Work Plan for Installation of a Non-Combustible Cover over Radiologically-Impacted Material At or Near the Ground Surface in Radiological Areas 1 and 2

West Lake Landfill Operable Unit-1

Prepared for

The United States Environmental Protection Agency Region VII

Prepared on behalf of

The West Lake Landfill OU-1 Respondents

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List of Acronyms

Auxier	Auxier & Associates, Inc.
EMSI	Engineering Management Support, Inc.
EPA	United States Environmental Protection Agency
FEI	Feezor Engineering, Inc.
FS	Feasibility Study
GERT	General Employee Radiation Training
GPS	GeoPositioning System
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDNR	Missouri Department of Natural Resources
MMP	Materials Management Plan
NaI	Sodium Iodide
NCC	Non-combustible Cover
OU	Operable Unit
oz/sy	ounces per square yard
PPE	personal protective equipment
QA	Quality Assurance
QC	Quality Control
RI	Remedial Investigation
RIM	Radiologically Impacted Material
SAP	Sampling and Analysis Plan
TAT	Turnaround Time
TLD	thermoluminescent dosimetry
UAO	Unilateral Administrative Order
VOCs	Volatile Organic Compounds

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1 EXECUTIVE SUMMARY

The purpose of this project is to install a non-combustible cover ("NCC") over those portions of OU-1 Areas 1 & 2 where radiologically-impacted material (RIM) is present at the ground surface, in order to prevent potential surface fires and migration of contaminants from those Areas, as required by the EPA's December 9, 2015 Unilateral Administrative Order (UAO) issued to Bridgeton Landfill, LLC, Rock Road Industries, Inc., and Cotter Corporation (N.S.L.) (the "OU-1 Respondents"). This Work Plan describes the work to be performed to install the NCC in accordance with the UAO.

The sequence of actions that will occur from the start of the field work until the non-combustible cover is in place is as follows:

1) Conduct initial overland gamma survey along the outer edges of the extent of surface RIM/anticipated extent of rock cover (as shown on the figures in the Work Plan) in those portions of Areas 1 & 2 that are currently accessible, as well as in the adjacent Buffer Zone and on the adjacent Crossroad Lot 2A2 property (subject to receipt of permission to access that property).

2) Install non-combustible cover in Area 1, which will include the following:
   a) Perform air monitoring - both for on-site workers and for the community
      1) For on-site workers – portable air sampler on job site
      2) For community – use present air monitoring program consisting of 13 air monitoring stations around perimeter of Areas 1 & 2
   b) Grub and clear trees and vegetation in the areas of surface RIM
   c) Chip the vegetation and place the chips on the ground in the areas to be covered
   d) Install geotextile over the cleared areas with surface RIM including the areas containing chipped woody vegetation cuttings
   e) Install 8 inches of rock over geotextile
   f) Perform additional overland gamma surveys as the vegetation is cleared from areas that were not previously accessible due to vegetation cover to confirm extent of surface RIM
   g) Install additional geotextile and rock cover as necessary to cover any additional surface RIM that may be identified

3) Install non-combustible cover in Area 2, including the adjacent Buffer Zone, as needed, which will include the following:
   a) Perform air monitoring - both for on-site workers and for the community
      3) For on-site workers – portable air sampler on job site
      4) For community – use present air monitoring program consisting of 13 air monitoring stations around perimeter of Areas 1 & 2

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b) Grub and clear trees and vegetation in the areas of surface RIM
c) Chip the vegetation and place the chips on the ground in the areas to be covered
d) Install geotextile over the cleared areas with surface RIM including the areas containing chipped woody vegetation cuttings
e) Install 8 inches of rock over geotextile
f) Perform additional overland gamma surveys as the vegetation is cleared from areas that were not previously accessible due to vegetation cover to confirm extent of surface RIM
g) Install additional geotextile and rock cover as necessary to cover any additional surface RIM that may be identified

4) Perform additional characterization including overland gamma surveying and soil sample collection to evaluate the potential presence and if present the extent of surface RIM that may exist on the uncovered (naturally vegetated) portions of Crossroads Lot 2A2 (*i.e.,* AAA Trailer property).

5) Install rock buttress in Area 2 in that portion of the berm located above the southeast corner of the adjacent Buffer Zone (Figure 4)

6) Perform radiological soil sampling around the perimeter on the non-combustible covers in Areas 1 & 2 (including the Buffer Zone) to confirm all RIM at or near the surface has been covered.
   a) Send soil samples to Eberline Analytical for analysis
      a. request quick turnaround time for Thorium-230
      b. analyze the samples using standard turn-around times for radium, thorium and uranium isotopes plus protactimium-231 and lead-210 (i.e., the same radiological parameters that were included in the analyses of the Phase 1D samples and the Additional Characterization of Areas 1 and 2 samples)
   b) Perform additional clearing and covering if and as necessary based on the initial Thorium-230 results

7) Receive results of standard turn-around time radiological analyses

8) Separately, confirm that remaining trees and vegetation do not present a fire risk that could result in potential release of RIM into the environment (if determined necessary by the USEPA). See Sampling and Analysis Plan for procedures to be followed.

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9) Confirm of completion of project to install non-combustible cover

Please note that many of the above items will occur concurrently, not sequentially. For example, installation of geotextile and rock will occur concurrently with clearing of vegetation and performance of overland gamma surveys will occur concurrently with the vegetation clearing. Similarly, collection of verification samples will occur whenever a sufficient length of the anticipated final perimeter of the NCC has been installed. Surveying to provide direction for clearing and construction and to document the construction will occur concurrently with all of the activities.

For additional information regarding the specific procedures to be followed for this project, please refer to this Work Plan and the following documents which are an integral part of this Work Plan:

- Health and Safety Plan for Non-Combustible Cover Installation at West Lake Landfill, Operable Unit 1, Bridgeton, St. Louis County, Missouri dated February 8, 2016.

- Radiation Safety Plan for Installation of Non-Combustible Cap, West Lake Landfill's Operable Unit 1, 13570 St. Charles Rock Road, Bridgeton, Missouri, 63044, dated January 4, 2016

- Quality Management Plan dated December 2015

- Surface RIM Identification Sampling and Analysis Plan (SAP), West Lake Superfund Site Operable Unit 1, dated December 2015

2 WORK TO BE PERFORMED

Paragraph 34.a. of the UAO identifies the following specific items to be addressed in this Work Plan:

1. A current West Lake Landfill map clearly indicating where RIM is located at or near the surface in OU-l. This map should also indicate which areas with surface RIM are currently covered by vegetation or other materials and which remain exposed to the atmosphere.

2. Plans and schedule for placement of a non-combustible cover or barrier as soon as possible over all exposed areas at OU-l where RIM is currently known to be located at or near the surface and is not otherwise covered by vegetation, fill, or other materials.

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3. Plans for grubbing and clearing all trees and vegetation where RIM is currently known to be located at or near the surface in OU-l, and placement of a non-combustible cover or barrier over the cleared areas.

4. Plans and schedule for the performance of testing to confirm that RIM located at or near the surface in OU-1 has been covered.

5. Plans and schedule for ensuring the remaining trees and vegetation in OU-l do not present a fire risk that could result in the potential for release of RIM into the environment.

6. Plans and schedule for air monitoring for ensuring protection of both on-site workers and the surrounding community during grubbing and clearing of trees and vegetation in OU-l, as well as during placement of the cover or barrier.

7. Plans for maintenance of the cover or barrier until a remedial action selected by EPA that addresses the surficial RIM is implemented at the Site.

The anticipated activities and schedules to complete these seven items are discussed in the following subsections of this Work Plan.

2.1 Extent of Surface RIM

The first item specified by the UAO for the NCC Work Plan is a map of the extent of surface RIM that also shows the areas currently covered by vegetation or other materials.

2.1.1 Surface RIM Extent

The approximate extent of surface RIM was previously identified on Figures 6-1 and 6-3 of the OU-1 Remedial Investigation report (EMSI, 2000). These figures were used as the initial basis for defining the extent of surface RIM (Figures 1 and 2). The results of the 1995 overland gamma survey (McLaren/Hart, 1996) were also reviewed to identify other areas where surface RIM may potentially be present in Areas 1 and 2. The results of these evaluations are summarized on Figures 3 and 4.

2.1.2 Vegetation Cover

Over the years since active waste disposal has ceased, extensive vegetative cover has grown over the surface of Areas 1 and 2. The aerial photography used as the base drawing for Figures 1 and 2 displays the extent of vegetation cover on Areas 1 and 2. No survey of the extent of vegetative cover on Areas 1 and 2 has ever been performed.

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Therefore, for purposes of this NCC Work Plan, the extent of vegetative cover is assumed to extend over all portions of Areas 1 and 2 that are not otherwise covered by inert fill or asphalt pavement (described below).

2.1.3 Other Cover Material

A feasibility study (FS) of potential remedial alternatives was completed in 2006 for OU-1. The FS identified regrading of the surface of Areas 1 and 2 to promote drainage in conjunction with installation of a new engineered landfill cover as likely components of remedial action for OU-1. In anticipation of the regrading and landfill cover construction activities, Bridgeton Landfill prepared a Materials Management Plan (MMP) (EMSI, 2006), which was subsequently approved by the Missouri Department of Natural Resources (MDNR). The purpose of the MMP was to allow Bridgeton Landfill to accept for disposal inert fill material that could be placed on the surfaces of Areas 1 and 2 to assist with the anticipated regrading and cover construction activities. Pursuant to the MMP, over the period from approximately 2006 through 2008, Bridgeton Landfill accepted concrete rubble, brick and other inert fill material which was placed in a topographic low (surface depression) in Area 1 and on the ground surface in Area 2. The extent of inert fill material on the surface of Areas 1 and 2 is shown on Figures 5 and 6.

In addition to the inert fill material, portions of the surface of Area 1 were historically covered with asphalt pavement. The extent of the asphalt pavement in Area 1 is shown on Figure 5. Cracks and other discontinuities exist in the asphalt pavement such that grasses, weeds and small trees have rooted in the area of the asphalt pavement.

Lastly, as part of recently performed additional investigations in Areas 1 and 2, vegetation was cleared and geotextile overlain by a nominal 8-inch thick layer of road base was placed along the roads and drill pads used to access Areas 1 and 2 to perform additional soil borings. The locations of the various roads in Areas 1 and 2 are shown on Figures 5 and 6.

2.2 Buffer Zone and Crossroads Lot 2A2 Vegetative Areas Investigation

It should be noted that, based on samples collected by McLaren Hart in 1995 (boreholes WL-201 through WL-208), EMSI in 1997 (samples designated FP-1 through FP-8), and Herst & Associates in 2000 (RC-01 through RC-07), the Remedial Investigation (RI) (EMSI, 2000) also identified occurrences of radionuclides in surface soil in the southern portion of what at that time was property owned by Ford Motor Credit (referred to in the RI as the Ford property but after a subsequent parcel division and sales has since been referred to as the Buffer Zone and Crossroads Lot 2A2), located immediately to the north and west of Area 2. Reportedly, after completion of landfilling activities in Area 2, but prior to establishment of a vegetative cover over the landfill berm, erosion of soil from the landfill berm resulted in the transport of radiologically-impacted materials from Area 2 onto the adjacent Ford property (EMSI, 2000). The landfill berm and the adjacent

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properties were subsequently re-vegetated by natural processes, and no subsequent erosion or other failures are present.

Ford sold a portion of the property to Crossroad Properties, LLC (Crossroad), and sold the remaining portion (the Buffer Zone) to Rock Road Industries to provide a buffer between the landfill and the adjacent properties. In November 1999, third parties scraped the vegetation and surface soil on Crossroad Lot 2A2 and the Buffer Zone to a depth of approximately 2 to 6 inches. These activities were unauthorized. The removed materials were piled in a berm along the southern boundary of the Buffer Zone, adjacent to the northwestern boundary of the West Lake Landfill. A small amount of removed materials was also placed in a small pile on the Crossroad property near the base of the landfill berm along the east side of Lot 2A2.

In February 2000, additional surface soil samples (RC-01 through RC-07) were collected from the disturbed area and submitted for laboratory testing. Only one sample (RC-02) obtained from the Buffer Zone, below and adjacent to the toe of the landfill berm, contained radionuclides (thorium-230) above levels that would allow for unrestricted use. The remainder of the samples contained either background levels of radionuclides or levels above background but within levels that would allow for unrestricted use. The results of the additional soil sampling indicated that most of the radiologically impacted soil that had previously been present on the Buffer Zone and Lot 2A2 of the Crossroad property had been removed and placed in the stockpiles. Evaluation of the soil sampling results obtained prior to and after the 1999 disturbance indicates that approximately one acre of the Buffer Zone may at that time still have contained some radionuclides above levels that would allow for unrestricted land use (i.e., combined radium or combined thorium activities greater than 5 pCi/g plus background which equates to 7.9 pCi/g). Inspection of the area in May 2000 indicated that native vegetation had been re-established over both the disturbed area and the stockpiled materials. The sequence of soil sampling activities and associated results are presented in the RI (EMSI, 2000)

A 2004 inspection of this area indicated that additional soil removal/re-grading had been performed on the remaining portion of the Crossroad property and the adjacent Buffer Zone property by third parties. These activities appear to have resulted in removal of the soil stockpiles created during the previous re-grading activity, removal of any remaining soil on Lot 2A2 and the Buffer Zone not scraped up during the 1999 event, and placement of gravel over the entirety of Lot 2A2 and most of the Buffer Zone. Reportedly, all of the soil removed during the July 1999 grading work and the May 2003 gravel layer installation was placed in the northeastern corner of the Buffer Zone (terra technologies, 2004).

No sampling has been performed since the most recent (May 2003) grading work conducted by third parties was performed, and therefore the levels and extent of radionuclides, if any, that may remain in the soil at the Buffer Zone and Crossroad Property are unknown. As discussed above, Lot 2A2 and most of the Buffer Zone were covered with gravel and Lot 2A2 was subsequently paved by AAA Trailer. In addition,

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as discussed in Section 2.2 below, it is anticipated that a temporary rock buttress will be constructed on the Buffer Zone parcel to provide for an NCC on the landfill slope in this area. Therefore, based on the historical data, it is expected that all or most any surface RIM that may still exist on the Buffer Zone property will be covered by the temporary rock buttress. A MARSSIM final status survey of Crossroad Lot 2A2 and the Buffer Zone will be conducted as necessary during remedial design activities associated with implementation of the selected remedy for this area to evaluate compliance with the cleanup standards selected by EPA.

Additional discussion of the prior sampling and activities relative to the Buffer Zone and Crossroads Lot 2A2 can be found in the RI (EMSI, 2000), Feasibility Study (EMSI, 2006) and Supplemental Feasibility Study (EMSI, 2010).

The entire Buffer Zone is currently owned by Rock Road Industries, Inc. and is therefore currently accessible to the Respondents for purposes of performing the required work. The Buffer Zone will be scanned via overland gamma scan according to the procedures specified in the Work Plan and associated planning documents (e.g., Sampling and Analysis Plan). The overland gamma survey will be performed using Ludlum 44-10 (2x2) Sodium Iodide (NaI) detectors coupled to Ludlum 2221 survey meters modified to integrate and transfer data from the detector at a rate of once per second to a Trimble GeoPositioning System (GPS) which stores the gamma reading and the location of that reading. If the scanning procedures indicate the potential for RIM, the affected areas will be cleared of vegetation followed by placement of a geotextile fabric and a nominal 8-inches of road base material. After clearing has occurred 10 feet beyond the extent of surface RIM identified in the Work Plan, or as further defined by the results of the overland gamma survey to be conducted along the perimeter of the outer boundary of the extent of surface RIM/outer edge of the NCC, confirmation samples will be collected at approximately 100 feet spacing along the perimeter except for those areas where the outer edge of the surface RIM/NCC coincides with the edges of the Buffer Zone. More frequent biased samples will be obtained from any areas where erosion of the surface or sediment accrual are identified.

Crossroads Lot 2A2, which is located adjacent to the Buffer Zone, is not owned or controlled by Respondents. After receipt of EPA approval to do so, the OU-1 Respondents' Project Coordinator will contact the current owner of Crossroads Lot 2A2 to obtain permission to conduct additional characterization via overland gamma scanning and confirmation testing within all uncovered areas of Lot 2A2 that are contiguous with the West lake Landfill Area 2 Fence. The same procedures (overland gamma scanning and confirmation sampling) will be used as described above for the Buffer Zone. Upon receipt of site access to conduct the additional characterization work on Lot 2A2, such work will be conducted in accordance with any scheduling and access conditions imposed by the property owner once access is granted, and as soon as personnel and equipment can be made available. The results of the additional characterization will be provided to the USEPA.

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A schedule for the additional characterization of the unpaved portions of Crossroads Lot 2A2 is included in Table 1. It is expected that once sufficient vegetation has been cleared, it should only take approximately one day to perform the overland gamma survey of the Buffer Zone. This work will be done once the contractor clears the vegetation from the Buffer Zone, which will occur after the contractor clears the vegetation leading to the edge of the top of Area 2 and from the slope of the landfill berm above the Buffer Zone and builds a ramp from the top of the slope down to the Buffer Zone. A specific schedule has not been established for these clearing and ramp-building activities.

It is anticipated that overland gamma surveying of uncovered, natural vegetation areas on Crossroads Lot 2A2 can be completed in a few hours (provided we receive permission to do so). Any additional characterization work associated with certain areas of Lot 2A2 will not be contingent on any work which would be performed in the Buffer Zone. Access to Lot 2A2 will be obtained from the property owner via coordination with EPA, as needed, and additional characterization of Lot 2A2 will begin as soon as possible.

2.3 Placement of a Non-Combustible Cover

Based on the extent of RIM described in Section 2.1 and shown on Figures 3 and 4, and also taking into account the extent of inert fill material and road base that currently exists in Areas 1 and 2 (Figures 5 and 6), the anticipated extent of the NCC has been identified as shown on Figures 7 and 8. Please note that the extent of asphalt pavement in Area 1 is not included as part of the extent of existing cover material because as noted above, vegetation has grown up through cracks and other discontinuities in the asphalt pavement and asphalt is not considered to be a non-combustible material. By comparison, the inert fill material and road base that currently exist in Areas 1 and 2 were included as part of the estimation of existing cover material. The areas of inert fill that are in close proximity to the proposed extent of new non-combustible cover will need to be visually inspected to determine if any additional rock cover needs to be place on or adjacent to the existing inert fill material.

Given that the extent of surface RIM in Areas 1 and 2 is approximately 1.4 acres in Area 1 and 8.74 acres in Area 2 and the extent of existing inert fill and road base cover is approximately 0.4 acres in Area 1 and 0.79 acres in Area 2, the total area for NCC construction in Areas 1 and 2 is estimated to be 1.0 and 7.95 acres, respectively. In order to ensure that the extent of surface RIM in these areas is completely covered, the bid specifications for the NCC will require the contractor to extend the cover placement nominally 10 ft beyond the edge of all areas where surface RIM is identified as being present within Areas 1 and 2; however, the cover will not extend beyond the limits of the Area 1 or 2 waste disposal units. Therefore, the total extent of the NCC cover is anticipated to be approximately 1.2 acres in Area 1 and 8.75 acres in Area 2 for a total area of approximately 10 acres in these two areas.

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Placement of a NCC over these areas will entail cutting/removal of the existing vegetation in these areas followed by placement of a geotextile fabric and a nominal 8-inches of road base material. The anticipated profile for the NCC is shown on Figures 7 and 8. If evidence of erosion or sediment deposition are identified outside of the areas to be covered by the NCC, additional biased samples will be collected from such areas and tested as part of the confirmation testing (see Confirmation Testing, Section 2.5.3). If the analytical testing of the additional biased samples indicates the presence of surface RIM, the area of erosion or sediment accumulation associated with such a sample will be covered with a geotextile and new rock fill.

The vegetation will be cleared with a forestry mower attached t o a low ground pressure tractor such as a skid steer. The vegetation will be moistened as necessary to minimize visible dust prior to the forestry mower advancing. Rutting wi ll be minimized by the equipment selection. Metal items or other debris on the surface of the existing landfill will be moved to an area or areas within Area 1 or 2 outside of the extent of where surface RIM exists. The debris will be stockpiled on the existing asphalt pavement in Area 1 and/or on the existing inert fill in Area 2, or otherwise placed in an ar ea(s) outside of the extent of surface RIM/non-combustible cover.

Rock stockpiles may be used for temporary storage of rock prior to placement within the NCC cover area, but it is generally expected the rock material will be delivered to the NCC cover area via tandem on-road haul trucks, and the trucks will only drive on previously rocked areas and deposit the rock onto the advancing front of t he cleared areas. The geotextile and rock placement will occur in such a manner that all newly cleared areas will be covered generally within 24 hours, but not more than 48 hours after clearing.

The source of the rock will be from a local quarry (most likely the Fred Weber quarry in Maryland Heights, MO). The fie ld engineer will collect load ti ckets from the drivers to document that the source of rock was from a commercial quarry.

It is likely that surface RIM is present along a portion of the landfill berm on the north side of Area 2, specifically in that portion of the berm located above the southeast corner of the adjacent Buffer Zone (Figure 4). Because of the steep slope (1.5H:1V) associated with the landfill berm, placement of geotextile with 8-inches of road base is not anticipated to provide for a stable cover. Therefore, in this area, a temporary rock buttress will be constructed from the base to near the top of the landfill berm. The rock buttress will be constructed by clearing vegetation from the Buffer Zone and from the landfill berm slope to the extent it can be conducted in a safe manner, followed by placing road base material on the Buffer Zone and extending up the face of the landfill berm. Attachment 1 presents a drawing of the preliminary design for the rock buttress. This rock buttress would be temporary, and, if necessary, most of the rock could be reclaimed during implementation of future remedial actions that may be implemented at the Site.

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The OU-1 Respondents have employed the procurement services of Bridgeton Landfill, Inc. and Republic Services, Inc. to procure a contractor to perform the vegetation clearing and construct the NCC. A bid package was completed and released to the prospective contractors on January 12, 2016 and that bids were received by January 22, 2016. Review of the bids and notice of intent to award were completed by February 3, 2016. The bid package included a sample contract with the West Lake Landfill NPL Site Trust ("the Trust") so the prospective contractors were aware of all contract conditions.

It is anticipated that installation of the NCC will begin on February 15, 2016 subject to weather conditions and the availability of the contractor personnel, necessary equipment (e.g., forestry mower) and required materials (e.g., geotextile). Prior to starting any work on site, the selected contractor personnel will be provided General Employee Radiation Training (GERT) if they have not already received it, as well as an overall orientation to Bridgeton Landfill safety procedures and communication of potential hazards associated with the NCC project. EPA was provided notice of the contractor selected to perform the work (Kuesel Excavating Co. Inc.) on February 3, 2016 as set forth in Paragraph 30 of the UAO. EPA was provided notice of the intended start of construction on February 12, 2016, in accordance with Paragraph 36(c) of the UAO.

2.4 Vegetation Clearing

Vegetation removal and construction of the NCC are anticipated to be performed using procedures similar to those previously employed to construct the access roads and drill pads during the prior Phase 1, Phase 1D, and Additional Characterization of Areas 1 and 2 investigations. Specifically, the vegetation will be cut near but above the ground surface using a "brush hog", a skid steer with a forestry cutter/grinder attachment, or equivalent equipment. Such equipment can cut and grind woody vegetation without disturbing the underlying ground surface or vegetation roots. The vegetation cuttings will be chipped and placed on the ground surface. Any significantly sized wood vegetation that needs to be removed will be cut with tree shears and chipped in a wood chipper. If necessary, the woody vegetation will be moistened with a water cannon prior to grinding to minimize chipping dust. The chipped woody vegetation will be placed beneath the extent of the NCC prior to geotextile deployment. Any material that is too large to chip (such as larger tree limbs or trunk sections) will be cut into 10 foot sections and placed in low lying areas and covered with geotextile and rock. The goal will be to minimize any uncovered logs long term. Should this not be possible, the logs will be neatly placed in an area where there is no RIM at or near the surface.

A geotextile will be laid on top of the cleared area and vegetation chips over which approximately 8 inches of road base material will be placed. Profile views of the final NCC are provided on Figures 7 and 8. Based on prior experience with building drill pad access roads in Areas 1 and 2, it is anticipated that additional road base material will need to be placed in any depressed areas or at the base of any steep slopes (e.g., steeper than 4H:1V).

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The areas of the inert fill that are in close proximity to the proposed extent of new non-combustible cover will visually inspected to determine if any additional fill placement is necessary in the transition area between the new rock cover and the existing inert fill.

It is anticipated that placement of the geotextile and rock cover material will generally occur the same day as the vegetation removal activities, but in any event should be completed within 48 hours of the vegetation clearing in any particular area. Should heavy rain be forecasted and an area cannot be covered the same day, storm water waddles will be placed on any downslope areas. In addition, vegetation clearing will not be performed during periods when severe thunderstorms or major precipitation events (rainfall of a rate of over ½ inch per hour) are forecasted for the site area or when observations by on-site personnel indicate a potential for a severe thunderstorm or major precipitation event. Additionally, on days when precipitation is anticipated to occur, placement of geotextile and rock cover will be coordinated to closely follow the vegetation clearing activities and the vegetation clearing will be closely monitored and/or suspended as necessary to ensure that the geotextile and sufficient cover necessary to anchor the geotextile can be placed prior to the occurrence of thunderstorms. Please note that monitoring of stormwater during NCC construction is addressed in a separate document that was submitted to EPA on February 23, 2016 that was conditionally approved by EPA on March 1, 2016.

NCC construction will only occur during days where the working temperatures will be 25 degrees or higher. The average temperature for February is approximately 35 degrees and the average temperature for March is above 40 degrees, so this requirement should generally not limit construction. Should the temperatures drop below freezing, caution will be used to avoid using too much water (needed for dust suppression) to avoid ice accumulations to prevent slips, trips or falls.

2.5 Performance Testing

It is anticipated that testing will be conducted in three phases to verify the extent of surface RIM and to confirm that the NCC extends over the full extent of surface RIM.

2.5.1 Initial Testing Prior to the Start of Construction

Subject to physical access constraints posed by the existing vegetation cover, an initial overland gamma survey will be performed along the margins of the estimated extent of surface RIM (Figures 3 and 4) to provide an initial verification of the extent of surface RIM. Prior to conducting the overland gamma survey, a reference area or areas will be identified and overland gamma survey background values will be obtained from this area(s).

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The overland gamma survey will be performed using Ludlum 44-10 (2x2) Sodium Iodide (NaI) detectors coupled to Ludlum 2221 survey meters modified to integrate and transfer data from the detector at a rate of once per second to a Trimble GeoPositioning System (GPS) which stores the gamma reading and the location of that reading. The detectors will be hung approximately six-inches above the ground surface and advanced at a rate of approximately 0.5 meters per second. Separation between the scanned transit lines will be approximately 1.5 meters unless influenced by terrain. Stored data will be downloaded and processed using commercially available software applications and plotted on a map of the Areas. Individual points will be assigned colors based on the magnitude of instrument response at that location.

Additional details regarding the data quality objectives and the procedures to be used for the overland gamma survey can be found in the Sampling and Analysis Plan (SAP) (Auxier, 2015a).

No problems or issues for performance of the overland gamma survey are expected to be encountered from vegetation hindrances because the overland gamma survey will be performed prior to or in conjunction with the clearing of vegetation from the areas identified as containing, or potentially containing surface RIM.

2.5.2 Additional Testing During Vegetation Clearing

Based on the maps generated from the initial overland gamma survey, remaining inaccessible areas that may contain surface RIM will be identified for vegetation clearing. A health physicist will then be assigned to perform additional overland gamma surveys in conjunction with the vegetation clearing activities to further verify the extent of surface RIM. These surveys will be conducted using the same techniques described above for the initial survey. The results of the additional surveys will be added to the map of the results obtained from the initial survey.

2.5.3 Confirmation Testing

Once the results of the overland gamma surveys described above define the extent of surface RIM, surface soil samples will be obtained along the perimeter to confirm the absence of RIM beyond the extent determined by the overland gamma surveys. It is anticipated that the surface soil sampling will be performed outside the perimeter of the defined surface RIM/outer extent of the NCC to verify that thorium-230 (which cannot be detected by the overland gamma survey) is not present outside the outer limit of the new cover at activity levels greater than the level that would allow for unrestricted land use. It is anticipated that soil samples will be collected from locations spaced approximately 100 feet apart along the perimeter of the outer boundary of the extent of surface RIM/outer edge of the NCC except for those areas where the outer edge of the surface RIM coincides with the edges of the Area 1 or Area 2 waste disposal unit boundaries. More frequent biased samples will be obtained from any potential sediment depositional areas that may be identified during the vegetation clearing, overland gamma survey or NCC

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installation activities. This confirmation testing will occur on the edge of the 10-foot outer clearing limit, so the area will be cleared of vegetation.

Surface soil samples will be submitted to Eberline Analytical Laboratory (Eberline) for quick turn-around-time (TAT) isotopic thorium analysis. The quick TAT isotopic thorium analyses will allow for an initial, quick determination as to whether the extent of NCC is sufficient or if placement of additional NCC may be required while the NCC contractor is still present at the site. The samples will also be analyzed for isotopic uranium and gamma spectroscopy in order to provide data comparable to the other investigatory data obtained from OU-1 areas.

2.6 Demonstration of No Risk of Release from Remaining Vegetation

Vegetation located outside the extent of surface RIM will remain on site. The results of the previous (2009) collection and analysis of vegetation samples are consistent with the established site background levels for RIM in soil (T.A. Woodford and Associates, 2009). The remaining vegetation at the site is not anticipated to pose any risk of release of radionuclides.

Discussions with EPA have indicated that they are still reviewing the results of the 2009 vegetation sampling event relative to the potential for release of radionuclides in the event a vegetation fire occurs at the site. If EPA concludes that the existing sample data provide sufficient basis to demonstrate that the remaining vegetation would not pose a risk of release in the event of a fire, no additional sampling will be conducted. If EPA determines that additional sample collection and analyses are required to complete the specified demonstration, additional samples will be obtained as necessary to demonstrate that the remaining vegetation does not pose a threat of release of radionuclides in the event of a fire.

The Sampling and Analysis Plan (Auxier, 2015a) submitted in conjunction with this Work Plan contains additional details regarding the scope and procedures to be used to conduct additional vegetation sample collection and analyses. The pertinent sections of that plan are currently under review by EPA.

2.7 Perimeter Air Monitoring

Pursuant to a prior request from EPA, the OU-1 Respondents previously implemented an air monitoring program consisting of 13 stations located around the perimeters of Areas 1 and 2 and elsewhere at the West Lake Landfill/Bridgeton Landfill site (Figure 9). Specifically, an Air Monitoring, Sampling and QA/QC Plan was prepared (Auxier & Associates, Inc., 2014), and was approved by EPA on December 5, 2014. Installation of the air monitoring stations was performed in early 2015, and continuous air monitoring began on May 1, 2015. A report of the results from the first quarter of air monitoring

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activities (May, June and July 2015) was submitted to EPA on December 9, 2015 (Auxier and EMSI, 2015).

The perimeter air monitoring activities include sampling for airborne radioactive particulates, radon gas, and volatile organic compounds (VOCs), and measurements of gamma radiation. Sampling is performed continuously at the perimeters of OU-1 Areas 1 and 2. All 13 monitoring stations include air sampling pumps equipped with air sample filters for collection of particulate samples for analyses of alpha and beta emitters. The particulate filters are collected every four weeks (28 days) and sent to Eberline Analytical for laboratory analyses. One set of the three sets of filter samples obtained during each calendar quarter are also analyzed for uranium and thorium isotopes and for radium by gamma spectroscopy. All 13 monitoring points also include radiation dosimeters for measurement of gamma radiation, and alpha track etch detectors for measurement of radon emissions that are submitted for laboratory analysis by Mirion Technologies and AccurStar, respectively, every calendar quarter.

Five of the monitoring stations house continuous passive samplers to monitor for VOCs. Monitoring of VOCs is performed using the Radiello Code 130 chemical adsorbing cartridge diffusion samplers that are left in place for periods of 14 days. These sampling devices are submitted to EuroFins Air Toxics Ltd for VOC analyses.

Data obtained from the ongoing perimeter air monitoring program are expected to be the primary method for evaluation of protection of the surrounding community during installation of the NCC over the surface RIM in OU-1.

2.8 Occupational Monitoring

In addition to the continued operation of the perimeter air monitoring program currently employed for Areas 1 and 2, temporary air monitoring activities will be conducted during the vegetation clearing and NCC placement activities. Specifically, portable air pumps equipped with filters will be set up near active work areas and/or installed on equipment to obtain particulate samples for analysis for alpha and beta emitters.

Ambient radiation levels in work areas will be routinely monitored during NCC construction. In addition, all workers will wear thermoluminescent dosimetry (TLD) badges to monitor their exposures to gamma radiation. The data obtained from analysis of samples collected by the portable air sampling equipment and TLDs will be used to verify that site workers are not exposed to radiation or radioactive materials above permissible levels.

In conjunction with use of personal protective equipment (PPE) and adherence to procedures set forth in the Health and Safety Plan (Auxier, 2015b) and Radiation Safety Plan (Auxier, 2015c), the results obtained from the perimeter and portable air sampling points and TLDs will be used to ensure protection of site workers.

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2.9 NCC Inspections and Maintenance

Quarterly inspections will be performed by a designee of the OU-1 Respondents to verify that the NCC remains intact and that stormwater runoff, burrowing animals or other activities have not caused any impacts that would affect the performance of the NCC. Additional inspections will be conducted after major precipitation events of sufficient intensity and/or duration to potentially impact the integrity of the NCC.

A description of the anticipated NCC inspection and maintenance activities is included as Attachment 2.

3 ANTICIPATED SCHEDULE FOR NCC COMPLETION

Table 1 presents an anticipated schedule for the various activities to be conducted to place the NCC over the surface RIM, collect and analyze samples to confirm that the NCC completely encompasses the surface RIM, and, if necessary, collect and analyze samples of vegetation obtained from outside the extent of surface RIM to further support the demonstration that in the event of a fire, the remaining vegetation will not result in a release of radionuclides. Subject to weather conditions, equipment and material availability and other factors, the OU-1 Group anticipates installation of the additional cover material will be completed within approximately 90 days of EPA approval of this Work Plan and the related project plans.

The status and results of the work performed to plan, construct and inspect/maintain the NCC cover will be tracked and reported to EPA in monthly status reports, as required by the UAO. A final report documenting the NCC installation is anticipated to be completed within 30 days of receipt of the final analytical laboratory report for the confirmation soil samples.

4 PROJECT TEAM

The project team will consist primarily of contractors that have previously been working in Areas 1 and 2 along with a construction contractor to be retained to perform the vegetation clearing and placement of the non-combustible cover.

Engineering Management Support, Inc. (EMSI) will provide overall coordination of the work including coordination of preparation of project plans, coordination of the various contractors, and coordination with EPA. Specifically, Paul Rosasco, P.E., the designated Project Coordinator under the UAO, will serve as the overall Project Coordinator for the Respondents, with assistance from Robert Jelinek, P.E. EMSI will also be responsible

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for preparation of monthly progress reports and overall coordination of the final report for the NCC installation project.

Feezor Engineering, Inc. (FEI) will provide office and field engineering services, including preparation of design and record drawings, supervision and documentation of field activities, and collection of confirmation surface soil samples (as necessary). Daniel Feezor, P.E., will serve as lead Project Engineer and Jonathan Wilkinson, P.E., will be lead Field Engineer for this project. FEI will also perform post-installation NCC inspections to verify that the NCC remains intact and identify any maintenance or repair activities that may be required.

Auxier & Associates, Inc. (Auxier) will provide health physics services including performance of radiation surveys including but not limited to overland gamma surveys, perimeter air monitoring, occupational monitoring during NCC construction, and free release surveys for equipment exiting Area 1 and 2. Michael R. Bollenbacher, CHP will serve as lead health physicist and radiation safety officer. Mr. Bollenbacher will be assisted by Cecilia Greene, MPH who will serve as the Health Physics project manager. Alex Luna will be the on-site health physics technician and site safety officer. Auxier will be responsible for implementation of the project health and safety and radiation safety plans for this work.

Weaver Consultants Group (Weaver) will survey the locations where confirmation surface soil samples are collected, provide survey control during construction, and survey the outer limits of the final, installed NCC. Collin Carson will serve as lead surveyor for the NCC installation project.

Eberline Analytical/Oak Ridge Laboratory will perform radionuclide analyses of soil samples collected to provide confirmation that the NCC extends beyond the extent of surface RIM.

Kuesel Excavating Co., Inc. was selected as the construction contractor for the vegetation clearing and installation of the non-combustible cover over areas where RIM is present or potentially is present at or near the ground surface in Areas 1 and 2 and the Buffer Zone. Kuesel Excavating Co., Inc., is based in O'Fallon, Missouri and has been performing demolition, clearing, grading, utility installation, stream back restoration, and soil stabilization related services in Missouri for over 50 years. Relative to Bridgeton Landfill, Kuesel recently provided demolition services and sub-grade preparation related to construction of the leachate pre-treatment system and is currently working on stormwater drainage improvements for the site.

5 REFERENCES

Auxier & Associates, Inc. (Auxier), 2015a, Surface Rim Identification, Sampling, and QA/QC Plan, West Lake Landfill Superfund Site Operable Unit-1, December.

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Auxier, 2015b, Draft Health and Safety Plan for Non-combustible Cover Installation at West Lake Landfill, Operable Unit-1, Bridgeton, St. Louis County, Missouri, December 21.

Auxier, 2015c, "Radiation Safety Plan for Installation of Non-combustible Cap, in Operable Unit 1 of Westlake Landfill Operable Unit-1, December 21.

Auxier, 2014, Air Monitoring, Sampling and QA/QC Plan, West Lake Landfill Superfund Site Operable Unit-1.

Auxier and EMSI, 2015, West Lake Landfill Perimeter Air Monitoring Quarterly Report, December.

Engineering Management Support, Inc. (EMSI), 2016, Letter from Paul Rosasco of EMSI to Tom Mahler of EPA re: Stormwater Monitoring During Non-Combustible Cover Construction, West Lake Landfill Operable Unit-1, West Lake Landfill, Bridgeton Missouri, February 23.

EMSI, 2006, Materials Management Plan, West Lake Landfill Operable Unit 1.

EMSI, 2000, Remedial Investigation Report, West Lake Landfill Operable Unit 1, April 10.

McLaren/Hart, 1996, Overland Gamma Survey Report, West Lake Landfill Radiological Areas 1 and 2, Bridgeton Missouri, April 30.

T.A. Woodford and Associates, LLC, 2009, Vegetation Sampling Results Summary in Support of Health and Safety Plan for Vegetation Clearing and Grubbing, March.

terra technologies, 2004, Letter to Ms. Cheryle Micinski, USEPA from David Heinze, terra technologies re: Clarifications to Information Request, West Lake Landfill Site, September 10, 2004.

United States Environmental Protection Agency (EPA), 2015, Letter from Alyse Stoy (EPA) to William Beck, Esq. and Jessica Merrigan, Esq., John McGahren, Esq., Steven Miller, Esq., and Phil Dupre, Esq. RE: In the Matter of Cotter Corporation (NSL), and Laidlaw Waste Systems (Bridgeton), Inc. and Rock Road Industries, Inc., and the U.S. Department of Energy, Administrative Order on Consent, EPA Docket No. VII-93-F-0005, December 9.

EPA, U.S. Department of Energy, U.S. Nuclear Regulatory Commission, and U.S. Department of Defense, 2000, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev 1, EPA 402-R-97-016, Rev. 1, DOE/EH-0624, Rev. 1, August.

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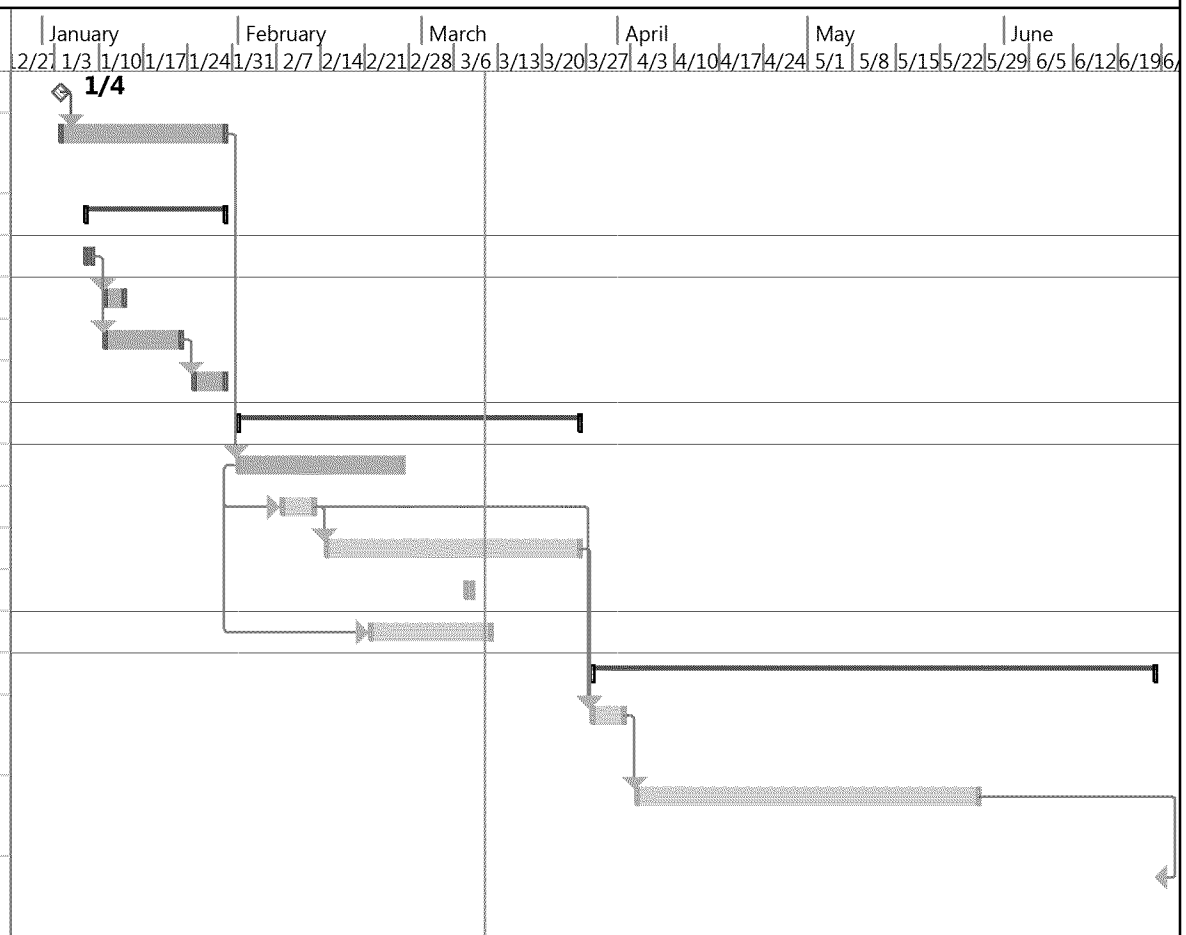
Table

Table 1 - West Lake Landfill 1 OU-1
Area 1 and Area 2 Non Combustible Cover Installation

ID	Task Name	Duration	Start
1	Submit Work Plan to USEPA	0 days	Mon 1/4/16
2	USEPA Review and Approval of Work Plan	4 wks	Mon 1/4/16
3	**Planning / Bidding**	**16 days**	**Fri 1/8/16**
4	Send Contractors Bid Package	1 day	Fri 1/8/16
5	Pre Bid Meeting	3 days	Mon 1/11/16
6	Bids Due	2 wks	Mon 1/11/16
7	Award Contract	5 days	Mon 1/25/16
8	**Field Work**	**40 days**	**Mon 2/1/16**
9	Conduct Overland Gamma Surv	4 wks	Mon 2/1/16
10	Install NCC Area 1	1 wk	Mon 2/8/16
11	Install NCC Area 2	6 wks	Mon 2/15/16
12	AAA Trailer Survey and Samplin	1 day	Tue 3/8/16
13	Install Rock Buttress	3 wks	Mon 2/22/16
14	**Project Wrap Up**	**65 days**	**Mon 3/28/16**
15	Radiological sampling around perimeter of NCC	1 wk	Mon 3/28/16
16	Radiological sample testing and data validation	8 wks	Mon 4/4/16
17	Final Report preparation and submittal	8 wks	Mon 5/2/16



Project: West Lake NCC Constru
Date: Fri 3/11/16

Task		Inactive Summary		External Tasks	
Split		Manual Task		External Milestone	
Milestone		Duration-only		Deadline	
Summary		Manual Summary Rollup		Progress	
Project Summary		Manual Summary		Manual Progress	
Inactive Task		Start-only			
Inactive Milestone		Finish-only			

Figures

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 1-FIG1 01/04/2016 4:11PM

LEGEND

Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface (from Figure 6-3 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)

N

100 0 100

SCALE IN FEET

Notes:

x 2015 Topography And Backround Image Provided By Cooper aerial Surveys Co. - Dated February 10, 2015

x all Elevations Are Above Mean Sea Level (amsl)

Figure 1

Extent of Surface RIM as Defined in the RI

Area 1

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 2 FIG2 01/04/2016 4:11PM

LEGEND

Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface Approximately 10.6 Acres (from Figure 6-5 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)

N

150 0 150

SCALE IN FEET

Notes:

x 2015 Topography and Backround Image Provided by Cooper Aerial Surveys Co. - Dated February 10, 2015

x All Elevations are Above Mean Sea Level (amsl)

Figure 2

Extent of Surface RIM as Defined in the RI

Area 2

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 1-FIG3 01/04/2016 4:11PM

LEGEND

Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface (from Figure 6-3 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)

Overland Gamma Reading, Background or Less

Overland Gamma Reading, 2x Background or Less

Overland Gamma Reading, More Than 2x Background

N

100 0 100

SCALE IN FEET

Notes:

x 2015 Topography And Backround Image Provided By Cooper aerial Surveys Co. - Dated February 10, 2015

x all Elevations Are Above Mean Sea Level (amsl)

Figure 3

Extent of Surface RIM and Overland Gamma Results from the RI Area 1

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 2 FIG4 02/12/2016 1:17PM

LEGEND

Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface Approximately 10.6 Acres (from Figure 6-5 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)

Potential Additional Areas Where Surface Radionuclide Impacted Material May be Present Approximately .74 Acres

Overland Gamma Reading, Background or Less

Overland Gamma Reading, 2x Background or Less

Overland Gamma Reading, More Than 2x Background

N

150 0 150

SCALE IN FEET

Notes:

x 2015 Topography and Backround Image Provided by Cooper Aerial Surveys Co. - Dated February 10, 2015

x All Elevations are Above Mean Sea Level (amsl)

Figure 4

Extent of Surface RIM and Overland Gamma Results from the RI Area 2

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 1 FIG5 01/04/2016 4:12PM

LEGEND

- Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface Approximately 1.4 Acres (from Figure 6-3 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)
- Potential Extent of Existing Asphalt Cover
- Existing Rock Cover Around Septic Tank
- Area Where Inert Fill Exists
- Newly Constructed Road

Notes:

x 2015 Topography And Backround Image Provided By Cooper aerial Surveys Co. - Dated February 10, 2015

x all Elevations Are Above Mean Sea Level (amsl)

N

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SCALE IN FEET

Figure 5

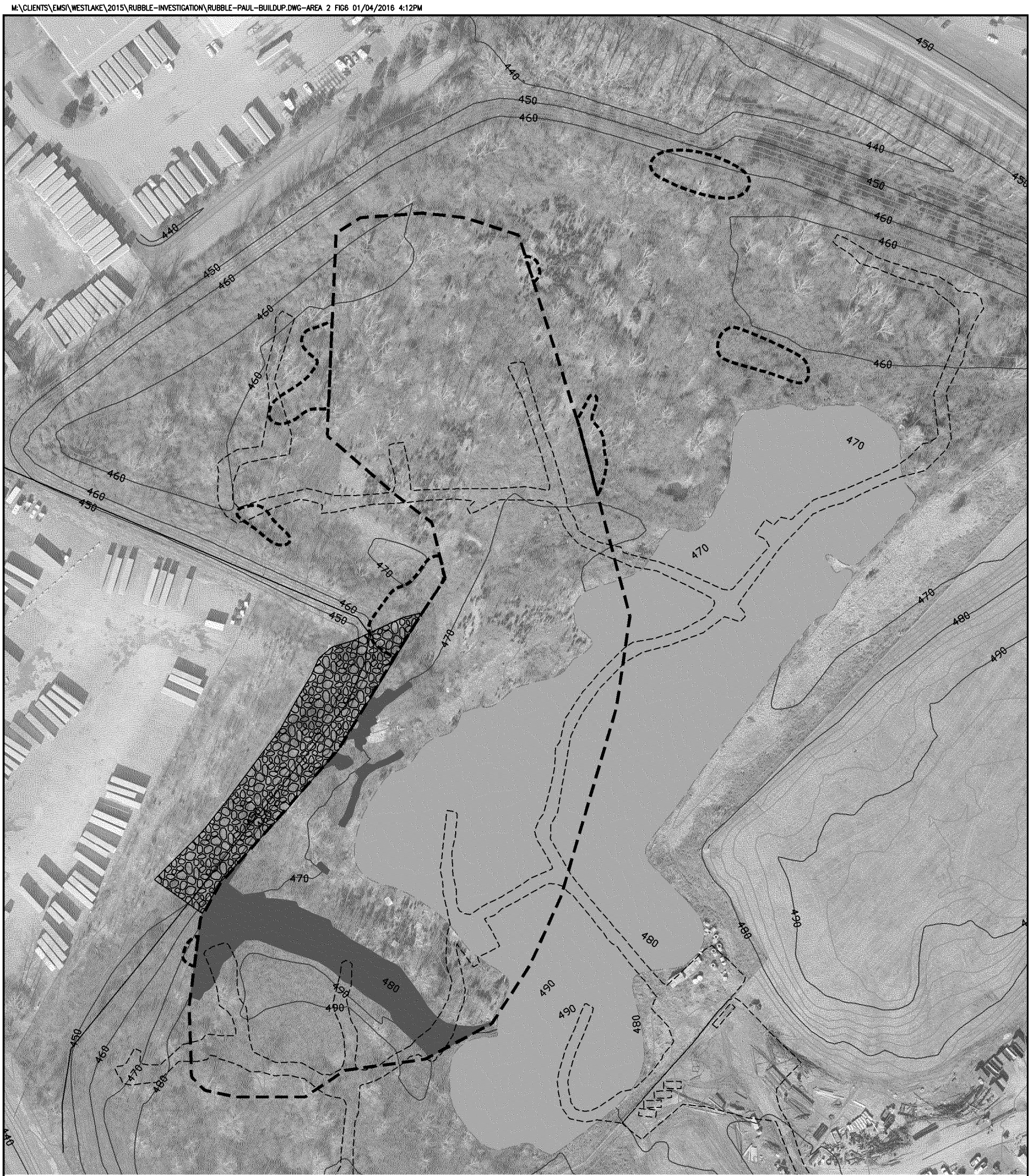
Extent of Surface RIM and Areas of Existing Cover

Area 1

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 2 FIG6 01/04/2016 4:12PM



LEGEND

- Approximate Extent of Radionuclide Impacted Materials at the Landfill Surface Approximately 10.6 Acres (from Figure 6-5 of West Lake Landfill OU-1 Remedial Investigation Report, EMSI 2000)
- Potential Additional Areas Where Surface Radionuclide Impacted Material May be Present Approximately .74 Acres
- Approximate LImit of Rock Buttress (See Attachment A for Additional Details)
- Area Where Inert Fill Exists
- Areas Outside Inert Fill Where Slope Exceeds 5:1
- Newly Constructed Road

N

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SCALE IN FEET

Notes:

x 2015 Topography and Backround Image Provided by Cooper Aerial Surveys Co. - Dated February 10, 2015

x All Elevations are Above Mean Sea Level (amsl)

Figure 6

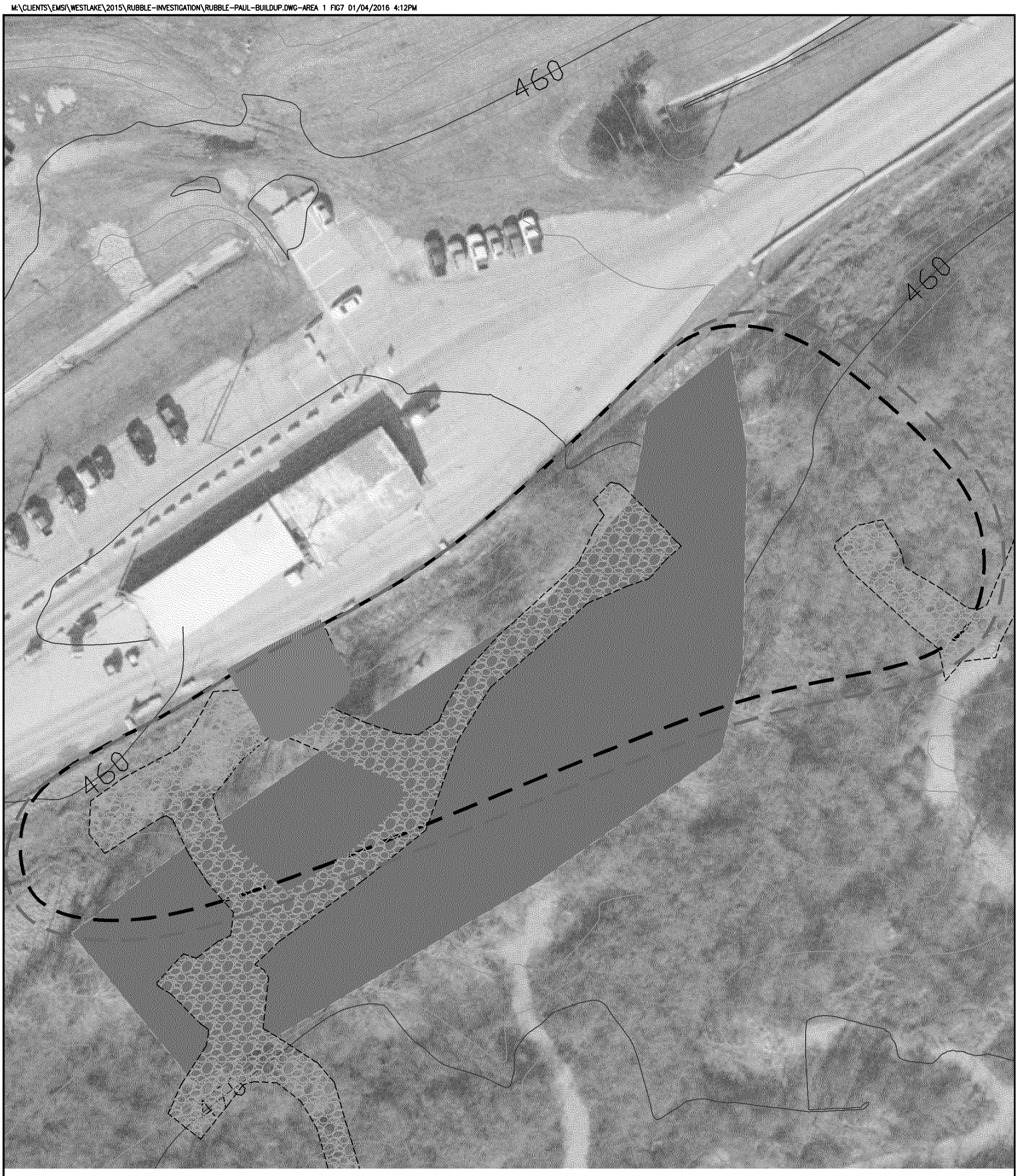
Extent of Surface RIM and Areas of Existing Cover

Area 2

West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 1 FIG7 01/04/2016 4:12PM



LEGEND

Proposed Extent of New Non-Combustible Cover
♂ $SSLR[LPDWHO\ ¶ ◄ ┤ $FUHV□

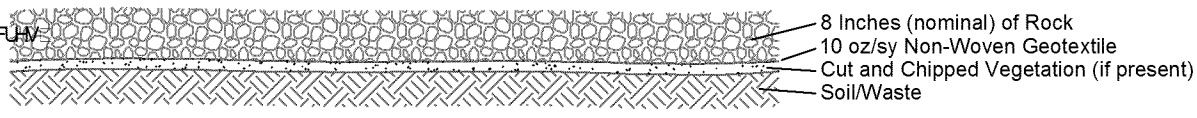
Proposed Extent of New Non-Combustible Cover
¶ !! RI IVHW- ♂ $SSLR[LPDWHO\ ¶ ◄ ┤ $FUHV

Potential Extent of Existing Asphalt Cover

Existing Rock Cover Around Septic Tank

Newly Constructed Road
♂ $SSLR[LPDWHO\ ¶ ◄ ┤ $FUHV
Within Proposed Extent of New
Non-Combustible Cover)

NON-COMBUSTIBLE COVER PROFILE



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Notes:
x 2015 Topography And Backround Image Provided By Cooper aerial Surveys Co. - Dated February 10, 2015
x all Elevations Are Above Mean Sea Level (amsl)

Figure 7
Preliminary Extent of
Non-Combustible Cover - Area 1
West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2015\RUBBLE-INVESTIGATION\RUBBLE-PAUL-BUILDUP.DWG-AREA 2 FIG8 01/04/2016 4:12PM

LEGEND

Proposed Extent of New Non-Combustible Cover
♂ $SSUR[LPDWHO\ ì ← ◀ → ┤ $FUHV□

Proposed Extent of New Non-Combustible Cover
¶ ‼ RI IVHW ♂ $SSUR[LPDWHO\ ˇ ˇ ì ◀ ↑

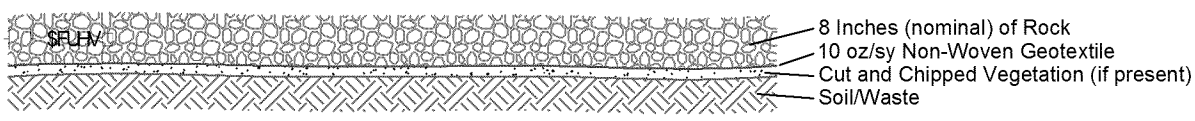
Limit of Rock Buttress (See Attachment A for Additional Details)

Area Where Inert Fill Exists

Areas Outside Inert Fill Where Slope Exceeds 5:1

Newly Constructed Road
♂ $SSUR[LPDWHO\ ì ◀ → $FUHV
Within Proposed Extent of New Non-Combustible Cover)

NON-COMBUSTIBLE COVER PROFILE



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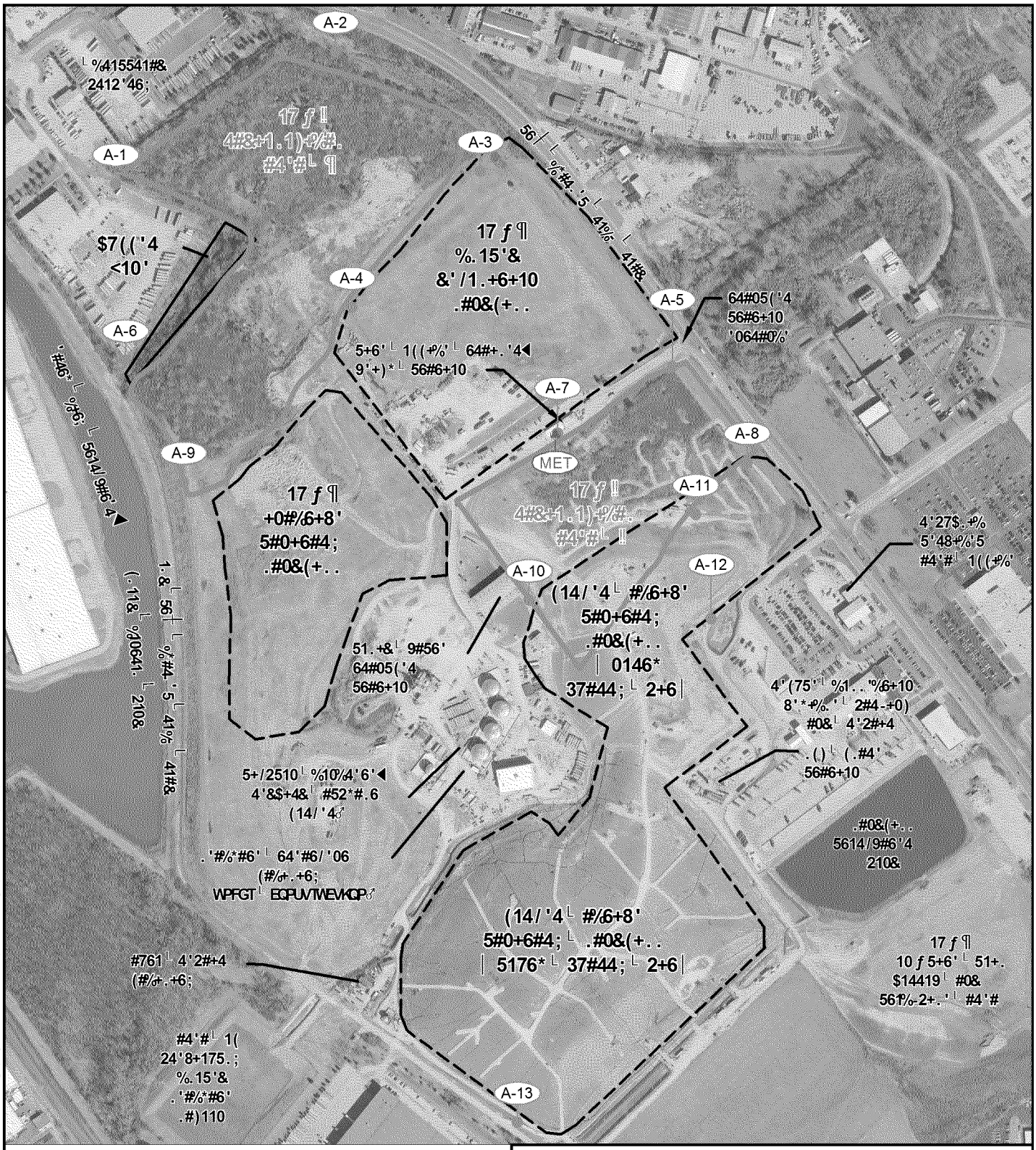
Notes:
x 2015 Topography and Backround Image Provided by Cooper Aerial Surveys Co. - Dated February 10, 2015
x All Elevations are Above Mean Sea Level (amsl)

Figure 8
Preliminary Extent of Non-Combustible Cover - Area 2
West Lake Landfill Superfund Site

EMSI Engineering Management Support, Inc.



Source: Cooper Aerial Surveys Company (2014)

Legend

A-1 Environmental Monitoring Station

MET Meteorological Station

0 600

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Figure 9

Air Quality Monitoring Station Locations

West Lake Landfill OU-1

EMSI Engineering Management Support, Inc.

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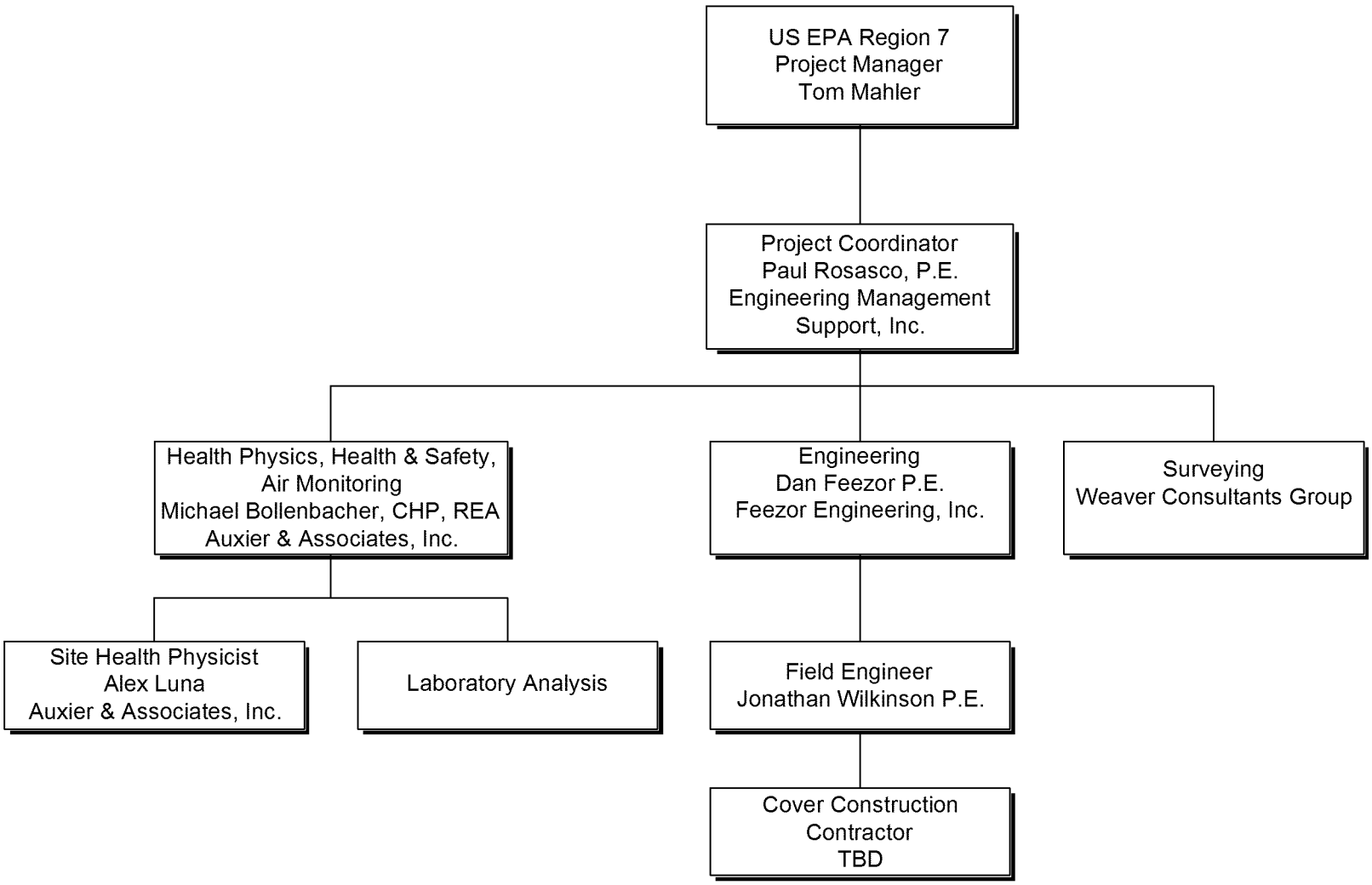


Figure 10

Project Team

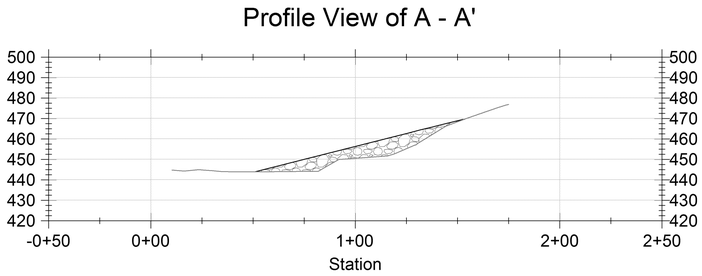
West Lake Landfill Superfund Site

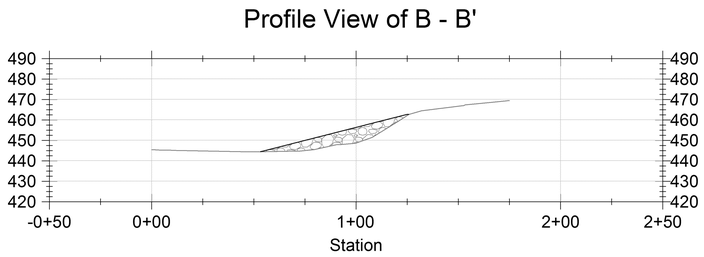
EMSI Engineering Management Support, Inc.

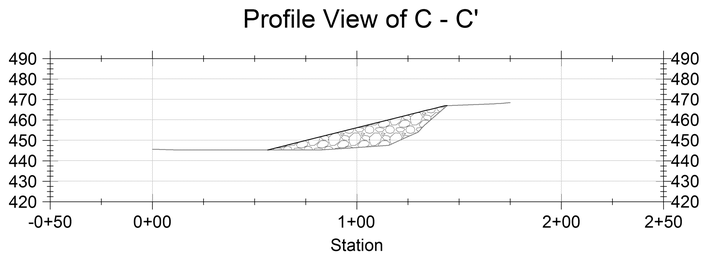
Attachments

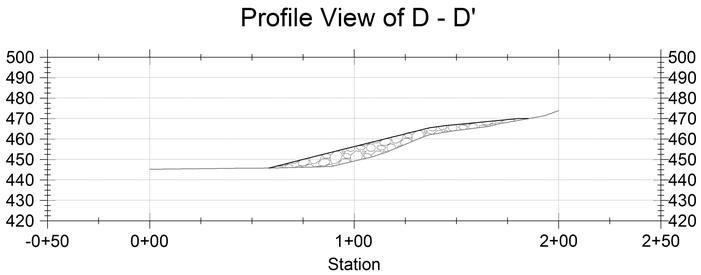
Attachment 1

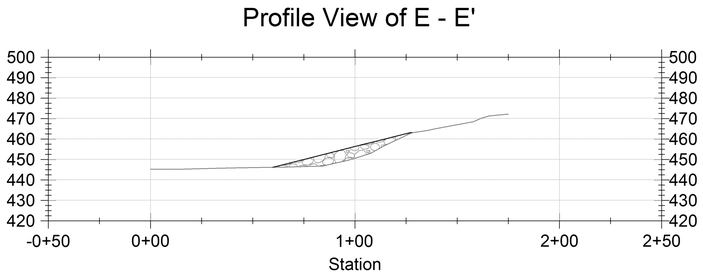
Area 2 Sloped Rock Fill – Plan and Profile View

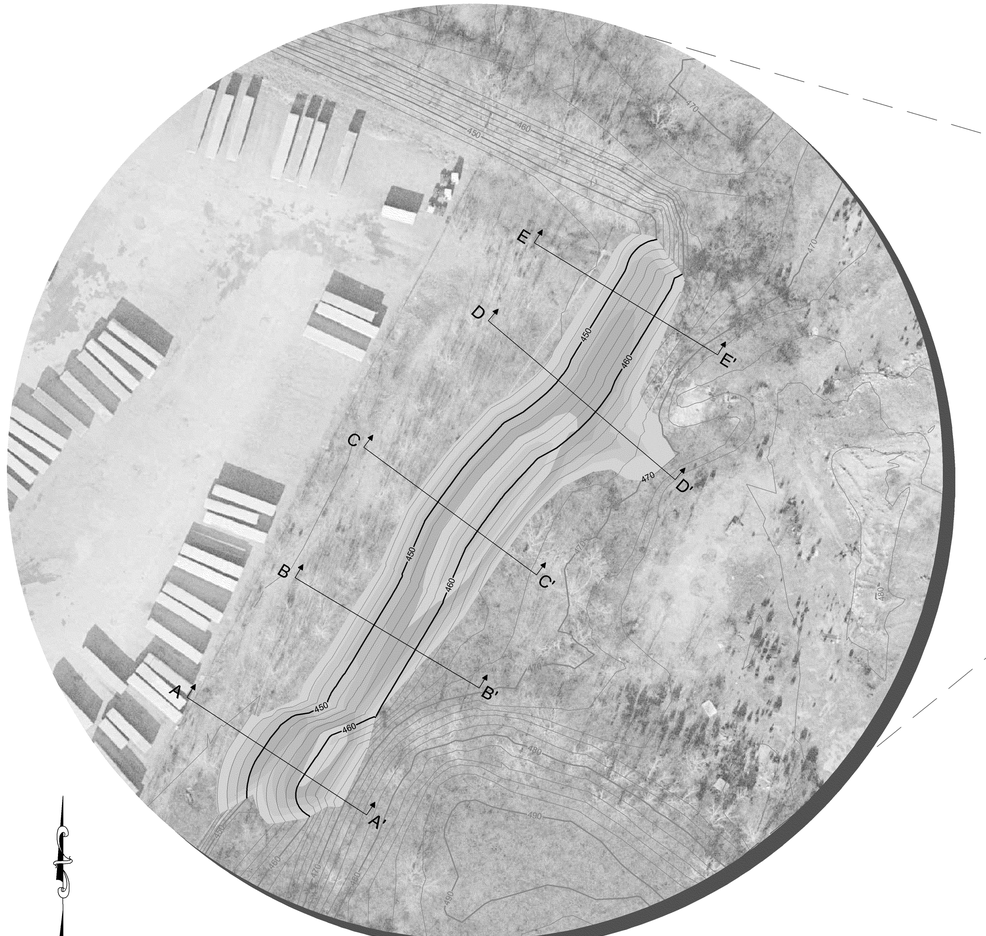


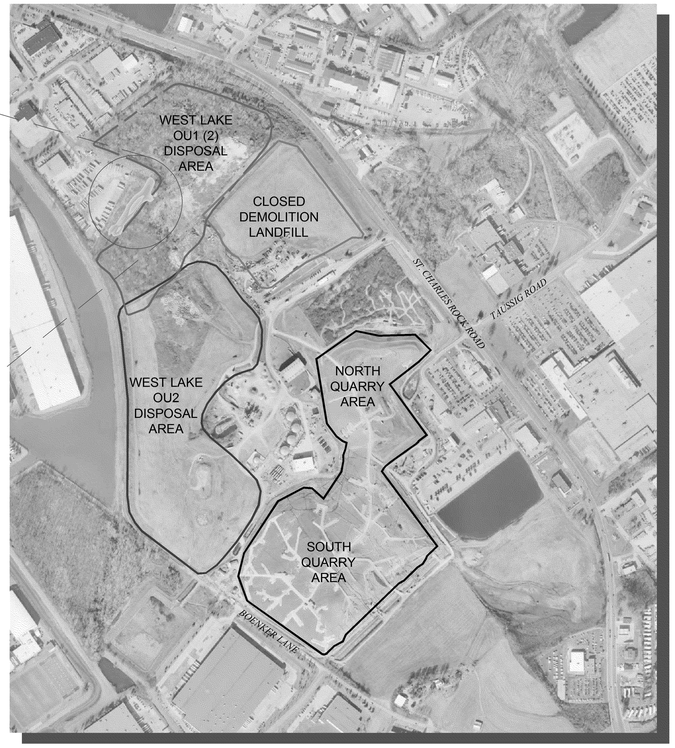












Thickness Map			
Range	Minimum Depth	Maximum Depth	Color
1	0	2	
2	2	4	
3	4	6	
4	6	8	
5	8	10	
6	10	12	
7	12	14	

FILL VOLUME: 8,639 CY

LEGEND

- BASE TOPOGRAPHY (2' CONTOUR)
- 500 BASE TOPOGRAPHY (10' CONTOUR)
- COMPARISON GRADING (2' CONTOUR)
- 500 COMPARISON GRADING (10' CONTOUR)

NOTE:

1.) AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS, INC. AND IS DATED MARCH 10, 2015
2.) ALL ELEVATIONS ARE ABOVE MEAN SEA LEVEL (AMSL).

DRAFT

BRIDGETON LANDFILL
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

BRIDGETON LANDFILL
AREA 2 SLOPED ROCK FILL

AREA 2 SLOPED ROCK FILL
PLAN AND PROFILE VIEW

Engineering for a Better World
FEEZOR ENGINEERING, INC.

DECEMBER 2015
DESIGNED BY: PML
APPROVED BY: ---

DRAWING NO.: **001**

PROJECT NUMBER: BT-087 | FILE PATH: E:\Dropbox\Feezor Engineering\Bridgeton\BT-087 Rock Stockpile\working\surface Dev.dwg

REVISION | DATE

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Attachment 2

Inspection and Maintenance Plan

Attachment 2

NCC Inspection and Maintenance Plan

This inspection and maintenance plan applies to the non-combustible cover (NCC) to be constructed over portions of Radiological Areas 1 and 2 at the West Lake Landfill Operable Unit (OU-1) located in Bridgeton, Missouri.

I. GENERAL INFORMATION:

Site Name: West Lake Landfill – Operable Unit (OU-1)
Site Address: 13570 St. Charles Rock Road

II. LOCATION INFORMATION:

Site maps for Areas 1 and 2 are provided as Figures 7 and 8 in the NCC Work Plan. The figures provide topographic contours and the approximate areas of the proposed cover.

III. NON-COMBUSTIBLE COVER DESCRIPTION:

The anticipated cover design consists of the following:

- Non-woven geotextile (10-oz/sy) placed over the ground surface (after vegetation clearing);
- 8-inch (nominal) thickness of 4" minus rock (pit run/road base material) placed over the geotextile; and
- Upper surface of the rock layer to be graded to provide a relatively smooth surface.

IV. INSPECTION AND MAINTENANCE PLAN

Described in this section are the inspection, maintenance, and repair activities to be performed to maintain the integrity and effectiveness of the constructed cover.

Personnel performing inspection, maintenance and repair activities will follow the same health and safety procedures, work procedures and sampling procedures as used for the installation of the Non-Combustible Cover Project as follows:

- Health and Safety Plan for Non-Combustible Cover Installation at West Lake Landfill, Operable Unit 1, Bridgeton, St. Louis County, Missouri dated February 8, 2016

- Radiation Safety Plan for Installation of Non-Combustible Cap, West Lake Landfill's Operable Unit 1, 13570 St. Charles Rock Road, Bridgeton, Missouri, 63044, dated January 4, 2016

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- Quality Management Plan dated December 2015

- Surface RIM Identification Sampling and Analysis Plan (SAP), West Lake Superfund Site Operable Unit 1 dated December 2015

Quarterly inspections will be performed on the constructed cover surface by a designee of the OU-1 Respondents until the final remedy for OU-1 has been implemented. After five (5) years, the quarterly inspections may be reduced to annual inspections depending on the conditions and maintenance requirements experienced (i.e., justified with reduced maintenance requirements). The inspections referred to above will also be performed following major precipitation events (with "major precipitation events" defined as greater than 1" of rainfall over a 24-hour period).

Inspection of the cover will be performed to identify areas of erosion, exposed geotextile, depressions, and growth of vegetation (brush, weeds, etc.). Maintenance and repair of the cover will be performed to maintain the thickness of the rock cover material placed on the landfill. The cover will be repaired in areas where rills, gullies, and crevices six (6) inches or deeper have been identified. Areas of cover which are identified as being highly susceptible to erosion will be repaired and/or otherwise protected with erosion control materials. In addition, any holes or depressions which have been created that may lead to surface water ponding will be repaired.

The repair of the cover will include adding rock material as necessary. If the geotextile of the cover is exposed and noted to be deteriorated, it will be replaced.

Removal of excessive amounts of unwanted vegetation (e.g., brush, weeds, trees and other woody growth) on the cover will be performed on a semi-annual basis as identified during the inspections. Removal work will consist of, at a minimum, back-dragging the cover surface. Mowing, clearing, and/or cutting may also be performed as necessary. The surface of the cover is not to be disturbed by any vegetation removal work and precautions are to be taken so that no dust is generated. Handling and management of cleared vegetation is further addressed below.

The surface water control drainage pathways will also be inspected in conjunction with the cover inspections. The frequency of the surface water system inspections may also be reduced to annual after five (5) years, along with the cover inspections, depending on the conditions and maintenance requirements experienced. Any drainage pathways and/or diversion berms that have become eroded will be regraded, and areas that have developed build-up of sediment will be cleaned, to restore proper functioning.

Any major access roads will also be inspected during the cover inspections. The conditions of the road surface and any settlement will be noted. Repairs will be implemented as necessary.

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A designee of the OU-1 Respondents will be responsible for performing site inspections and maintaining corresponding records. Record documentation of inspections will be maintained on-site, or at the Bridgeton Landfill, LLC offices, along with a record of any repair actions taken. A summary of the inspection activities follows:

ITEM	FREQUENCY	INSPECTION DESCRIPTION
Cover	Quarterly and following major precipitation events (i.e., > 1" rainfall over 24-hr period)	Erosion Exposed geotextile Settlement/depressions Vegetative growth
Surface Water Controls	Quarterly and following major precipitation events (i.e., > 1" rainfall over 24-hr period	Erosion of drainage pathways and berms Sediment build-up Blockage and settlement of drainage pathways Adequate surface drainage
Access Roads	Quarterly	Condition of road surface Settlement
Vegetation	Semiannually	Cutting or removal of any vegetation that may sprout in the NCC area

V. MANAGEMENT OF REMOVED VEGETATION

Clippings from any cutting or pulling of grass and weeds, as well as any cleared vegetation (including tree trunks up to 12" in diameter) will be chipped and the chipped material will be placed in a designated area. Trees too large to chip will be cut with a chain saw and felled in the immediate area and on the property. Branches from trees will be removed and chipped. Trunks will be cut into lengths no longer than 10 feet and will be safely and neatly stacked in the designated tree trunk storage area.

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TABLE 1A
MAINTENANCE PLAN - INSPECTION ACTIVITIES CHECKLIST
WEST LAKE LANDFILL - OPERABLE UNIT (OU-1)
NON-COMBUSTIBLE COVER CONSTRUCTION AREAS

Name of Inspector: _____ Date: _____
Signature: _____ Weather: _____
Company: _____

ITEM	FREQUENCY	INSPECTION DESCRIPTION	STATUS		COMMENTS
			OK	ACTION REQ'D (3)	
Cover	Quarterly and following major precipitation events (1)	Erosion			
		Exposed geotextile			
		Settlement/depressions			
		Vegetative growth			
Surface Water Controls	Quarterly and following major precipitation events (1)	Erosion of drainage pathways and berms			
		Sediment build-up			
		Blockage and settlement of drainage pathways			
		Adequate surface drainage			
Access Roads	Quarterly	Condition of road surface			
		Settlement			
Vegetation Removal	Semi-annually (2)	Vegetation cutting or removal			

NOTES:
(1) Major precipitation events are defined as >1" rainfall over 24-hr period
(2) Removal of vegetation will be performed on a semi-annual basis as identified during the quarterly inspections
(3) If follow-up actions are required, see Table 1B for details

TABLE 1B
MAINTENANCE PLAN - REPAIR CHECKLIST AND RECORD
WEST LAKE LANDFILL - OPERABLE UNIT (OU-1)
NON-COMBUSTIBLE COVER CONSTRUCTION AREAS

Name of Inspector: _____ Date: _____
Signature: _____ Weather: _____
Company: _____

ITEM	REPAIR DESCRIPTION	STATUS		DATE REPAIRED	FURTHER DESCRIPTION / COMMENTS
		OK	ACTION REQ'D		
Repairs to Cover	Maintain thickness of cover				
	Repair where rills, gullies, and crevices (≥6") identified				
	Repair areas highly susceptible to erosion				
	Repair holes or depressions				
	Regrade to promote positive drainage				
	Add rock material as necessary				
	Cover exposed geotextile				
	Replace deteriorated geotextile				
	Other				
Repairs to Surface Water Controls	Regrade eroded drainage pathways and berms				
	Clean areas with sediment build-up				
	Remove blockages				
	Repair depressions and settlement				
	Maintain adequate surface drainage				
	Other				
Repairs to Access Roads	Repair as necessary				
	Other				
Removal of Vegetation	Cut or remove any excessive unwanted vegetation that may sprout in the NCC area (on a semi-annual basis)				
	Other				