.

3.3.8 Stockpiling (Miller Hill and Skeet Range)

Much of the backfill needed for the project has been tested, approved and stockpiled on site and is ready for use. Native "clean" soils and gravels and cobbles that were too large to pass through the ¾-inch screen and designated for backfill will also be temporarily stockpiled at their designated stockpile locations (Figures 3 and 11). Backfill designated as "clean" will not come into contact with lead impacted soil or equipment. To date, approximately 2,500 CY of clean backfill has been stockpiled at the Skeet Range. Another 10,000 CY of backfill has been stockpiled at Miller Hill. These existing stockpiles are shown on Figures 3 and 11. New stockpiles that will be created from screened material from excavated areas will be stockpiled at Miller Hill and the Skeet Range as shown on Figures 7 and 11. In addition, soil may be stockpiled at Range 42 near the existing picnic shelter as shown on Figure 9.

All stockpiles will be managed in accordance with the approved SWPPP.

3.3.9 Soil Screening, Stabilization and Loading

3.3.9.1 Soil Screening

Lead impacted soil excavated from the Miller Hill sites will be screened using a ¾-inch screen. The large cobbles and gravel greater than ¾-inches will be removed from the screens as clean material and reused as backfill. Lead impacted soils will be temporarily staged near the screening plant as shown on Figure 7 until it is treated and/or hauled to the firing ranges, as explained in the next section. Lead impacted soil at the Skeet Range will be screened on-site with the fraction of soil less than ¾-inch directly hauled to the active firing range. The plus ¾-inch material will be used as backfill.

A misting system will be operational around the perimeter of the screens for dust suppression, as required. Personal and perimeter air monitoring will also be conducted in accordance with the HASP to ensure worker safety.

3.3.9.2 Soil Stabilization (Miller Hill Only)

The excavated soils greater than 2,000 mg/kg total lead will be stabilized to ensure soils pass TCLP criteria prior to transporting and placing on active firing ranges. The remediation contractor, MT2, will use an appropriate technology for soil stabilization and is expected to use the same or similar methods

of stabilization that the treatability test utilized. Based on the treatability studies, a phosphate based stabilizer, ECOBOND ™ or approved equal, will be used to ensure that the minus ¾-inch excavated soils greater than 2,000 mg/kg total lead meet the TCLP lead criterion.

MT2's method of mixing reagent into lead impacted soils is simple, yet effective. Incoming minus ¾-inch soils that are above 2,000 mg/kg total lead based on RI data, will first be staged into piles. Initially, each pile will be approximately 100 CY. The phosphate based stabilizer will be stored in bulk on-site and used to mix into the staged piles. A front-end loader will be used to transport the reagent to each pile at a dosage estimated conservatively to treat the pile (e.g. 1% or greater). The reagent will be mixed with the soil using a backhoe or front-end loader, or both. After thorough mixing, the treated material will be left 24-48 hours for curing. After curing, the pile will be randomly sampled and a composite sample will then be analyzed for TCLP lead. If the TCLP lead result is less than 5 mg/L lead, then the pile will be loaded and transported to an active firing range. If the TCLP lead result is greater than or equal to 5 mg/L lead, then the pile will be remixed using more reagent. All piles that fail TCLP will be remixed and re-tested until they pass. The intent is to retreat all such piles that fail the TCLP analysis and retesting will be done to assure it passes. We expect that successful passing of 10 piles will help to fine-tune the phosphate dosage criteria such that future tests will not fail. However, 500 CY piles (as explained below) will also be tested in similar fashion; it is in KEMRON's interest to pass the TCLP analysis so that retreating of piles can be avoided or minimized.

After 10 staged 100 CY piles have been successfully mixed and passed the TCLP test, soils will be staged into 500 CY size piles for mixing. Each 500 CY pile will be sampled and analyzed for TCLP lead. Each pile must pass the TCLP criterion for less than 5 mg/L lead before it will be loaded and hauled to an active firing range. The TCLP sampling details are contained in the SAP/QAPP.

3.3.9.3 Loading (Miller Hill/Skeet Range)

Following excavation, screening for gravels and cobbles and/or treatment, the soils will be transported to one of several active ranges and used as berm material. As of now, the closest available range is Range 101 located on the North Impact area. It is actually closest to the Miller Hill Ranges as well as the Skeet Range. KEMRON wants to maintain the flexibility to use Interstate 5 as this is not only the most expedient route, but is believed to be the safest as it avoids congested residential and recreational streets. All trucks will be tarped securely, the truckers will be licensed commercial truckers in the State of Washington, and Department of Transportation (DOT) requirements will be followed. All soils carried in these trucks will be non-dangerous materials. Location and haul routes are presented on Figures 12 and 13.

The work area for excavation, soil screening, stabilization, staging, and loading is shown on Figure 7 - "Soil Processing/Treatment Area". In addition, soil screening may be done on-site at the Skeet Range prior to loading, as an alternative to using the processing plant as shown on Figure 7.

3.3.9.4 Lead Reclamation

Based on the lead shot survey presented in Appendix E, the lead shot at the Skeet Range is not economically viable for removal and reclamation. In fact, in the surveys no lead shot has been found and it is believed that the shot has dissolved due to the acidic soils. Therefore, no attempt will be made to recover lead shot.

Based on the lead shot survey presented in Appendix E, the few slugs found at Miller Hill are also not economically viable for reclamation. These slugs will be stabilized with the rest of the minus ¾-inch material that is above 2000 mg/kg.

KEMRON will follow the approved Technical Memo appended to the WP. Lead slugs are expected to pass through the ¾" screen. The gravel and cobble material will be visually inspected to determine that the slugs passed through the screen as intended. If not, then the ¾" screen may have to be exchanged for a 1-inch screen to pass the slugs. The material passing the screen will be transferred to the active range, whether treated or not treated, depending on the nature of total lead determined in that grid area. For lead-slug rich areas as defined in the Memo, KEMRON will add a 3/8" screen to catch the slugs. This material can then be further picked to separate the slugs from rocks for salvage value.

3.3.10 Traffic Control Plan

Traffic control, especially the movement of soils (clean, contaminated or treated) into and out of Miller Hill and the Skeet Range and to the live firing ranges, requires proper management to minimize the disruption to the normal traffic flows in the area and other portions of JBLM. Haul routes were selected to minimize inconveniences. The haul routes from Miller Hill and the Skeet Range to the preferred Range 101 or other various firing ranges will be as shown on Figures 12 and 13. Rock pads will be maintained at the driveway entries for rumble pads. Street sweeping will be done as necessary to keep the roads clean. Traffic will access Miller Hill near the Stone Education Center and avoid using the N16th Street entryway. Cones or caution tape may be used for working around Ranges 54 and 42, while using the Stone Education Center parking lot for access and egress. Also refer to Section 3.3.9.3.

3.3.11 Soil Reuse and Placement on Active Ranges

The soil to be reused at active ranges will be placed in windrows at locations directed by Range Control. Berms will then be shaped to their specifications. Typically, berms are 10 feet high with a one to two foot top width and side slopes at the angle of repose. Also see Section 3.3.1, last paragraph.

3.3.12 XRF Sampling and Re-excavation

Vertical soil concentration profiles have been established for most of the grids based on RI samples collected from 0- 6 inches BGS, 6-12 inches BGS, and 12-24 inches BGS, at Miller Hill. At the Skeet Range, the RI data shows the lead concentrations at 6-12 inches below BGS. Soils will be removed in 6-inch lifts from each grid at the Skeet Range and in 6-12-inch lifts at Miller Hill based on the RI data and excavation will stop once the depth of remediation exceedances has been reached. The bottom of each excavation will be tested with the XRF device for total lead to verify concentrations are below the cleanup or remediation level. If the bottom soil exceeds the cleanup or remediation level, additional excavation will be made and the procedure repeated, in accordance with the SAP/QAPP. Clean soil lifts will be segregated from contaminated soil and reused as backfill.

During excavation, on-site soils will be tested for lead concentrations using a combination of a portable XRF device and standard laboratory chemical analysis in accordance with the SAP/QAPP, which has been provided as Appendix A. The cleanup and remediation levels are shown on Table 2-1. The XRF device will be used to determine final excavation depths. Confirmation soil samples for laboratory analysis will then be collected based on a statistical analysis (e.g. 10%, within a broad range of lead values) of the XRF data (Section 3.3.6).

If an XRF sample indicates a grid is "clean" but then later a lab or QA/QC sample indicates the grid exceeds a remediation level, then the results from the off-site lab will dictate action and KEMRON will return to the grid in question and scrape a few additional inches of soil off the bottom and resample the

bottom. In this case, KEMRON will also run an additional laboratory confirmation sample with the XRF field sample to verify the grid in question has met the specified cleanup objectives.

3.3.13 Delineation of Additional Grids

At Miller Hill Ranges 62/67 and as shown on Figures 5 and 6, a total of seven grids lack sufficient RI data to characterize the soil for lead concentrations. This was due to thick brush which has recently been cleared. The grids requiring delineation are grids 11-17 to 11-19, 9-23, 9-24, 9-27, and 9-28. Composite samples from four quadrants of each grid at three depths (0-6 inches, 6-12 inches, and 12-24 inches) will be analyzed for total lead in accordance with the SAP/QAPP. Depths of excavation in these grids will be based on the results determined and the bottoms of each excavated grid will be tested as described in the previous section.

For the Unnumbered Pistol Range, Figure 10, Grid MH-32 will be explored with additional delineation points located on its north, east and west sides, as requested by Ecology.

For the Skeet Range, based on Ecology's request, several new excavation grids have been added, additional step out excavations have been added and more grids will be delineated due to lack of sufficient RI data. These grids and delineation locations are shown on Figure 11.

3.3.14 Decontamination of Personnel and Equipment

The contractor will establish decontamination procedures for on-site personnel who perform activities in the exclusion zone (EZ) and for equipment utilized in the EZ. Decontamination will be performed in the contamination reduction zone (CRZ) prior to entering the support zone (SZ) from the EZ. Procedures are described in the HASP. The contractor will train employees in the procedures and enforce the procedures throughout site operations. All zones are shown on Figures 7, 9, 10, and 11. Similar zones will be erected around each grid or selected groups of grids.

Decontamination facilities will be designed to meet all requirements of the HASP and all local, state, and federal requirements.

Decontamination stations will be used to:

1. Isolate contamination;
2. Prevent cross contamination; and
3. Prevent contamination from leaving the site.

Decontamination PPE and debris will be placed in 55-gallon drums or other suitable containers and properly disposed in JBLM or at an off-site disposal facility, at the discretion of the U.S. Army and at the expense of the contractor.

3.3.15 Mitigation Plan

This Plan is intended to guide the site activities performed under the direction of KEMRON for the interim action for Miller Hill and former Skeet Range at JBLM, Washington. This Plan is intended to provide measures necessary to protect on-site personnel, residents, visitors, and the public from physical harm and exposure specific to the interim action to be conducted.

All communications will be through JBLMPW Environmental. Residents will be notified (via mailers and posted signs) to:

- Not use the north side of Colorado Avenue as a walk way between 16th Street and the Stone Education Center.
- Keep themselves and their guests OUT of the work area/exclusion zone.

Any concerns should be communicated to the JBLMs POC (Jim Gillie) who will notify the Site Safety Officer.

Protection to the residents from exposure to lead and injury by slip/trip/fall or heavy equipment will be provided by fencing/flagging off the area so that direct exposure is removed. Dust will be controlled by wetting soil to minimize potential inhalation exposure. Air monitoring will be conducted to ensure compliance with the HASP. Air monitors will be used for worst case scenario of heavy equipment operator this is moving soil.

Heavy equipment will be brought to Ranges 62/67 and Range 54 via a new access driveway off Colorado Avenue near the Stone Education Center. The access driveway will eliminate traffic in the area of the Hillside Housing area. Other equipment will be brought to Range 42, the unnumbered pistol range, and the Skeet Range as shown on the drawings.

Excavations will be backfilled with clean material and topsoil and seeded once confirmation sampling results indicate the area does not exceed the lead MTCA cleanup or remediation levels.

3.3.16 Restoration

All sites will be restored to near original grades or as shown on the Final Grading Plans (Figures 14-18) following excavation and on-site soils confirmation monitoring. Restoration activities will also include seeding with a native seed mixture, and replanting with native shrubs in other areas (e.g. near Stone Education Center parking lot) to prevent invasive species such as Scot's Broom to establish.

In addition, the Army has requested that the Oregon White Oaks that were removed during the clearing operations be replaced with new Oregon White Oaks at a five to one ratio. Most of these oaks will be planted near the west end of Miller Hill where there is already a substantial number of oaks present and preserved. Locations for Oak revegetation are shown in Figure 14.

3.4 Demobilization

Following the completion of the site restoration activities, the contractor and subcontractors will demobilize from the site. Required activities as part of demobilization include removal of stored materials, removal of equipment and temporary facilities, final cleaning, and documentation submittal. Silt fence will remain in place until the grass has established a healthy stand. The silt fences will be removed in accordance with the approved SWPPP.

3.5 Interim Action Report

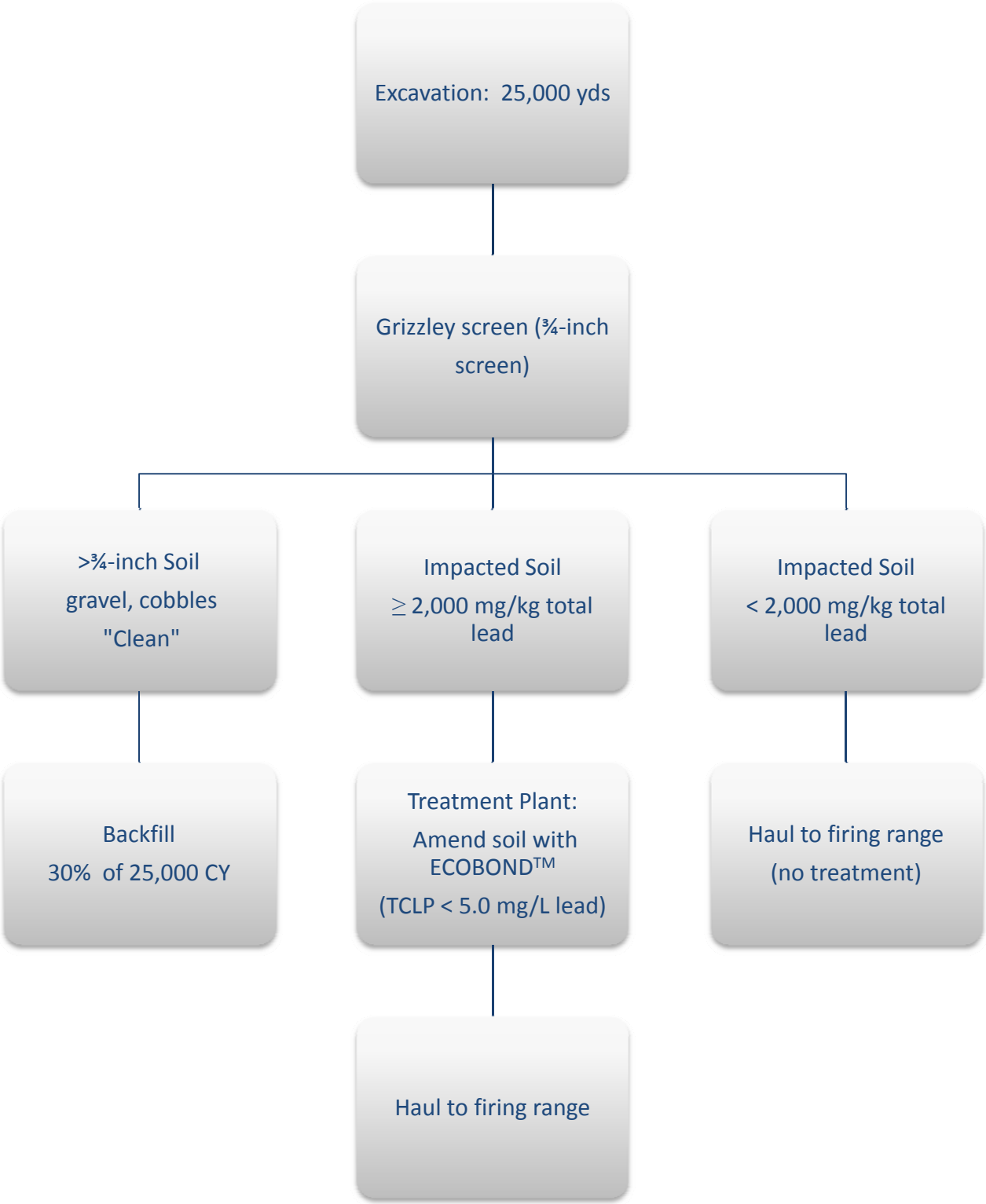
This report will include details of the construction activities; sampling and analyses and quality control; health and safety; land use controls; and recommendations and conclusions. A narrative of the work done will include:

- Summary of any remedial investigations (e.g. delineation) conducted;
- Summary and results of clean-up actions conducted;
- Explanations of any deviations from this IAWP;

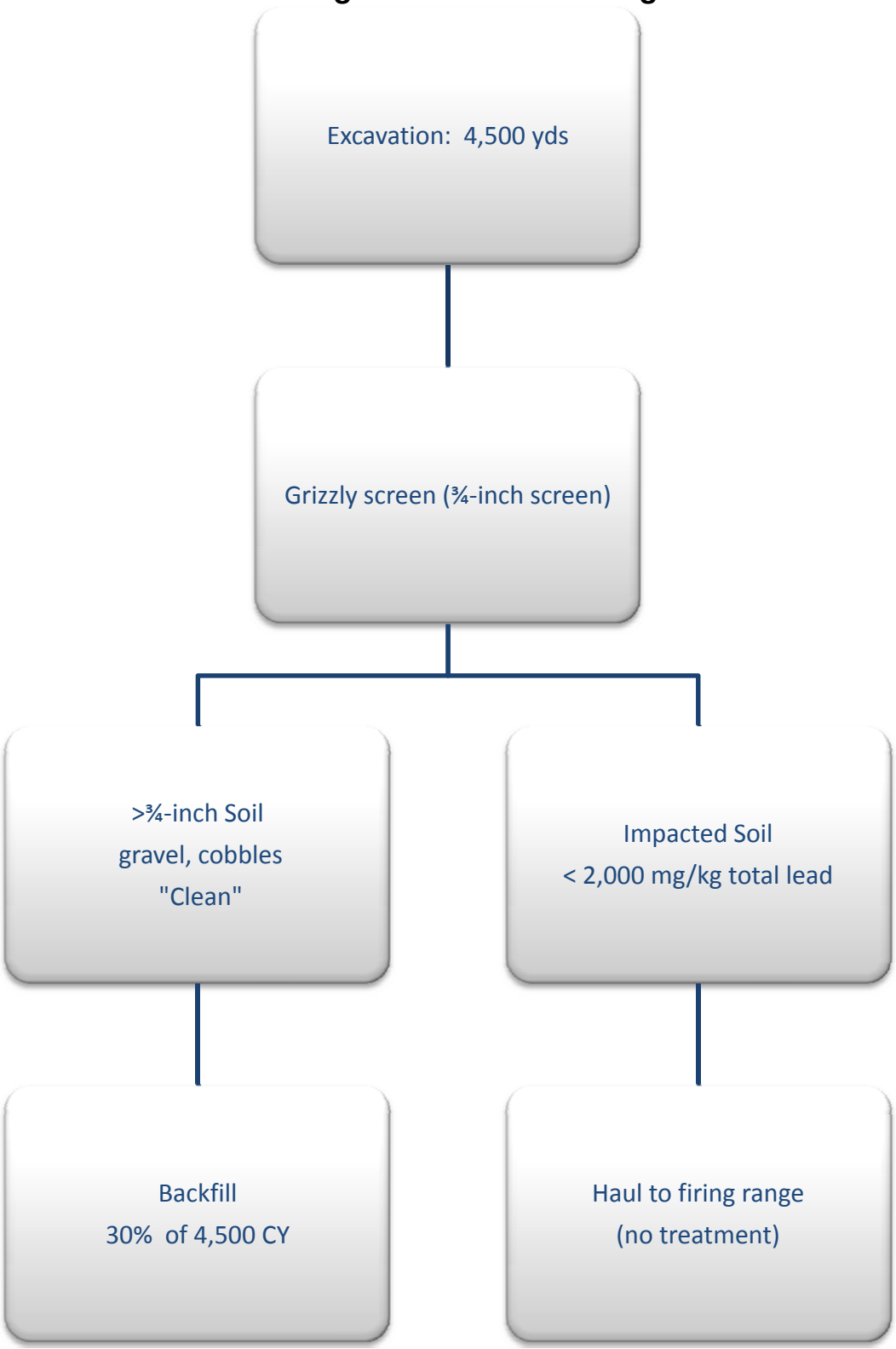
- Photographs of the work in progress;
- As-built plans of the final excavation and depth;
- Confirmatory sampling locations and analytical results;
- Waste disposal documentation;
- Final soil disposition summary including GPS locations of soil moved to active firing ranges; and
- Statement of substantial completion by Professional Engineer.

The sampling analyses and quality control will present all delineation and confirmational sampling results for field and laboratory data. An on-site/off-site sample data comparison of the XRF versus analytical results will be presented.

Miller Hill Material Flow Diagram



Skeet Range Material Flow Diagram



4.0 LAND USE CONTROLS

LUCs are measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or result in exposure to hazardous chemicals at the sites. Such measures are required to assure both the continued protection of human health and the environment, and the integrity of the interim action whenever hazardous chemicals remain at the site at concentrations that exceed the applicable cleanup level (WAC 173-340-440(1) and (4)).

LUCs are a critical component of the proposed interim action for Miller Hill. The Skeet Range will be remediated to the MTCA Method A unrestricted use cleanup level and will not require LUCs except for the adjacent recreational park lot. At Miller Hill, residual contamination will remain onsite beneath the clean backfill in the Flatlands and Buffer Zone. Untouched lead-impacted soils will be located in the Steep Hillside of Miller Hill. Both physical controls and administrative mechanisms will be used to ensure that current and future human receptors do not come into contact with residual contamination and the Steep Hillside ecological habitat is protected.

Prior to completion of the remediation work, the draft LUC Plan (LUCP) will be submitted to Ecology for review. The final LUCP will then be submitted with the Interim Action Completion Report, along with an as-built drawing of the work site.

5.0 PROJECT ORGANIZATION AND SCHEDULE

5.1 Organization Table

The personnel presented in Table 5-1 are identified as the KEMRON project team, JBLM Project Team, and Ecology's staff.

Table 5-1
KEMRON Project Team Personnel

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JBLM Project Team Personnel

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State Government Representative

Greg Caron, P.E. (Initial Point of Contact) Site Manager Washington State Department of Ecology Central Regional Office 15 W. Yakima Avenue, Suite 200 Yakima, WA 98902-3452 (Office) 509-454-7893 grca461@ecy.wa.gov	

5.2 Project Schedule

A copy of the latest Project Schedule is included in Appendix D. As shown on the schedule, the work activities will last approximately three months following Ecology approval of this Work Plan.

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FIGURES

APPENDIX A

SAMPLING ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

APPENDIX B

HEALTH AND SAFETY PLAN

APPENDIX C

STORMWATER PREVENTION POLLUTION PLAN

APPENDIX D

PROJECT SCHEDULE

APPENDIX E

TECHNICAL MEMORANDUM AND ANALYTICAL RESULTS