



**US ENVIRONMENTAL PROTECTION AGENCY  
REGION 7**

**Explanation of Significant and Non-Significant Differences  
West Lake Landfill Operable Units 1 and 2**

Bridgeton, St. Louis County, Missouri

CERCLIS ID #: MOD079900932

January 2025

U.S. Environmental Protection Agency

Region 7

## **I. Introduction**

### **A. Site Name and Location**

West Lake Landfill Site Operable Unit 1 and Operable Unit 2  
Bridgeton, St. Louis County, Missouri  
CERCLIS ID #: MOD0799009322

### **B. Lead and Support Agencies**

The U.S. Environmental Protection Agency (EPA) Region 7 is the lead agency for Operable Unit 1 (OU-1). The Missouri Department of Natural Resources (MoDNR) is the support agency. The EPA is also the lead agency for Operable Unit 2 (OU-2), but in the OU-2 Record of Decision (ROD), part of OU-2 was deferred to the State of Missouri based on active solid waste permits. MoDNR is the support agency on the portions of OU-2 where the EPA is the lead agency.

### **C. Legal Authority for Explanation of Significant Differences (ESD)**

Under Section 117 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), as amended by the Superfund Amendment and Reauthorization Act of 1986, 42 U.S.C. §9617(c), the lead agency is required to publish an Explanation of Significant Differences (ESD) when significant, but not fundamental, changes are proposed to a previously selected site remedy. The National Contingency Plan (NCP) §300.435(c)(2)(i) sets forth the criteria for issuing an ESD and requires that an ESD be published if the remedy is modified in a way that differs significantly in either scope, performance, or cost from the remedy selected in the ROD or Record of Decision Amendment (RODA).

### **D. Statement of Purpose and Summary of Rationale**

The EPA is issuing an ESD for OU-1 and OU-2 of the West Lake Landfill Site (Site) located in Bridgeton, St. Louis County, Missouri. This ESD document provides a brief history of the Site, describes the remedy selected, and explains the significant and non-significant changes identified in this ESD for both remedies and how they differ from the selected remedies. It also discusses how the remedy changes comply with all legal requirements and provides details on how the reader may obtain more information on these modified remedies. Section D.1 discusses the purpose and rationale for the OU-1 ESD and Section D.2 discusses the purpose and rationale for the OU-2 ESD.

## **1. OU-1 ESD: Purpose and Summary**

On May 29, 2008, the EPA signed the West Lake Landfill ROD for OU-1. After further evaluation, the EPA, with concurrence from the MoDNR, signed the West Lake Landfill RODA for OU-1 on September 27, 2018. The 2018 RODA involved a fundamental change to the remedy selected in the 2008 ROD.

This ESD describes three components of the selected amended remedy that are or will be significantly changed from what was presented in the OU-1 RODA. In brief, those components are:

- 1) Expanded areal extent of OU-1 based on the presence of Radiologically Impacted Material (RIM) which will be addressed under the RODA and a corresponding decrease in the areal extent of OU-2
- 2) Increase in the estimated costs of the OU-1 Remedial Action (RA) commensurate with the expanded extent of OU-1 and
- 3) Equivalent Standard of Performance Waiver for the applicable or relevant and appropriate requirement (ARAR) related to minimum top slope of the landfill cover.

The potential for modification to all three of these components was identified in the RODA when it was finalized. None of these modifications change the outcome of the nine-criteria-evaluation presented in the 2018 RODA. No fundamental changes to the remedy selected in the RODA are being made.

This ESD also documents three non-significant or minor changes to the OU-1 remedy selected in the RODA. These three changes are:

- 1) Allow flexibility with regards to the need for a RIM staging and loading building, provided specified criteria can be met,
- 2) Clarify the timing and analysis of confirmation sampling, and
- 3) Eliminate the need for an onsite laboratory.

These changes are based on investigations or evaluations performed during the Remedial Design (RD) phase. They are considered minor or non-significant changes in accordance with CERCLA and do not significantly or fundamentally change the remedy selected in the RODA.

## **2. OU-2 ESD: Purpose and Summary**

On July 25, 2008, the EPA signed a ROD for OU-2 of the Site. This ESD describes three significant changes that will be applied to the selected remedy presented in the July 2008 OU-2 ROD. In brief, the primary changes are:

- 1) Significant reduction in the size of OU-2 based on the presence of RIM in areas of the site originally designated as OU-2

- 2) No deferral of the RIM impacted portions of the landfill to MoDNR and
- 3) Cost decrease based on the decrease in size of OU-2.

### **E. Administrative Record**

This ESD and all documents that form the basis for the decision to modify the response action have been added to the Administrative Record as required by the NCP 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2). The Administrative Record is available for public review at the following locations:

U.S. Environmental Protection Agency  
Region 7  
11201 Renner Blvd  
Lenexa, Kansas 66219

The West Lake Landfill Site Profile Page at:

<https://www.epa.gov/superfund/westlakelandfill>

Public computers to access the West Lake Landfill Site Profile Page can be found at:

Bridgeton Trails Branch of the St. Louis County Library  
3455 McKelvey Rd.  
Bridgeton, Missouri 63044  
314-994-3300

## **II. Site History, Contamination and Selected Remedy**

### **A. Site History**

The Site is a 200-acre, inactive solid waste disposal facility with a physical address of 13570 St. Charles Rock Road in Bridgeton, Missouri. The Site previously received radiologically contaminated materials from the processing of uranium ore for the Manhattan Engineering District and the U.S. Atomic Energy Commission (AEC), in addition to receiving municipal and demolition waste. The Site lies 18 miles northwest of downtown St. Louis in northwestern St. Louis County, approximately one mile north of the intersection of Interstate 70 and Interstate 270, and approximately one and three quarter (1.75) miles west-northwest of the St. Louis Lambert International Airport. The present channel of the Missouri River is located approximately one and a half (1.5) miles to the west of the Site, which is situated on the eastern boundary of the river's alluvial floodplain. Industrial properties exist both on and adjacent to the Site, and commercial and residential properties are located around and near its perimeter. The Site is composed of three operable units defined as follows:

- OU-1 is comprised of areas of the Site that contain radiologically impacted material (RIM). A RODA describing the selected remedy for this operable unit was finalized September 27, 2018. OU-1 is in the RD phase of the Superfund process.
- OU-2 is comprised of landfilled areas in the Site that do not contain RIM. A ROD for OU-2 was signed by EPA on July 25, 2008. OU-2 is in the RD phase of the Superfund process.
- OU-3 is comprised of groundwater at or surrounding the Site that has been impacted by contaminants at the Site. An Administrative Settlement Agreement and Order on Consent between the EPA and the Respondents to conduct a Remedial Investigation and Feasibility Study (RI/FS) was signed by EPA on February 6, 2019. OU-3 is in the RI phase of the Superfund process.

The Site area was used agriculturally until a limestone quarrying and crushing operation began in 1939. The quarrying operation continued until approximately 1988 and resulted in two quarry pits on the southeast and south area of the Site. Beginning in the early 1950s, portions of the Site were used for landfilling municipal refuse, industrial solid wastes, and construction/demolition debris. These operations were not subject to state permitting because they occurred prior to the formation of the MoDNR in 1974. In 1974 several portions of the landfilled areas were either closed as former unregulated landfills or closed and permitted to receive new wastes. Areas that were permitted at that time include locations that are part of areas referred to as the inactive sanitary landfill (ISL) and an area formerly referred to as the Closed Demolition Landfill. The name, "Closed Demolition Landfill" is a misnomer because the landfill is not currently closed; therefore, moving forward this area will be referred to as the Construction and Demolition Landfill (CDL). The quarry pits were used for permitted solid waste landfill operations beginning in 1979 and are now referred to as Bridgeton Landfill. Figure 1 identifies these areas of the Site. In August 2005, the Bridgeton Sanitary Landfill, which was the final active cell, stopped receiving waste pursuant to an agreement with the city of St. Louis to reduce the potential for birds to interfere with airport operations.

The RIM from uranium ore processing activities conducted as part of the Manhattan project was brought to the Site in 1973 and used as fill in typical landfilling operations. This radiologic contamination was initially identified in two areas of the Site by the Nuclear Regulatory Commission (NRC) during the initial investigations at the Site and are referred to as Area 1 and Area 2 (see Figure 1). In August 1990, the EPA added the Site to the National Priorities List, and the NRC deferred regulatory oversight to the EPA in a letter dated June 16, 1995.

The initial RI for OU-1 was conducted under EPA's oversight from 1994 to 2000 and the ROD was signed in 2008. Following the re-evaluation of the 2008 ROD, additional data were collected between 2012 and 2016 which resulted in a RODA finalized in September 2018. The RODA selected remedy includes a partial excavation with offsite disposal of RIM, and an engineered cover to reduce infiltration and prevent the release of radon above allowable levels. The RODA also required a

Remedial Design Investigation (DI) to confirm the boundaries between OU-1, areas with radiological contamination, and OU-2, landfilled areas without radiological contamination at the Site.

In December 1994, EPA entered into an Administrative Order on Consent (AOC) with the potentially responsible party (PRP) for performance of the RI/FS for OU-2. The ROD for OU-2 was finalized on July 25, 2008.

## **B. Contamination**

### **1. OU-1 Contaminants**

This ESD does not change the contaminants of concern (COCs) for the West Lake Landfill OU-1. The radiological COCs from the RODA are listed in Table 1 and the chemical COCs are listed in Table 2 and included below. As in the original Baseline Risk Assessment (BRA) dated April 2000, the January 31, 2018, BRA, which was updated for the 2018 RODA, identified Th-230 and Ra-226, including their respective decay products, as the primary COCs. These isotopes and their associated decay products accounted for more than 95% of the total risk to the target receptors.

The 2018 RODA established a cleanup level for the partial excavation of RIM. The concentrations of radionuclides that define RIM were based on regulations identified with ARARs and EPA policy. This primarily relates to 40 CFR 192 which provides limits for radium-226. The clean-up levels for the partial excavation are 52.9 pCi/g for combined radium (Radium-226 and Radium-228) or combined thorium (Thorium-230 and Thorium-232). These concentrations are associated with potential future risks around  $1 \times 10^{-3}$  or ten times the upper end of the CERCLA risk range. Because radioactive contaminants will remain at the site after excavation, the 2018 RODA establishes remedial action objectives (RAOs) which include preventing direct contact to contaminated media (including waste material, fill, stormwater, sediments, leachate and groundwater) located on or emanating from OU-1. To achieve this objective the remedy requires an engineered landfill cover be constructed over all landfill waste and RIM. Therefore, concentrations of radionuclides were established based on ARARs and EPA policy to define RIM in order to support establishing the extent of the engineered landfill cover (see Section 5.5 of the 2018 RODA). The 2018 RODA defines RIM as combined radium or combined thorium greater than 7.9 pCi/g and total uranium (the sum of Uranium-238, Uranium-235, and Uranium-234) greater than 54.5 pCi/g based on the 5 pCi/g plus background health-based level for cleanup of radium in soil in C.F.R. Part 192.12 and OSWER Directives no. 9200.4-18, and 9200.4-25, which are ARAR for the site.

For Buffer Zone/Lot 2A2, which was impacted by RIM that migrated off landfill property, the 2018 RODA established a remedial action objective to remediate soils to the extent necessary to allow for unrestricted land use. The EPA performed a site-specific evaluation of risk and determined the radiologically impacted soils on Lot 2A2 and portions of the Buffer Zone should be remediated to background levels to allow for unrestricted use. Estimated background levels of radionuclides were

included with the 2018 RODA (See Table 1). However, the RODA also required additional background characterization to be performed as a post-ROD activity to determine statistically valid background concentrations for the Buffer Zone and Lot 2A2. The updated background levels are currently being developed as part of the remedial design.

For the Chemical Contaminants of Concern (Table 2 below), the Target Screening Level of the compounds listed in the table is set at 10<sup>-6</sup> cancer risk level or a 0.1 hazard quotient for non-cancer effects. These compounds are associated with waste at the site and because they are present at levels that exceed the target screening levels they are considered COCs; however, the remedy addresses these compounds by placing an engineered cover over all landfill waste. Groundwater contamination associated with OU-1 will be addressed under OU-3.

**Table 1 - OU-1 Radiological Contaminants of Concern**

<b>Uranium Series</b>	<b>Background (pCi/g)</b>
Uranium-238	1.33
Thorium-234	1.18
Protactinium—234	NA
Uranium-234	1.47
Thorium-230	1.51
Radium-226	1.06
Lead-214	1.01
Bismuth-214	0.72
Lead-210	2.08
<b>Actinium Series</b>	
Uranium-235	0.326
Thorium-231	NA
Protactinium-231	2.19
Actinium-227	0.454
Thorium-227	ND
Radium-223	9.51
Lead-211	NA
Bismuth-211	NA
<b>Thorium Series</b>	
Thorium-232	0.895
Radium-228	1.12
Actinium-228	NA
Thorium-228	0.683

Radium-224	1.93
Lead-212	1.29
Bismuth-212	0.905
Thallium-208	0.435

**Table 2 - OU-1 Chemical Contaminants of Concern**

<b>Inorganic Chemicals</b>	<b>Target Screening Level mg/kg</b>
Antimony	47
Arsenic	3
Barium	22,000
Beryllium	230
Chromium*	6
Cobalt	35
Lead	800
Mercury	5
Nickel	2,200
Thallium	1.2
Uranium Total	23
Vanadium	580
Zirconium	9
<b>Pesticides/PCBs</b>	
Aldrin	0.18
Aroclor 1242	0.95
Aroclor 1248	0.95
Aroclor 1254	0.97
Dieldrin	0.14
<b>Semivolatile Organic compounds</b>	
Naphthalene	17
Pentachlorophenol	4
<b>Volatile Organic Compounds</b>	
1,1-Dichloroethane	16
1,4-Dichlorobenzene	11
Benzene	5.1
Chlorobenzene	130



Ethylbenzene	25
--------------	----

## 2. OU-2 Contaminants

This ESD does not change the contaminants identified or the RAOs for the West Lake Landfill OU-2. The remedy selected for OU-2 was the EPA’s presumptive remedy for landfills, which often contain a heterogeneous mixture of municipal waste frequently co-disposed with industrial and/or hazardous waste in older, unregulated landfills. In accordance with the *Presumptive Remedy for CERCLA Municipal Landfill Sites Quick Reference Fact Sheet*, Directive No. 9355.0-49FS, dated September 1993, which states, “As a matter of policy, for the source area of municipal landfills, a quantitative risk assessment that considers all chemicals, their potential additive effects, etc., is not necessary to establish a basis for action if ground-water data are available to demonstrate that contaminants clearly exceed established standards or if other conditions exist that provide a clear justification for action.” Based on this policy, and as documented in Section 7.1 of the 2008 OU-2 ROD, the basis for taking remedial action is based on groundwater data at the site with contaminants that exceeded the MCLs. The contaminants and the concentrations this decision was based on are presented in Tables 5.1 and 5.2 from the ROD, which are included below. Groundwater contamination from operable unit 2 is being addressed under OU-3 which is in the RI/FS phase of the superfund process.

**Table 5-1**  
**Summary of Constituents Detected in**  
**Groundwater that Exceed MCLs or MCLGs**

Parameter	Range of Detection (mg/l)	MCL (mg/l)
<b>Alluvium</b>		
<b>Metals</b>		
Arsenic (Dissolved)	<0.002 to 0.094	0.05 <sup>a</sup>
Arsenic (Total)	<0.002 to 0.087	0.05 <sup>a</sup>
Iron (Dissolved)	<0.04 to 92.0	0.3 <sup>b</sup>
Iron (Total)	<0.063 to 90.1	0.3 <sup>b</sup>
Manganese (Dissolved)	<0.017 to 6.54	0.05 <sup>b</sup>
Manganese (Total)	<0.077 to 6.39	0.05 <sup>b</sup>
<b>Conventionals</b>		
Chloride	17 to 299	250 <sup>b</sup>
Total Dissolved Solids	86 to 1396	500 <sup>b</sup>
<b>Volatiles/Organics</b>		
Benzene	<0.002 to 0.078	0.005 <sup>a</sup>
Vinyl Chloride	<0.001 to 0.026	0.002 <sup>a</sup>
Total Petroleum Hydrocarbons	13.12 to 21.3	10 <sup>c</sup>
<b>St. Louis/Upper Salem</b>		
<b>Metals</b>		
Iron (Dissolved)	<0.04 to 4.24	0.3 <sup>b</sup>
Iron (Total)	<0.04 to 5.87	0.3 <sup>b</sup>
Manganese (Dissolved)	<0.01 to 0.375	0.05 <sup>b</sup>
Manganese (Total)	0.017 to 0.528	0.05 <sup>b</sup>
<b>Conventionals</b>		
Fluoride	0.49 to 2.7	2 <sup>b</sup>
Total Dissolved Solids	364 to 1418	500 <sup>b</sup>
<b>Deep Salem</b>		
<b>Metals</b>		
Iron (Dissolved)	<0.04 to 0.945	0.3 <sup>b</sup>
Iron (Total)	0.119 to 2.09	0.3 <sup>b</sup>
Manganese (Dissolved)	0.016 to 0.238	0.05 <sup>b</sup>
Manganese (Total)	0.017 to 0.332	0.05 <sup>b</sup>
<b>Conventionals</b>		
Total Dissolved Solids	340 to 665	500 <sup>b</sup>

<sup>a</sup> Primary MCL 40 CFR 141.11 and 141.62

<sup>b</sup> Secondary MCL 40 CFR 143.3

<sup>c</sup> Missouri Department of Natural Resources, Tier 1 Clean-up Level

**Table 5.2 Organic Compounds Detected in Leachate**

Compound	Active Sanitary Landfill Leachate				Inactive Landfill Leachate			
	LCS-1	LCS-2	LCS-3	LCS-4	LR-100	LR-103	LR-104	LR-105
Acetone	<i>1.2</i>	<i>0.65</i>	<i>0.038</i>	<i>0.61</i>	<0.010	<0.010	<0.010	<i>0.04</i>
Benzene	<0.5	<i>0.009</i>	<0.005	<0.005	<0.005	<0.005	<0.005	<i>0.007</i>
Chlorobenzene	<0.5	<i>0.035</i>	<i>0.029</i>	<i>0.011</i>	<i>0.044</i>	<0.005	<0.005	<i>0.74</i>
1,4-Dichlorobenzene	<0.5	<i>0.081</i>	<i>0.009</i>	<i>0.056</i>	<i>0.01</i>	<0.005	<0.005	<i>0.068</i>
Ethylbenzene	<0.5	<i>0.049</i>	<i>0.023</i>	<i>0.07</i>	<i>0.012</i>	<0.005	<0.005	<i>0.089</i>
2-Hexanone	<1	<i>0.1</i>	<0.010	<i>0.18</i>	<0.010	<0.010	<0.010	<0.010
Methyl Ethyl Ketone	<i>3</i>	<i>1.3</i>	<i>0.11</i>	<i>2.6</i>	<0.010	<0.010	<0.010	<0.010
Methyl iso-butyl Ketone	<1	<i>0.08</i>	<0.010	<i>0.076</i>	<0.010	<0.010	<0.010	<0.010
Styrene	<0.5	<i>0.005</i>	<0.005	<i>0.006</i>	<0.005	<0.005	<0.005	<0.005
Toluene	<0.5	<i>0.097</i>	<i>0.15</i>	<i>0.12</i>	<0.005	<0.005	<0.005	<i>0.007</i>
Total Xylenes	<0.5	<i>0.14</i>	<i>0.035</i>	<i>0.17</i>	<i>0.057</i>	<0.005	<0.005	<i>0.43</i>
M+P Cresol	<i>1.9</i>	<i>0.95</i>	<i>0.077</i>	<i>0.26</i>	<0.010	<0.010	<0.010	R
2,4-Dimethylphenol	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<i>0.082</i>
Bis(2-ethylhexyl)phthalate	<i>0.019</i>	<i>0.022</i>	<i>0.017</i>	<0.010	<i>0.12</i>	<0.010	<0.010	<i>0.036</i>
Diethyl phthalate	<i>0.033</i>	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dimethyl phthalate	<i>0.012</i>	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenol	<i>0.29</i>	<i>0.16</i>	<0.010	<i>0.017</i>	<0.010	<0.010	<0.010	R
Naphthalene	<0.010	<0.010	<0.010	<0.010	<i>0.011</i>	<0.010	<0.010	<0.010
Volatile Petroleum Hydrocarbons	<i>0.41</i>	<i>0.4</i>	<i>0.12</i>	<i>0.48</i>	<i>0.17</i>	<0.05	<0.05	<i>0.95</i>
Petroleum Hydrocarbons (Diesel)	<i>79</i>	<i>6.9</i>	<i>2.2</i>	<i>0.22</i>	<i>2.2</i>	<i>0.63</i>	<i>0.08</i>	<i>4.4</i>

Notes:

All results in mg/L

R: Data point rejected during data evaluation

Results above reporting limit are shown in *boldface/italic* type

Inactive landfill leachate riser LR-101 was not installed due to the absence of leachate at this location

Inactive landfill leachate riser LR-102 was not sampled due to minimal (<6 inches) liquid thickness

### C. Summary of the OU-1 Remedy

The OU-1 remedy includes the following components:

- Excavation and stockpiling of overburden in OU-1 Radiological Areas 1 and 2 to access the RIM;
- Excavation of RIM from Areas 1 and 2 of OU-1 that contains combined radium or combined thorium activities greater than 52.9 pCi/g that is located generally within 12 feet of the 2005 topographic surface. Optimization of RIM removal above and below the 12-foot target depth (excavation as deep as 20 feet or as shallow as 8 feet) will be performed during the RD based on criteria set forth in Section 12.0 of the RODA;
- Excavation of radiologically impacted soil from the Buffer Zone and/or Lot 2A2 sufficient to reduce concentrations of radionuclides to background in order to allow for unlimited use and unrestricted exposure (UU/UE);
- Loading and transport of the RIM and radiologically impacted soil for disposal at an off-site permitted disposal facility;

- Regrading of the remaining solid waste materials within Areas 1 and 2 to meet the minimum (5%) and maximum (25%) slope criteria;
- Installation of a landfill cover over Areas 1 and 2 designed to meet the Resource Conservation and Recovery Act (RCRA) hazardous waste design criteria, municipal waste landfill regulations, and Uranium Mill Tailings Radiation Control Act (UMTRCA) performance and longevity standards;
- Design, installation, and maintenance of surface water runoff controls;
- Groundwater monitoring;
- Landfill gas and radon monitoring and control, in accordance with ARARs;
- Institutional controls (ICs) to prevent land uses that are inconsistent with a closed landfill containing radiological materials; and
- Long-term surveillance and maintenance of the landfill cover in Areas 1 and 2 and other remedial components.

Implementing the components of the remedy listed above will achieve the following Remedial Action Objectives (RAOs) for OU-1:

- Prevent direct contact to contaminated media (including waste material, fill, stormwater, sediments, leachate, and groundwater) located on or emanating from OU-1.
- Limit inhalation and external radiation exposure from contaminated media (including waste material, fill, leachate, and gas emissions) located on or emanating from OU-1 to within the acceptable risk range ( $10^{-4}$  to  $10^{-6}$  cancer risk or a hazard index (HI) of less than 1 for non-carcinogenic risk).
- Minimize water infiltration to prevent contaminants from leaching to groundwater above levels protective for the reasonably anticipated use of the groundwater and surface water.
- Control and manage leachate that emanates from OU-1 in accordance with standards identified in the ARARs.
- Control and treat landfill gas from OU-1, including radon, in accordance with standards identified in the ARARs.
- Control surface water runoff, and minimize erosion associated with OU-1 in accordance with standards identified in the ARARs.

#### **D. Summary of the OU-2 Remedy**

The OU-2 remedy addresses the landfilled areas that are not impacted by RIM namely: the Former Active Sanitary Landfill (Bridgeton), the CDL and the ISL. The ROD acknowledged that Missouri is a federally approved regulator for solid waste landfills and has promulgated laws and requirements for the design and operation of sanitary landfills (10 CSR 80-3.010) and demolition landfills (10 CSR 80-4.010), including requirements for closure and post-closure care (10 CSR 80-2.030). For areas operated

under state permit, (i.e., Bridgeton Landfill and the CDL) that were not closed before 1991, the terms of their respective permits dictate the appropriate closure and post-closure care requirements. The CDL operated under a Missouri permit until it stopped accepting waste in 1995, and the Bridgeton Landfill operated under a Missouri permit until disposal operations ceased in 2005. Consistent with the EPA's policy on coordination between the Resource, Compensation and Recovery Act (RCRA) and the CERCLA actions, the 2008 ROD deferred these regulated units to the state regulatory program, indicating that the terms of the applicable permits would dictate the closure and post-closure requirements. Therefore, the CDL and the Bridgeton Landfill were deferred to state and local regulation.

For the ISL, which was closed prior to state regulation, the OU-2 selected remedy, which is based on the Presumptive Remedy Approach for CERCLA Municipal Landfills, is engineered containment with relevant and appropriate closure and post-closure care requirements identified through the CERCLA remedy selection process.

The major components of the OU-2 selected remedy for the ISL, the portion of OU-2 not deferred to the State, are as follows:

- Installation of landfill cover meeting the Missouri closure and post-closure care requirements for sanitary landfills,
- Use and application of groundwater monitoring and protection standards consistent with requirements for sanitary landfills,
- Surface water runoff control,
- Gas monitoring and control consistent with sanitary landfill requirements as necessary,
- Institutional Controls (ICs) to prevent land uses that are inconsistent with a closed solid waste landfill site,
- Long-term surveillance and maintenance of the remedy

The RAOs for OU-2, based on the municipal landfill presumptive remedy, are the following:

- Prevent direct contact with landfill contents,
- Minimize infiltration and resulting contaminant leaching to groundwater,
- Control surface water runoff and erosion,
- Control and treat landfill gas emissions.

### III. Basis for Significant Changes in OU-1

#### A. Expanded extent of OU-1

The first significant change in this ESD is the expanded areal extent of OU-1 based on data collected during the DI and presented in the draft Design Investigation Evaluation Report, West Lake Landfill Superfund Site Operable Unit 1 (DIER) and subsequent addendums to that document. OU-1 was previously described in the 2018 RODA as being comprised of the following four radiological sub-areas:

- Radiological Area 1 (Area 1) – This area was associated with landfill operations conducted at the Site prior to the commencement of state regulations in 1974.
- Radiological Area 2 (Area 2) – This area, located in the northern portion of the Site, was also associated with unregulated landfill operations conducted prior to commencement of state regulations in 1974.
- Buffer Zone – This relatively small triangle-shaped property is located near the northwestern corner of the Site. This property was acquired by the landfill operators in 2001. Radiologically contaminated soils/sediments apparently eroded from the Area 2 landfill berm and migrated onto this property.
- Lot 2A2 – This property is located immediately north-northeast of the Buffer Zone. This privately owned commercial property is also impacted by radiologically contaminated soils that eroded and migrated from the Area 2 landfill berm.

However, Section 10.4.2 of the Remedial Investigation Addendum (RIA) conceptual site model stated that review of historical aerial photographs indicated that activities associated with landfilling occurred contemporaneously across the southern boundary of Area 2 and that portions of the areas that are now known as the CDL and the ISL were being used for waste disposal while Areas 1 and 2 were being landfilled, including placement of RIM. Based on this information, Section 12.2.2 of the RODA required additional samples be collected during the RD phase near the boundaries of Area 1 and Area 2 to confirm the extent of OU-1 and ensure the required engineered cover was placed over all areas where RIM would remain on site.

Sampling was performed under an EPA approved workplan as part of DI work conducted between October 2020 and September of 2022 and follow-up sampling conducted in 2023 and 2024. During the DI, perimeter borings were installed around the previously estimated boundaries of OU-1, Areas 1 and 2. If RIM greater than 7.9 pCi/g was detected in a perimeter boring, a step-out boring was installed perpendicular to the estimated boundary.

Multiple step-out borings and additional investigations were required based on the sampling results along the entire previously estimated southern boundary of Area 2 and into the areas designated as

the CDL and the ISL. Step-out borings also identified RIM in a few other localized areas outside the RODA estimated perimeter of OU-1 Area 1 and Area 2.

Part 1, Section 5.0 of the 2018 RODA states the amended remedy for OU-1, “addresses the portions of the West Lake Landfill that are contaminated with radiologically impacted soils and landfilled waste through a combination of excavation and placement of an engineered cover.” Part II., Section 4.0 of the 2018 RODA states, “The subject of this ROD Amendment is OU-1, which is comprised of contaminant source areas at the Site where RIM has been identified within surface and subsurface soil, sediment, and solid waste”. Based on these statements, the 2018 RODA clearly defines OU-1 as, and selected a remedy to address all areas where RIM is present. Therefore, because the analytical results from the DI and subsequent addenda identified the presence of RIM beyond the originally estimated OU-1 boundaries presented in the RODA, this ESD is necessary to update and refine the originally estimated boundaries of OU-1 to incorporate all areas of the Site that contain RIM greater than 7.9 pCi/g. The presence of RIM provides the basis for expanding the extent of OU-1.

New areas being incorporated into Area 2 of OU-1 include:

- the northern portion of the Inactive Sanitary Landfill (ISL), and
- a majority of the Construction and Demolition Landfill (CDL)

Since one of the areas being incorporated into OU-1 is part of the permitted CDL, certain ARARs will be applicable for the CDL. For details, see section III.C.2. below.

Section 5.8.1.3 of the RODA also required additional evaluation of sediment transportation and deposition during the RD. This involved collecting deeper sediment samples in the North Surface Water Body (NSWB) at the end of the closed drainage ditch along the east side of Area 2. Deeper samples (2-4 feet deep) were collected to represent the material that would have eroded off the landfill in the past before vegetation had been established and before the non-combustible rock cover was placed over surficial RIM. These samples identified RIM > 7.9 pCi/g in the NSWB and expands the site boundary by approximately 500 feet west northwest along the closed drainage area (see Figure 2) which will now be incorporated into OU-1. This data is presented in the DIER and associated addendums submitted subsequently.

## **B. Increase in Costs**

The second significant difference described in this ESD is an increase in cost. Changes to the OU-1 boundaries based on the need to incorporate all areas with RIM greater than 7.9 pCi/g are also anticipated to cause a significant increase in the estimated cost of the OU-1 RA, commensurate with the increase in size of OU-1. A revised cost estimate for the increase in overall costs and the specific costs associated with this ESD were provided by the private Responsible Parties. The areal extent of

OU-1 is increasing by approximately 40 acres or about 62% increase in size and the projected final cover is increasing by approximately 48%. The additional material and construction costs associated with the expanded cover area are anticipated to represent the largest cost increase. The increase in construction cost includes additional significant costs associated with regrading needed to bring the landfill slopes in these newly incorporated RIM areas into compliance with solid waste regulations and to install necessary stormwater controls. Some of the RIM causing the expansion of OU-1 is located in proximity to steep slopes (e.g., on the western side of the ISL) which will require substantial regrading. In addition to the increased costs associated with cover materials and construction and grading activities, there will also be additional costs associated with excavation and disposal of RIM. The DI identified RIM in some of the expanded areas of OU-1, including the CDL, where excavation and offsite disposal will be required based on the excavation criteria in the RODA. The Revised Excavation Plan indicates the RIM excavation and off-site disposal volume has increased by approximately 20,000 cubic yards which is a volume increase of approximately 25%. The overall cost is also expected to increase due to inflation occurring between when the cost estimate for the RODA was developed in 2017 and the revised cost estimate developed in 2024.

The basic line items included in the RODA cost estimate (e.g., excavation activities, shipping and disposal costs, backfill materials, capping materials, and construction and grading operations) are not expected to change significantly but the overall cost of the OU-1 remedy is expected to increase significantly.

### **C. ARAR Modifications**

#### **1. ARAR Waiver Modification for Minimum Top Slope**

The third significant difference described in this ESD is the application of an Equivalent Standard of Performance ARAR Waiver to the minimum final top slope of the OU-1 cover system. The purpose of an Equivalent Standard of Performance ARAR waiver is when an ARAR stipulates use of a particular design or operating standard (such as 5%), but equivalent or better remedial results could be achieved using an alternative design or method of operation. The Missouri solid waste regulations in 10 C.S.R. 80-3.010(17)(B)7 require a minimum top slope of 5%.

The purpose of the 5% minimum final top slope required for Subtitle D landfills in Missouri Solid Waste rules 10 C.S.R.80-3.010(17)(B)7 is to promote runoff without excessive erosion and to account for potential differential settlement of the waste and engineered cover. The rules are designed for placing covers over recently filled landfills. Because landfilling of OU-1 was completed many years ago, much of the compaction and biodegradation of the refuse and most of the differential settlement has already taken place.



The UMTRCA regulation 40 C.F.R. 192.02(a), was also cited as an ARAR in the RODA and states, “Control of residual radioactive materials and their listed constituents shall be designed to be effective for up to one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years.” This longevity requirement is significantly greater than what is required for typical Subtitle D landfills.

Respondents conducted evaluations to help determine appropriate final minimum top slopes for the OU-1 landfill cover during the RD process which are documented in the 90% RD and summarized in a technical memorandum dated November 20, 2024.

The conclusions summarized in this technical memorandum indicated that an initial top slope of 3% is anticipated to be sufficient to retain an average slope of 1% to 2% which will meet the intent of Missouri Solid Waste rules 5% minimum top slope requirement. Since steeper slopes are more prone to erosion, an initial top slope of 3% should provide an equivalent standard of performance but reduce the rate of erosion. By waiving the 5% minimum top slope requirement and allowing a slightly flatter top slope of 3%, the engineered cover may achieve better remedial results by minimizing erosion and increasing the longevity performance of the remedy so that it remains protective far into the future. Waiving the minimum 5% top slope requirement does not alter the requirement to establish and maintain a positive top slope to promote drainage for the life of the cover.

## **2. ARAR Applicability to CDL Portion of Expanded OU-1**

Expanding the extent of OU-1 to incorporate part of the CDL requires a slight change to the ARARs. Because the CDL is an actively permitted landfill that continued accepting waste until 1995 and has not formally completed Closure, certain Missouri Solid Waste regulations for sanitary and demolition landfills are applicable to this expanded area of OU-1. The 2008 OU-2 ROD identified certain provisions in 10 C.S.R. 80-3.010 and 10 C.S.R. 80-4.010 as ARARs for OU-2, which included the CDL at the time. The 2018 OU-1 RODA identified certain provisions of 10 C.S.R. 80-3.010 as relevant and appropriate for OU-1. Those provisions will continue to be relevant and appropriate in areas of OU-1 that are outside the CDL. State regulations at 10 C.S.R. 80 Chapter 4 specific to the operation and closure of demolition landfills were rescinded on February 28, 2019, and incorporated into 10 C.S.R. Chapter 3 Solid Waste Disposal Areas – Sanitary, Demolition, and Special Waste Landfills dated January 29, 2019. These requirements remain substantively the same as the prior requirements. See Section IV.C.2 for CDL ARAR citations below.

## **IV. Description of Significant Differences for OU-1**

### **A. Significant Difference 1 – Expanded Extent of OU-1**

This ESD updates the areal extent of OU-1 presented in the RODA based on the presence of RIM, increasing Area 2 significantly to the south and slightly expanding the perimeter of Area-1. The expanded extent of OU-1 can be seen in Figure 2. Incorporation of the RIM identified during the DI increases the size of OU-1 from roughly 64 acres to approximately 104 acres, which is an estimated area increase of about 62%. The majority of RIM identified in the CDL and ISL is deeper than 12 to 16 feet and therefore, according to the 2018 RODA, will not require excavation. However, there are some new localized areas of RIM that do meet the criteria for excavation in the RODA, and they will be excavated accordingly. The areas where excavation is needed were identified in the draft DIER and the Revised Excavation Plan, and will be more precisely identified in the final RD.

The portion of expanded Area 1 located within the CDL is subject to Solid Waste Disposal Area Operating Permit #218912 issued by the MoDNR on September 17, 1984<sup>1</sup> and is subject to an October 1987 Closure Plan and Missouri state closure and post-closure regulations. To the extent the OU-1 RODA is implemented in the CDL, those substantive portions of the regulations upon which the permit conditions are based will become action and location specific applicable requirements for the OU-1 RODA in the CDL. Final closure and long-term monitoring of this area of the CDL will be performed pursuant to the OU-1 RODA and this ESD. As noted above, state regulations at 10 C.S.R. 80 Chapter 4 specific to the operation and closure of demolition landfills were rescinded on February 28, 2019, and incorporated into 10 C.S.R. Chapter 3 Solid Waste Disposal Areas – Sanitary, Demolition, and Special Waste Landfills. Certain provisions in these revised regulations are identified as applicable requirements for the expanded OU-1 area that includes the CDL and are identified in Section IV.C.2 below.

Additional sampling required by the RODA also identified RIM above 7.9 pCi/g in the subsurface sediments (2-4 feet into the sediment) of the NSWB, in subsurface samples from the drainage ditch west of St. Charles Rock Road, and in a few localized areas beyond the originally estimated OU-1 boundaries presented in the RODA. The site boundary has been revised to incorporate all of these areas, as needed, and is depicted on ESD Figure 2.

All of expanded OU-1 is required to meet the OU-1 RODA requirements, as modified by this ESD. The estimated boundaries for the expanded OU-1 based on RIM are presented on Figure 3. In addition to

---

<sup>1</sup> Permit #218903 was previously issued by the MoDNR in this area for operation of a solid waste disposal landfill in accordance with Missouri Waste Management Law (Sections 260.200 to 260.245, RSMo, Supplement 1973), the rules and regulations promulgated pursuant to the Missouri Waste Management Law, and approved engineering plans, specifications, and operating procedures.

incorporating the full extent of RIM, OU-1 will also be expanded to incorporate an appropriate OU-1 cover system transition zone and any other area beyond the extent of RIM necessary to implement the OU-1 remedy. This transition zone will be designated in the final design and will consist of land that must be incorporated into OU-1 in order to implement and maintain the remedy to prevent any future exposure to RIM or impacts to the integrity of the final OU-1 cover(s). This transition zone is anticipated to include the toe of the OU-1 landfill cover (or any portion of the cover beyond the extent of RIM greater than 7.9 pCi/g), potential drainage features for OU-1, and areas that must be graded or maintained to prevent any future exposure to RIM or impacts to the integrity of the final covers. The estimated OU-1 boundaries depicted on Figure 3 are estimated because the transition zones have not been designated in the design yet. The EPA shall review and approve the designated OU-1 transition zone in the final RD. The official extent of OU-1 will be documented in the Final approved RD. This expansion of OU-1 is necessary to protect human health and the environment.

### **B. Significant Difference 2 – Increase in Costs**

The second significant difference described in this ESD is an increase in cost. The need to expand the extent of OU-1 based on the distribution and extent of RIM is also anticipated to cause a significant increase in the estimated cost of the OU-1 RA commensurate with the increase in size of OU-1 Areas being incorporated into OU-1 include the northern half of the ISL, the majority of the CDL, the drainage ditch adjacent to Area 1 west of St. Charles Rock Road and the NSWB northeast of Area 2.

Because the area of RIM contamination has increased, the engineered cover required by the 2018 RODA must also be expanded, which will increase cost. Costs for excavation and disposal will also increase since some areas being incorporated into OU-1 contain RIM that meets the RODA requirements for excavation (RIM greater than 52.9 pCi/g between 0 and 12 feet below the landfill surface). The private Responsible Parties calculated a revised cost estimate for the OU-1 RA. This estimate may change as the RD and RA process continues. The revised cost estimate includes construction costs, support activities, professional services, off-site transportation and disposal, and contingencies. In addition to cost changes based on size and scope, the overall cost of the remedy is also increasing based on inflation between 2018 and 2024. A method of gauging construction cost increases resulting from inflation is to use changes in the Engineering News-Record's Construction Cost Index (ENR CCI) to estimate increased costs due to inflation. The ENR CCI index between May 2017 and May 2024 indicates an inflationary increase in costs of approximately 26%. Sales tax on material costs has also increased by approximately 1.6% during the same timeframe.

Cost increases associated with a 62% estimated increase in the size of OU-1 (approximately 48-acre increase), an approximate 48% increase in the extent of the cover (96.2 acres versus the 65.2 acres) and about a 26% increase in the volume of RIM to be excavated and disposed off-site (95,500 bcy versus the 75,500 bcy) are significant. The revised estimated capital costs for the RA projected by the

private Responsible Parties is \$392 million dollars. The capital cost estimate for the RA presented in the RODA was \$229 million. The revised capital costs specifically associated with activities presented in this ESD are approximately \$113.5 million dollars. The EPA considers this cost increase a significant change to the RODA.

### **C. Significant Difference 3 – ARAR Modifications**

#### **1. ARAR Waiver Modification for Minimum Top Slope**

Based on the age of the waste, the results of the evaluation presented in the 90% RD, the risk drivers and the UMTRCA longevity requirements for the cover system, the EPA is applying the Equivalent Standard of Performance ARAR Waiver in this ESD to the 5% minimum final top slope requirement in 10 C.S.R.80-3.010(17)(B)7.

Applying this waiver is considered a significant change by the EPA and will result in the final slope of the top of the OU-1 landfill having a minimum slope between 5% and 3% as determined and approved by EPA in the final RD. The 90% RD currently proposes a 3% top slope for the OU-1 cover system based on consideration of both potential settlement and long-term erosion. Even with this waiver, the landfill is still required to maintain a positive top slope to promote drainage for the life of the cover system. This change will achieve the same degree of protection, and the same level of performance and will potentially increase the future protectiveness and long-term effectiveness of the remedy.

#### **2. ARAR Applicability to CDL Portion of Expanded OU-1**

Expanding the extent of OU-1 to incorporate part of the CDL requires a slight change to the ARARs. Because the CDL is an actively permitted landfill that continued accepting waste until 1995 and has not formally completed Closure, certain Missouri Solid Waste regulations for sanitary and demolition landfills are applicable to this expanded area of OU-1.

The 2018 OU-1 RODA identified numerous ARARs that are relevant and appropriate for OU-1, including certain permit related provisions of 10 C.S.R. 80-3.010 and 10 C.S.R. 80 Chapter 4. Those ARARs will continue to be relevant and appropriate in areas of OU-1, including the expanded areas, that are outside the CDL. Non-permit related ARARs are also relevant and appropriate for the CDL; however, permit related ARARs will now be applicable for the CDL. Since State of Missouri regulations at 10 C.S.R. 80 Chapter 4 specific to the operation and closure of demolition landfills were rescinded after the RODA was signed, the citations for the ARARs applicable to the CDL are from the January 2019 version of 10 C.S.R. Chapter 3 Solid Waste Disposal Areas – Sanitary, Demolition, and Special Waste Landfills. These requirements remain substantively the same as the prior requirements; however, the following citations to the updated regulations are provided in the table below as the applicable requirements for the CDL in the expanded area of OU-1.

**Table 3 - ARARs Applicable to the CDL Sub-Area of OU-1**

<b>January 2019 Citation</b>	<b>ESD Determination</b>	<b>Requirement/Purpose</b>
10 C.S.R.80-3.010(3)(B)1.A. and B.	Applicable to CDL sub-area of OU-1, Area 2	Satisfactory Compliance-Design, Airport safety.
10 C.S.R.80-3.010(5)	Applicable to CDL sub-area of OU-1, Area 2	Quality Assurance, Quality Control (QA/QC)
10 C.S.R. 80-3.010(7)(B) and 7(C)	Applicable to CDL sub-area of OU-1, Area 2	Water Quality
10 C.S.R. 80-3.010(9)(A)2, 3, and 5.A and B. Potentially all of (9)	Applicable to CDL sub-area of OU-1, Area 2	Groundwater Monitoring
10 C.S.R.80-3.010(11)	Applicable to CDL sub-area of OU-1, Area 2	Air Quality
10 C.S.R. 80-3(12) (13) and (14)	Applicable to CDL sub-area of OU-1, Area 2	Landfill gas - monitoring, collection, and Corrective Action
10 C.S.R. 80-3.010(15)	Applicable to CDL sub-area of OU-1, Area 2	Vectors
10 C.S.R. 80-3.010(17)	Applicable to CDL sub-area of OU-1, Area 2	Cover
10 C.S.R. 80-3(18)	Applicable to CDL sub-area of OU-1, Area 2	Compaction
10 C.S.R. 80-3(19)	Applicable to CDL sub-area of OU-1, Area 2	Safety
10 C.S.R. 80-3.010 Appendix I, II,III, and IV.	Applicable to CDL sub-area of OU-1, Area 2	Constituents for monitoring
10 C.S.R. 80-2.030*	Applicable to CDL sub-area of OU-1, Area 2	Closure and post-closure

\* This citation did not change since the RODA but the regulation is applicable to the CDL, not relevant and appropriate.

## **V. Description of Non-Significant Changes in OU-1**

There are also three non-significant or minor changes to the OU-1 remedy selected in the RODA. These changes are based on new information and analyses developed during the RD phase of work.

These three changes clarify the timing and analysis of confirmation sampling, eliminate the need for an onsite laboratory, and allow flexibility with regards to the need for a RIM staging and loading building provided specified criteria can be met. The EPA has concluded that these changes are considered non-significant or minor changes in accordance with CERCLA and will not have a significant or fundamental impact on the scope, performance, or cost of the West Lake Landfill OU-1 remedy.

### **A. Making the RIM Staging and Loading Building Conditional**

The first non-significant difference presented here makes the RIM staging and loading building requirement in the RODA conditional based on the ability of the excavation and loading process to meet waste acceptance criteria (WAC) for disposal facilities without special handling. Section 12.2.3, of the RODA states, "Prior to excavation, an enclosed structure equipped with dust, odor, and vapor emission control equipment will be constructed for staging and loading of RIM for off-site disposal. The RIM staging and loading building will be used to store RIM during loading operations to minimize contact with stormwater, odor emissions, and bird attraction. Specific plans for loading and transporting of RIM will be developed to comply with the permitted disposal facility's waste acceptance criteria during the RD." Every regulated radiological disposal facility has a WAC that they must comply with. At the time the RODA was prepared, it was unclear if potential disposal facilities could receive the RIM excavated for off-site disposal under their existing WACs without substantial segregation and processing. However, since the issuance of the RODA, several disposal facilities have applied for, and at least one facility has received a permit modification that allows the facility to accept higher concentrations of material so that the need for on-site processing would be significantly reduced or may be eliminated altogether.

In addition, sampling was conducted as part of the DI to further characterize and refine estimates of the occurrence and volume of RIM whose activity exceeds current WAC for disposal facilities. The DI and evaluations have demonstrated that there is less elevated RIM activity than was assumed during preparation of the RODA. The reduced quantity of elevated RIM activity and the substantially increased WAC discussed above means that most of the RIM to be excavated at the Site could be loaded directly into containers at the excavation area and staged directly for off-site disposal without an intermediate processing step. This provides several benefits that increase the short-term effectiveness of the selected remedy. Direct loading would provide benefits such as:

- eliminates the need to handle the RIM multiple times and transport it to other locations on-site

- reduces the potential for contamination to be spread between haul routes on-site
- makes odor and fugitive dust emissions easier to control and reduces the potential for on-site accidents
- reduces the potential for remediation workers to be exposed to RIM and gamma radiation
- reduces the time needed for Site preparation during RA before excavation can begin
- reduces the overall cost of the remedy

Since contracting of the specific disposal facility(s) will not occur until the RA phase of work, it is not possible at this time to determine whether a RIM Staging and Loading Building will be necessary. Because of this uncertainty and the benefits of direct RIM loading previously described, the EPA has determined that the need for a RIM Staging and Loading Building will be conditional based on the ability of the excavation and loading process to meet WAC for the contracted disposal facilities without special handling, rather than a requirement in the RODA. A RIM Staging and Loading Building will not be required if the following two conditions can be met: 1) RIM does not require multiple handling and prolonged staging so that the RIM can generally be loaded into a sealed container within the same day and meet the disposal facilities' WAC criteria, and 2) any staged material, (i.e., for purposes of dewatering or other occurrence that precludes completion of loading of the staged materials that day) be of small enough volume that it can be quickly covered with tarpaulins or other daily cover in the event of inclement weather, or other sudden need to stop work. Without a building, any temporarily staged materials would need to be loaded into containers for off-site disposal on the next workday that has active excavation and loading occurring. These requirements will be detailed in the Loading, Transportation and Off-site Disposal Plan (LTODP) and the project plans and specifications. If these excavation and loading criteria cannot be met, then an enclosed structure for processing RIM for off-site disposal will be required. A RIM Staging and Loading Building will also be required if additives, such as fly ash or cement, are necessary to reduce the water content of RIM prior to loading. Therefore, detailed specifications for the RIM building and materials management inside the building will be included in the Final RD document as a contingency in case such a building is determined to be necessary during RA.

The basis for this change is new information collected during the DI and the following information that has been presented to the EPA: the draft DIER, the new WAC for one or more of the disposal facilities being evaluated in the RD, additional evaluation and information presented in the May 13, 2020 draft LTODP, Parson's January 26, 2022 Material Management presentation, and a summary write-up by the Respondents on Conditions under which the RIM Staging and Loading building will not be needed submitted to the EPA on September 29, 2023. The cost for the RIM staging and loading building was estimated at 16.9 million dollars in the FFS. Therefore, this change potentially increases the short-term protectiveness and cost effectiveness of the remedy.

## **B. Clarification of Timing of the Confirmation Sampling**

The second non-significant change is a clarification in the timing of confirmation sampling. The timing of confirmation sampling was not explicitly discussed in the RODA. Rather Section 12.2.1 of the 2018 RODA stated “Confirmation sampling procedures will be specified in a site-specific sampling and analysis plan to be developed during the RD.” After coordinating with the EPA, the Respondents proposed in the May 13, 2020 draft 30% RD to perform pre-excavation confirmation sampling, which would eliminate the lag time between excavation and receipt of laboratory results and allow for a decrease in the time excavations are open due to nearly contemporaneous excavation and backfilling. This will result in:

- Reduced health and safety risks to workers;
- Reduced environmental risks (e.g., birds, odors, gamma emissions);
- Reduced need for daily cover since excavations can be backfilled to grade more quickly, making the selected remedy greener and more sustainable; and
- More efficient time frame for implementing the excavation during the RA.

This modification is based on a proposal presented in the draft 30% RD, EPA’s January 25, 2021, comment letter on the draft 30% RD, a January 26, 2022, Material Management presentation to the EPA, and the draft confirmation sampling plan submitted to the EPA on August 30, 2023.

The EPA considers this change in the timing of the confirmation sampling to be a minor or non-significant change to the RODA that will result in a more protective and more timely excavation during the RA. This change increases the short-term protectiveness of the remedy.

## **C. Elimination of the Requirement for an On-site Laboratory**

The third non-significant difference described in this document is elimination of the requirement in Section 12.2.2.2 of the 2018 RODA to have an onsite laboratory for confirmation sampling during excavation of the RIM. This requirement assumed that confirmation sampling would be performed during excavation and was intended to provide quicker analysis of the samples to guide excavation activities and allow backfilling of the excavations sooner. An on-site laboratory is no longer necessary if pre-excavation confirmation sampling is performed and, by using a commercial lab, confirmation sampling can achieve an equivalent level of data quality to the DI work. The basis for this change is the proposal to use pre-excavation confirmation sampling described above and information presented in the July 6, 2022, Confirmation Sampling presentation. This modification does not prohibit the use of an on-site laboratory for other purposes if appropriate, such as using an onsite laboratory to evaluate waste to meet disposal facility requirements. This change will potentially improve the quality of the confirmation sampling data.



## **VI. Basis for Significant Changes in OU-2**

The three significant changes described for OU-2 in this ESD are based on additional data collected and additional evaluations performed during the RD phase of the Superfund process. This ESD modifies the selected remedy in the OU-2 ROD by implementing the changes described below. The decrease in size and scope of OU-2 is directly related to the increase in size and scope of OU-1, which is discussed above. The presence of RIM in the ISL and CDL as determined by analytical data collected under an approved work plan and Quality Assurance Project Plan (QAPP) provides the basis for decreasing the extent of OU-2 and expanding the extent of OU-1. The modified extent of OU-1 and OU-2 are based directly on the data collected and evaluated during the OU-1 DI and subsequent addenda work plans.

This ESD documents the modifications made to the OU-2 remedy selected in the ROD.

### **A. Decrease in Areal Extent of OU-2**

The primary change in this ESD is the decrease in areal extent of OU-2 based on the distribution of RIM identified during the OU-1 DI and presented in the draft DIER and subsequent addendums to this document. The 2008 ROD stated that “OU-2 addresses the other landfill areas that are not impacted by radionuclide contaminants.” As indicated above, these landfilled areas were originally identified in the ROD as Bridgeton Landfill, the CDL, and the ISL.

As stated in Section III.A. above, the OU-1 RODA required additional samples be collected during the RD to confirm the extent of OU-1. A DI was performed between October 2020 and September 2022 with additional step-out borings performed in 2023 and 2024. RIM was identified south of the previously estimated boundary for OU-1 Area 2 in the CDL and northern half of the ISL, which had previously been designated as part of OU-2. The investigation specifically identified RIM in approximately the northern half of the ISL and approximately the western three fourths of the CDL (Figure 2).

Since the OU-1 RODA addresses all areas with RIM, this ESD is necessary to update the originally designated areas of OU-2 presented in the ROD to remove from consideration those areas that contain RIM. The presence of RIM in the CDL and the ISL provides the basis for decreasing the size of OU-2 by removing the areas that contain RIM and officially incorporating them into Area 1. The estimated updated extent of OU-2 is presented on Figure 4. The modified extent of OU-2 and OU-1 are based on the data collected during the OU-1 DI and subsequent addenda work plans. The area that is subject to and will be addressed under the OU-2 ROD is approximately the southern half of the ISL. The areas with an active Missouri permit that were deferred to the State and do not contain RIM will continue to be deferred to the state of Missouri for closure and post closure under the existing permits. The updated extent of OU-2 is estimated on Figure 4 because the final extent of OU-2 will be based on the

final extent of OU-1 approved in the Final OU-1 RD. The official extent of OU-2 will be documented in the Final approved OU-2 RD.

### **B. No deferral of RIM impacted CDL to State**

Missouri is a federally approved regulator of solid waste landfills and has promulgated laws and requirements for design, operation, closure and post-closure of Subtitle D landfills that were not closed prior to 1991. The OU-2 ROD deferred the Bridgeton Landfill and the CDL to the State of Missouri since these two areas were operated as landfills under Missouri State permits, continued receiving waste after 1991, and have not completed closure requirements.

As indicated above, the OU-1 2018 RODA addresses all areas with RIM, so this ESD for OU-2 is necessary to update the areas originally incorporated into OU-2, by moving areas found to have RIM present from OU-2 to OU-1. One of the landfilled areas that contained RIM is the CDL. The CDL area accepted demolition wastes pursuant to Missouri Operating Permit numbers 218903 and 218912 until June 1995 and is subject to an October 1987 Closure Plan and Missouri State closure and post-closure regulations. Section 5.1.1 of the OU-2 ROD states, "There is no evidence that the Closed Demolition Landfill (which ceased accepting waste in June 1995) received or disposed of waste outside the scope of its permit. It is therefore appropriate for the Closed Demolition Landfill to remain under the state of Missouri regulatory program." This statement is no longer accurate. Prior to the issuance of these permits, this area of the Site was used for disposal of sanitary wastes. Based on the recent OU-1 investigation, RIM was disposed in the CDL area prior to the issuance of the demolition landfill permits. Therefore, it is no longer appropriate to defer the radiologically impacted portions of the CDL to the State based on the existing permit.

The Bridgeton Landfill and the non-RIM impacted areas of the CDL that are not needed to implement the OU-1 remedy will continue to be deferred to the State of Missouri where the terms of the applicable permits will dictate the closure and post-closure requirements. RIM impacted areas of the CDL and ISL will be incorporated into OU-1. Non-RIM impacted areas of the ISL will continue to be remediated in accordance with the remedy for OU-2. Much of the CDL area being deferred to the State of Missouri is located generally down-slope of areas containing RIM. Damage to the OU-2 portion of the cover in an area that could threaten the OU-1 cover, must be addressed as part of the maintenance for the OU-1 cover if not addressed under OU-2. Requirements for maintaining the OU-1 cover will be documented in the *Operations and Maintenance Plan West Lake Landfill Superfund Site Operable Unit 1*.

### **C. Change in Cost**

FS level cost estimates are expected to be accurate to within + 50% to -30%. Since the area being addressed by the remedy described in the ROD is decreasing by approximately 50%, the EPA anticipates the estimated cost of the remedy to decrease by about 50%. The basic line items included in the RODA cost estimate are not fundamentally changing; however, because they are being applied to a reduced ISL area, the cost of the remedy is anticipated to decrease. Therefore, since the cost is decreasing by more than 30% of the estimated costs presented in the ROD, this is considered a significant change.

## **VII. Description of Significant Differences for OU-2**

### **A. OU-2 Significant Difference 1 – Decrease in the areal extent of OU-2**

RIM was identified contiguously across the previously estimated southern boundary of OU-1, Area 2 and is present in approximately the western three fourths of the CDL and approximately the northern half of the ISL (Figure 2). Both areas were previously considered OU-2. The RIM detected in the ISL and CDL impact approximately 40 acres of land. Since OU-1 will address all site areas with RIM, these 40 acres of the CDL and ISL will be removed from OU-2 and placed in OU-1. The specific boundary of OU-2 will be presented in the final OU-2 RD and approved by EPA.

The remedy specified in the OU-2 ROD for the ISL is listed in Section II.B above. The ROD states in Section 12.2, “The landfill cover, gas control, runoff control, long-term groundwater monitoring, and post-closure inspection and maintenance will at a minimum meet the relevant and appropriate requirements found in the Missouri solid waste rules for sanitary landfills.” This ESD does not change any of the technical requirements for the landfill cover on the ISL. The engineered cover will just be installed over a smaller area, specifically the southern half of the ISL.

### **B. OU-2 Significant Difference 2 – No Deferral of the RIM impacted CDL to the State**

Missouri Solid Waste regulations exclude disposal of radiological wastes in a permitted landfill, so the existing permit conditions do not address closure of a landfill containing RIM. Therefore, portions of the CDL that contain RIM will no longer be deferred to the State of Missouri. The portion of the CDL that contains RIM is being incorporated into OU-1 through this ESD. The portion of the CDL that does not contain RIM and the Bridgeton Landfill are still being deferred to the State based on the terms of their existing permits which dictate the appropriate closure and post-closure requirements. The existing and former permits in these areas are shown in Figure 5. The general area of the CDL and Bridgeton Landfill being deferred to the State of Missouri under this ESD are presented on Figure 4. The precise area that will be deferred to the State will be depicted in the final EPA approved OU-2 RD.

This ESD does not change the applicable or relevant and appropriate regulations (ARARs) for the areas remaining in OU-2 originally cited in the 2008 ROD.

### **C. OU-2 Significant Difference 3 - Cost Decrease**

The third significant difference addressed in this ESD is a decrease in the estimated cost for the OU-2 remedy. As discussed above, the approximately northern half of the ISL is being incorporated into OU-1; therefore, the OU-2 engineered cover will be approximately half the previously estimated size. Bridgeton Landfill provided a revised cost estimate based on the changes to OU-2 documented in the ESD. The revised capital cost is estimated to be \$3,263,239 dollars. This revised cost is less than half of the originally estimated capital costs for OU-2 of \$6,670,000 dollars. This cost change is considered significant.

## **VIII. Support Agency Comments**

The EPA developed the ESD. The Missouri Department of Natural Resources has reviewed this ESD and supports the EPA's proposed significant changes as presented.

It will be critical for EPA to fully incorporate into Operable Unit 1 all areas that contain radiologically impact material along with those areas that are needed to implement the OU-1 remedy including any areas that must be maintained to ensure longevity and long-term protectiveness of the remedial system. As stated in the department's position on the 2018 Record of Decision Amendment, we recognize the need for perpetual care and monitoring and expect EPA to develop robust and durable long-term stewardship and monitoring plans.

## **IX. Statutory Determinations**

The EPA evaluated these changes to OU-1 with respect to how they would impact the other remedial alternatives evaluated in the Proposed Plan and whether they would have affected the remedy selected in the RODA. The EPA evaluated and presented 8 alternatives in the RODA.

With the exception of the "no action alternative", the scope and cost of all the previously evaluated remedial alternatives would be increased as a result of the changes described in this document. The expanded extent of RIM requires construction of an engineered cover over a larger portion of the Site which increases the scope and cost of all three partial excavation alternatives and the two capping only alternatives. In addition, because a majority of the RIM in the expanded area are present at depths significantly below 20 feet, the scope and cost of the full excavation of RIM alternatives would increase to an even greater degree because of a significant amount of non-RIM overburden that would have to be removed to excavate all the additional RIM.

As stated in 2018 RODA, the NCP states in 40 C.F.R. § 300.430(f)(1)(ii)(E) that balancing of the nine criteria shall emphasize long-term effectiveness and permanence. Long-term effectiveness includes consideration of the remaining risk at the site after the RA is complete which can be measured by the volume or concentration of contaminants remaining on site. Therefore, the EPA concluded that the long-term permanence is increased as radioactivity is removed from the Site. This emphasis was considered by EPA when the Amended Remedy, which includes the excavation and off-site disposal of a significant amount of radioactivity, was selected. While the aerial extent of RIM has increased significantly, this change has not impacted or prevented the completion of an optimized excavation plan as required in the 2018 RODA. Further, the change to pre-excavation confirmation sampling and the potential to directly load the RIM into off-site shipping containers without the need for selective loading in a RIM Staging and Loading building increases short-term effectiveness of the remedy by reducing the time that RIM and waste will be exposed and reducing the risks to remediation workers. These changes are in line with the expectation in the RODA that during RD, an excavation plan will be developed that will achieves the same long-term effectiveness and permanence while minimizing the short-term impacts on the community and on-site workers.

The 2018 RODA also states that the EPA's amended remedy is cost effective because it strikes the best balance between long-term effectiveness and permanence and short-term effectiveness, for the cost. These changes do not impact the overall balance of these criteria and two of the changes lead to improvements in short-term effectiveness, therefore, the remedy remains cost effective. Based on this assessment, the changes documented in this ESD would not change the outcome of the 9-criteria evaluation for OU-1 performed in 2018.

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

The selected remedy for OU-1 and OU-2, as modified by this ESD, meet the statutory requirements of CERCLA §121 and the NCP. The significant changes made to the remedy are based on new information developed during the RD process for OU-1 and OU-2. The changes are protective of human health and the environment, comply with federal and state applicable ARARs (except where justified by a waiver), are cost-effective, and utilize permanent solutions to the extent practicable. The modified remedies will meet RAOs specified in the RODA and ROD.

## **X. Public Participation Compliance**

General information regarding these proposed changes were shared with the public by the EPA at a Public Meeting about the DI held on May 9, 2023, and at a Technical Community Advisory Group

meeting held on December 5, 2023. In general, the public attending these meetings responded positively and the primary concern expressed was whether the changes would cause delays in implementing the selected remedy.

The EPA held a public availability session and meeting on August 29, 2024, to present and explain the changes documented in this ESD to the community and answer their questions.

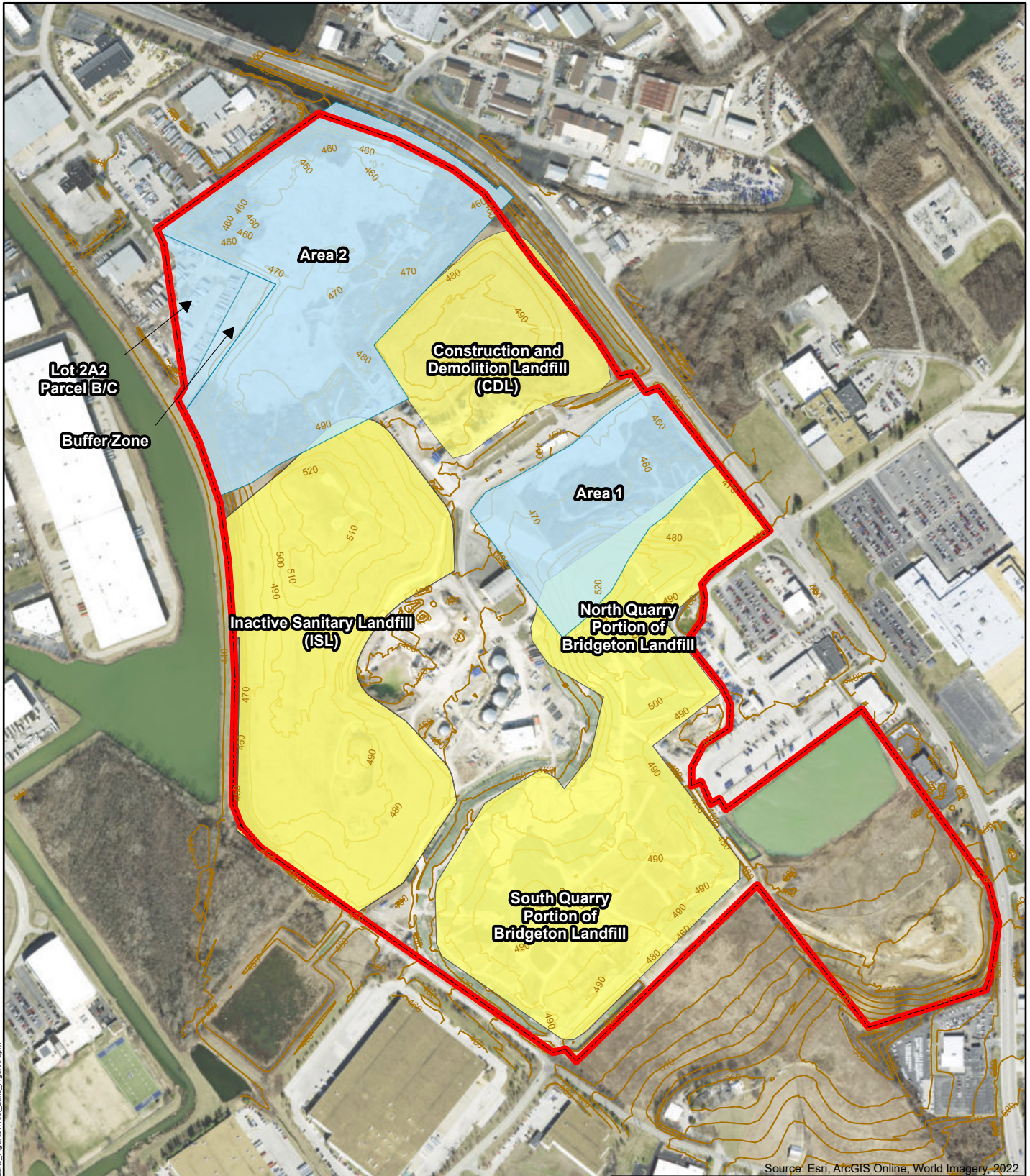
A notice of availability of this ESD will be published in a local newspaper and posted on the West Lake Landfill Site Profile Page shortly after the ESD is signed by the EPA. A copy of this ESD will be placed in the OU1 and OU2 Administrative Record and on the West Lake Landfill Site Profile Page in accordance with the public participation requirements in 40 CFR 300.435(C)(2)(i).

## **XI. Declaration by EPA**

EPA has determined that the significant and non-significant changes identified during investigations or evaluations performed during the Remedial Design (RD) phase and presented in this ESD are necessary to protect human health and the environment and to implement the remedy modified in the RODA. These changes are in accordance with CERCLA and do not significantly or fundamentally change the remedy selected in the RODA. For the rationale set forth in this document, I approve the issuance of this ESD for the Westlake Landfill Site.

---

Barry Breen  
Principal Deputy Assistant Administrator  
Office of Land and Emergency Management

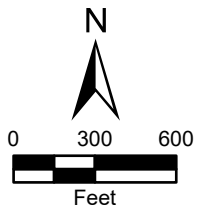


Source: Esri, ArcGIS Online, World Imagery, 2022

D:\Application\_Data\Region7\West\_Lake\Projects\Pro\West\_Lake\_Figures.aprx

**Legend**

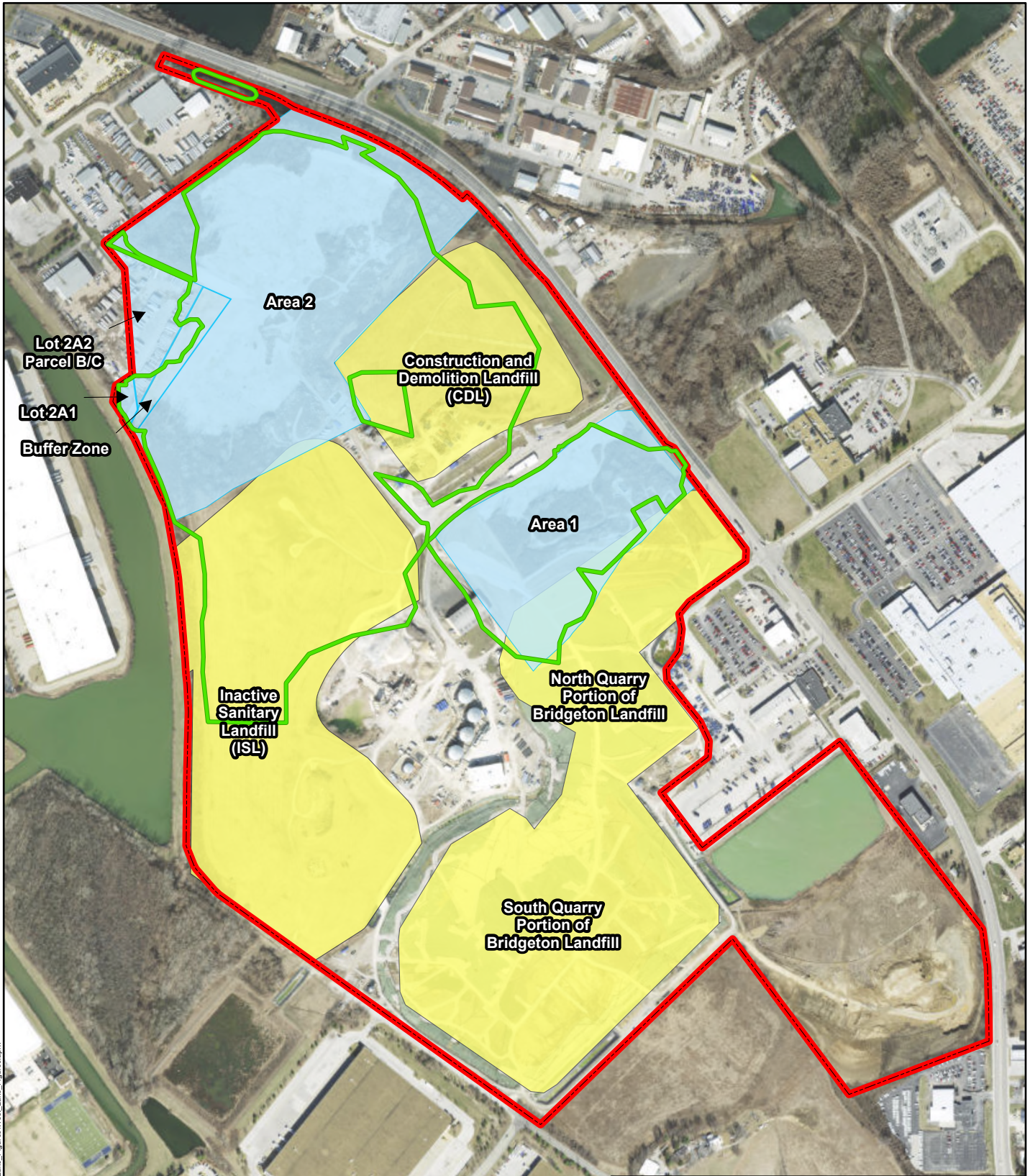
- Former Operable Unit-1
- Former Operable Unit-2
- West Lake Landfill Site Original Boundary
- Ground Surface Contours



West Lake Landfill  
Bridgeton, Missouri

**Figure 1**  
2018 Record of Decision Amendment  
OU-1 and OU-2 Boundaries

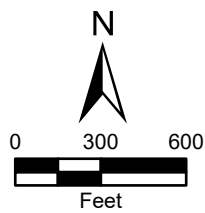




D:\Application\_Data\Region7\West\_Lake\Projects\Pro\West\_Lake\_Figures.aprx

**Legend**

- Extent of RIM (radium or thorium > 7.9 pCi/g)
- Former Operable Unit-1
- Former Operable Unit-2
- Updated West Lake Landfill Site Boundary

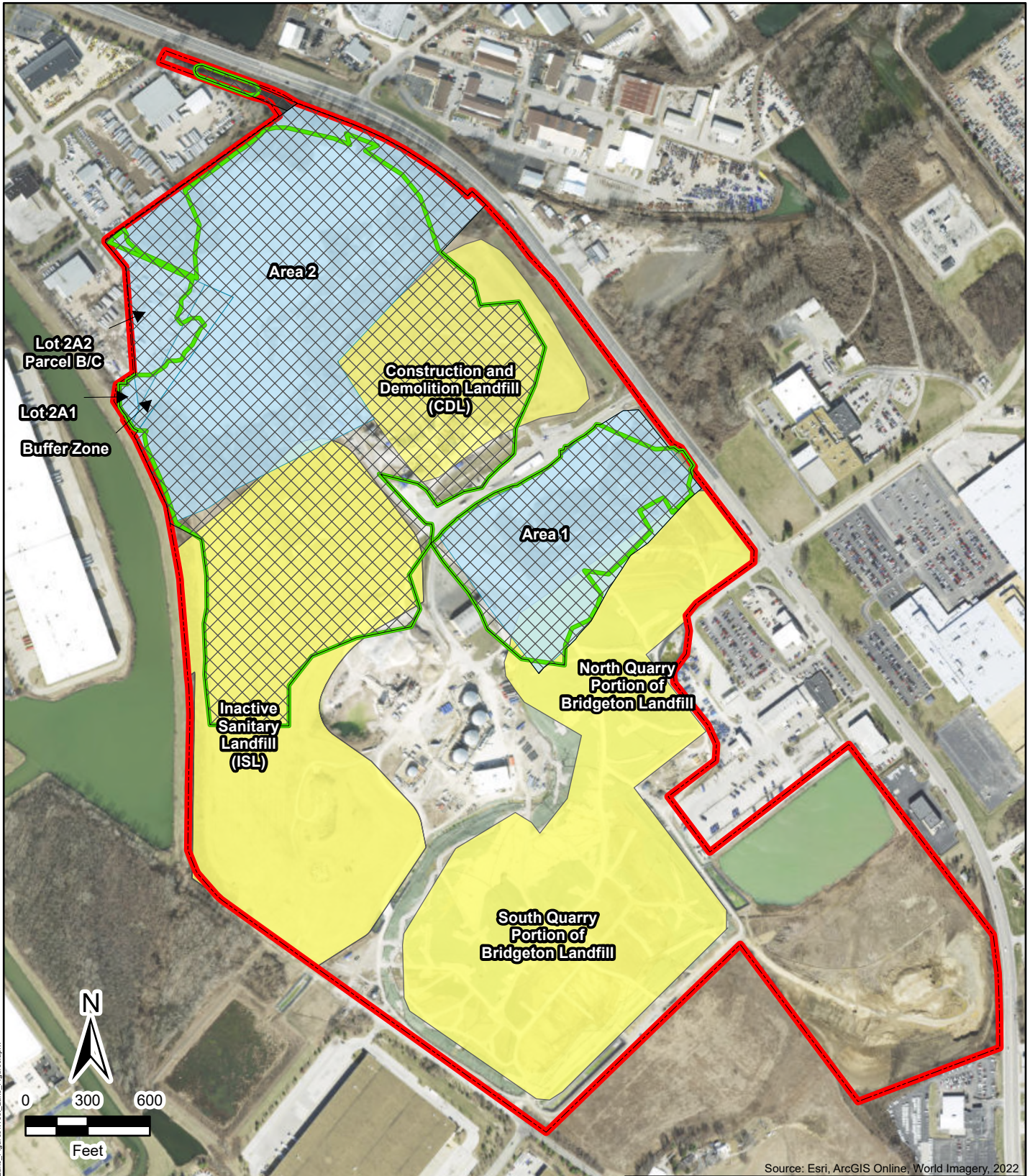


West Lake Landfill  
Bridgeton, Missouri

**Figure 2**  
West Lake Landfill Extent of RIM







Source: Esri, ArcGIS Online, World Imagery, 2022

**Legend**

- Extent of RIM (radium or thorium > 7.9 pCi/g)
- Former Operable Unit-1
- Former Operable Unit-2
- Updated Operable Unit 1, Estimated\*
- Updated West Lake Landfill Site Boundary

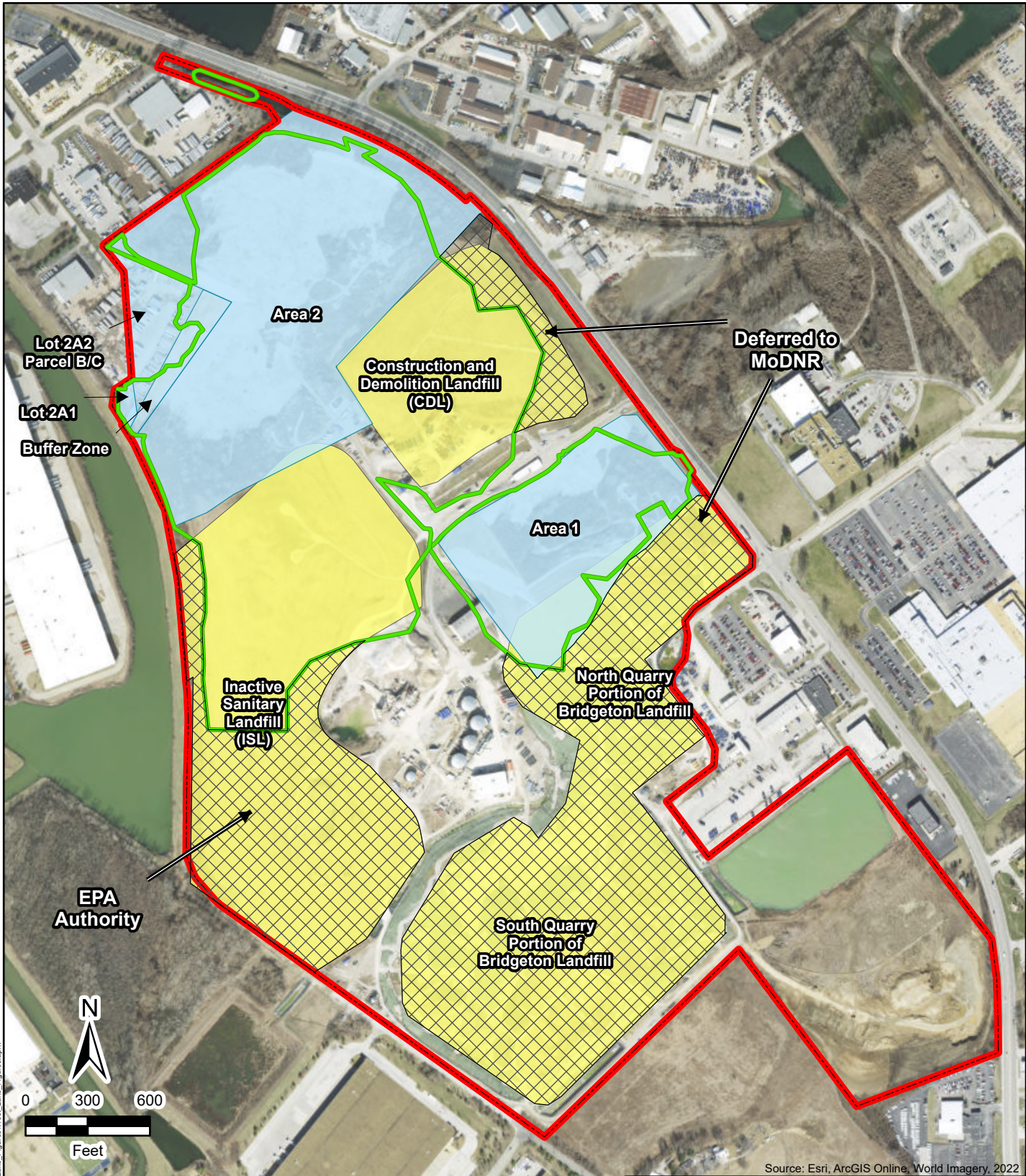
\* Final OU-1 boundary will be presented in the Final Remedial Design document.

West Lake Landfill  
Bridgeton, Missouri

**Figure 3**  
ESD OU-1



D:\Application\_Data\Region7\West\_Lake\Projects\Pro\West\_Lake\_Figures.aprx



Source: Esri, ArcGIS Online, World Imagery, 2022

West Lake Landfill  
Bridgeton, Missouri

**Figure 4**  
ESD OU-2

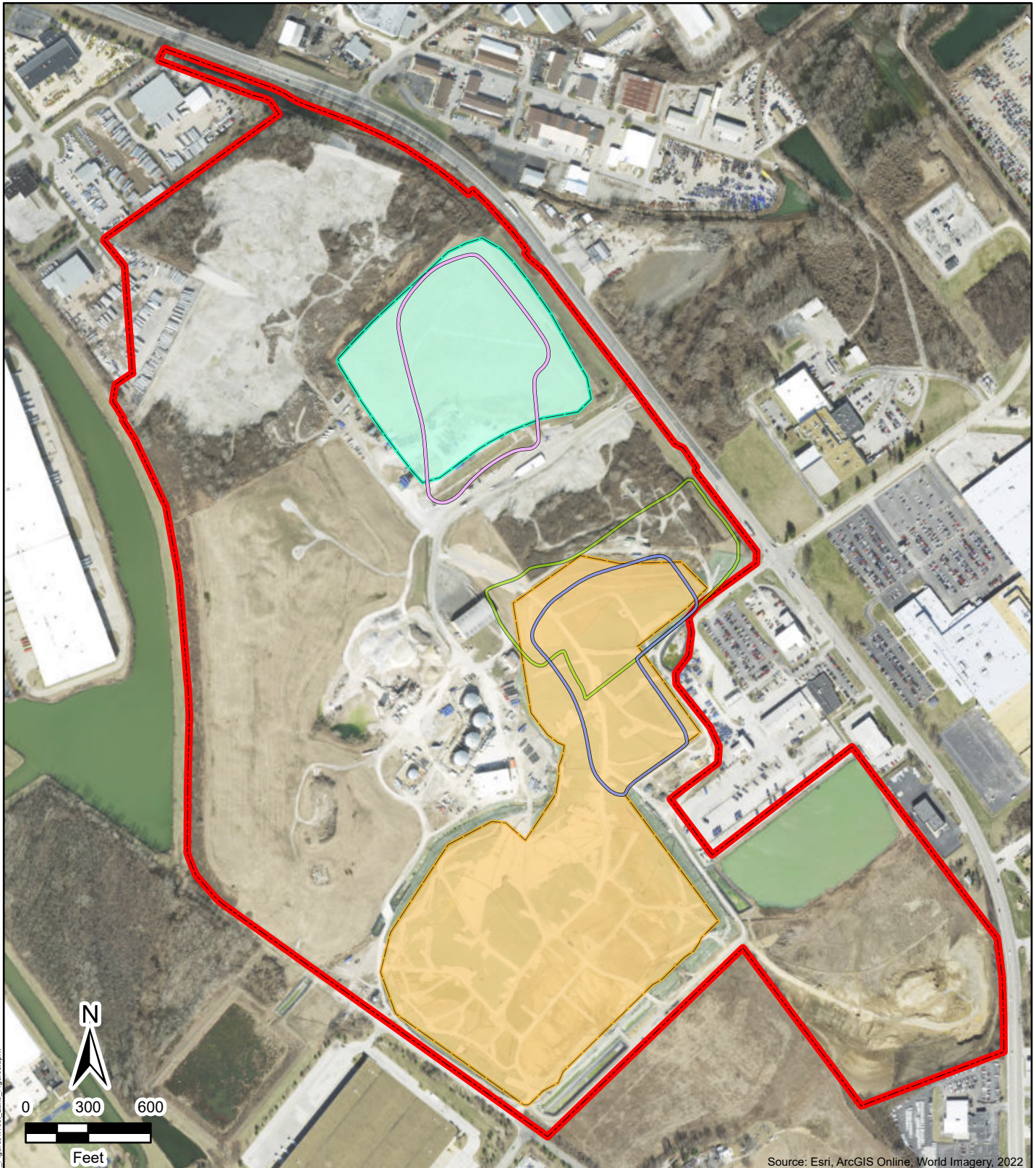


Date: 12/4/2024 Drawn By: Susmita Shrestha Project No: 103X903022F0131

D:\Application\_Data\Region7\West\_Lake\Projects\Pro\West\_Lake\_Egrees\West\_Lake\_Egrees.aprx

- Legend**
- Extent of RIM (radium or thorium > 7.9 pCi/g)
  - Former Operable Unit-1
  - Former Operable Unit-2
  - Updated Operable Unit 2, Estimated\*
  - Updated West Lake Landfill Site Boundary

\* Final OU-2 boundary will be presented in the Final Remedial Design document.



Source: Esri, ArcGIS Online, World Imagery, 2022







West Lake Landfill  
Bridgeton, Missouri

**Figure 5**  
Permits Associated With Areas  
Deferred to the State of Missouri


**TETRA TECH**

D:\Application\_Data\Region7\West\_Lake\Projects\Pro\West\_Lake\_Figures.aprx

**Legend**

-  Permit 118906R
-  Permit 218903R
-  Permit 118909R
-  Updated West Lake Landfill Site Boundary
-  Permit 118912R
-  Permit 218912

Historical Permit Limits from the Waste Limits Investigation Summary Report, dated July 14, 2011 by Aquaterra Environmental Solutions, Inc. and initially drawn by Midwest Environmental Consultants dated 12/95.