



Annual Inspection Report Lawrence Energy Center Industrial Landfill #0847

Prepared for:

Westar Company

Lawrence Energy Center

Lawrence, Kansas

Prepared by:

CB&I Environmental & Infrastructure, Inc.

January 2017



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CCR Regulatory Requirements

USEPA CCR Rule Criteria 40 CFR §257.84	Lawrence Energy Center (LEC) Annual Inspection Report
<p>§257.84(b)(1)(i) stipulates:</p> <p><i>“(b) Annual inspections by a qualified professional engineer. (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:</i></p> <p style="padding-left: 40px;"><i>(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections)”</i></p>	<p>Section 3.0</p>
<p>§257.84(b)(1)(ii) stipulates:</p> <p><i>“(b) Annual inspections by a qualified professional engineer. (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:</i></p> <p style="padding-left: 40px;"><i>(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.”</i></p>	<p>Section 4.0</p>



USEPA CCR Rule Criteria 40 CFR §257.84	Lawrence Energy Center (LEC) Annual Inspection Report
<p>§257.84(b)(2)(i) stipulates:</p> <p><i>“(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:</i></p> <p style="padding-left: 40px;"><i>(i) Any changes in geometry of the structure since the previous annual inspection;”</i></p>	<p style="text-align: center;">Section 5.1</p>
<p>§257.84(b)(2)(ii) stipulates:</p> <p><i>“(ii) The approximate volume of CCR contained in the unit at the time of the inspection;”</i></p>	<p style="text-align: center;">Section 5.2</p>
<p>§257.84(b)(2)(iii) stipulates:</p> <p><i>“(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit;”</i></p>	<p style="text-align: center;">Section 5.3</p>
<p>§257.84(b)(2)(iv) stipulates:</p> <p><i>“(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.”</i></p>	<p style="text-align: center;">Section 5.4</p>



USEPA CCR Rule Criteria 40 CFR §257.84	Lawrence Energy Center (LEC) Annual Inspection Report
<p>§257.84(b)(4) stipulates:</p> <p><i>(4) Frequency of inspections. The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(9).</i></p>	<p>Section 1.0</p>
<p>§257.84(b)(5) stipulates:</p> <p><i>"(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken."</i></p>	<p>Section 6.0</p>
<p>§257.84(c) stipulates:</p> <p><i>"(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g)."</i></p>	<p>Sections 7.0</p>



1.0 INTRODUCTION

CB&I Environmental and Infrastructure, Inc. (CB&I) has prepared the following Annual Inspection Report (Report) at the request of Westar Energy (Westar) for the Industrial Landfill No. 0847 (Landfill) located at the Lawrence Energy Center (LEC) in Lawrence, Kansas. LEC is a coal-fired power plant that was initially commissioned in 1938. The Landfill has been deemed to be a regulated coal combustion residual (CCR) unit by the United States Environmental Protection Agency (USEPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) 40 CFR 257 and §261.

In support of compliance to the CCR Rule, Mr. Richard Southorn (a qualified professional engineer with CB&I) conducted an annual site inspection of the Landfill on November 30th 2016. Prior to inspection, CB&I personnel reviewed the relevant portions of the facility's operating record and 2015 annual inspection report in relation to this Report, under the direct supervision of Mr. Southorn. This Report meets the requirements set forth within 40 CFR §257.84(b)(1) and (b)(2) based the review of available information and visual observation, to evaluate if the design, construction, operation, and maintenance of the Landfill is consistent with good engineering standards. The annual landfill inspection has been conducted and completed in compliance with the frequency of inspection timeframe set forth in §257.84(b)(4).

2.0 LEC LANDFILL OVERVIEW

Westar owns and operates an industrial landfill at LEC near Lawrence, Douglas County, Kansas. LEC resides in Section 14, Township 12 South, Range 19 East. The Landfill is located on the east side of LEC. The Landfill is surrounded by the Kansas River to the north, the Burlington Northern and Santa Fe railway along the north and east, prairies and industrial buildings to the south, and the LEC power plant to the west. The location of the Landfill is depicted in **Figure 1**.

The Landfill is divided into eight cells designated Cell 1 through Cell 8. Phased construction at the Landfill will occur in numerical order. Cell 1 is approximately 13.8 acres within the northwest corner of the permitted Landfill boundary. Cell 1 shares a border with a closed landfill adjacent to Cell 1. The closed landfill is permitted under KDHE-BWM Permit No. 0333. Portions of Cell 1 along the western boundary have been closed in accordance with the existing permits.

The eastern portion of Cell 1 as well as Cells 2 and 3 are currently operational and actively accepting CCR material. Cells 2 and 3 are 6.5 acres and 5.2 acres respectively, located east of Cell 1. Cells 4 through 8 will become operational as active cells achieve permitted elevations. In total, the completed Landfill will be approximately 57.3 acres. Phased construction of the cells will continue at the Landfill until all cells are completed and closed in accordance with current CCR regulations. Existing site topography is depicted in **Figure 2**.

CCR material is transported to the active portion of the Landfill, where it is discharged and graded by dozers and compacted. Periodic dozing of the CCR material will occur as needed, within the active area to maintain a relatively uniform grade. The CCR material will be wetted prior to the final cover placement and will form a hardened surface as it dries.



3.0 REVIEW OF AVAILABLE INFORMATION

Prior to the on-site inspection, Mr. Southorn reviewed the available information for the Lawrence Landfill as provided by Westar:

- ❑ Kansas Department of Health and Environment – Bureau of Waste Management (KDHE-BWM) Industrial Landfill Permit No. 0847, October 15, 2015.
- ❑ Lawrence Energy Center Weekly Inspection Reports, October 2015 through November 2016.
- ❑ Lawrence Energy Center Annual Landfill Inspection – 2015, Blackstone Environmental, January 15, 2016.

Mr. Southorn verified the available information during the on-site inspection on November 30th 2016.

3.1 Summary of Weekly Inspection Reports

A review of the weekly inspection reports indicate minor erosion and vegetation maintenance along landfill side slopes, primarily due to monitoring well installations. These issues were resolved immediately following the completion of monitoring well installation. Progressive vegetation monitoring and maintenance occurs on a weekly basis at the Landfill.

3.2 Summary of Previous Annual Inspection Report

Based on a review of the 2015 annual inspection report, it was determined that the Landfill was in good working order. The active landfilling area was properly grade and all stormwater conveyance features were functioning as designed. It was concluded that the landfill procedures have not deviated from the operational plan for the landfill and that the layout and grading processes for Lawrence Landfill are consistent with the design.



4.0 INSPECTION SUMMARY

During the on-site inspection, Mr. Southorn focused on geotechnical signs of distress or malfunction such as slumping at the toe of slopes, tensile cracking, abnormal or excessive erosion on the side slopes or stormwater management facilities slope bulging, and groundwater/surface water seepage or ponding. These visual signs are potential indicators of structural weakness of the CCR Landfill.

4.1 Visual Signs of Distress or Malfunction

Based on observations noted during the on-site inspection, there are no visual signs of distress or malfunction. Slope appearance, slope stability, and overall site conditions were assessed. Closed portions of the Lawrence Landfill exhibited well-established and maintained vegetative cover.

4.2 Review of Environmental Control Systems

Environmental control systems at Lawrence Landfill are functioning as designed. Stormwater and contact water management systems are in good operating condition and functioning as designed. Additional riprap is suggested to be installed at Outfall 006 due to the potential high flow conditions. Photograph 24 depicts the discharge location at Outfall 006.

5.0 CONCLUSIONS

Based on a review of the available facility information and on-site inspection, the following conclusions were developed:

5.1 Changes in Geometry

As of the date of this inspection, the Landfill is actively accepting CCR material in Cells 1, 2 and 3 of the 847 permitted area. Changes in geometry were evaluated by comparing topographic information from the 2015 Annual Landfill Inspection Report and the latest survey conducted in June 2016. Changes in geometry of the Landfill since the previous annual inspection consist of CCR placement Cells 1, 2 and 3. Minor grading has occurred in this area to promote positive drainage of stormwater in these areas.

5.2 CCR Volume

The total permitted disposal capacity for the Lawrence Landfill is 4,868,578 cubic yards (cy), as stated in the 2015 Annual Landfill Inspection Report. Based on the most recent survey, the remaining capacity was estimated at approximately 3,339,911 cy. The volume of CCR material contained within the Fly Ash Area 1 Landfill is approximately 1,528,667 cy. As detailed in the 2015 Annual report, the average fill rate for the Landfill has been previously been reported to be 68,288 tons per year (tons/yr) of CCR material (fly ash, bottom ash, and FGD). Based on the fill rate, it is estimated that the Lawrence Landfill has a remaining operational life of approximately 51 years.

5.3 Structural Weakness and Disrupting Conditions

At the time of this inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness at the Lawrence Landfill.



5.4 Changes Affecting Stability and Operations

There have been no changes to the Landfill that pose a threat or concern to the stability of the landform. Landfill operations and maintenance have not deviated from the original designed plan.

6.0 RECOMMENDATIONS

Based on the on-site inspection performed on November 30th 2016, CB&I recommend the following actions:

- Install additional riprap as necessary at Outfall 006 (see Photograph 24).
- Continue to monitor erosion controls and vegetative cover in line with the weekly inspections.
- Continue to monitor animal burrows.
- Continue proper management of the active landfill areas.
- Continue to monitor all stormwater conveyance features for signs of erosion or malfunction in line with weekly inspections.



7.0 RECORDS RETENTION AND MAINTENANCE

7.1 Incorporation of Plan into Operating Record

§257.105(g) of 40 CFR Part §257 provides record keeping requirements to ensure that this Plan will be placed in the facility's operating record. Specifically, §257.105(g) stipulates:

§257.105(g): "(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information, as it becomes available, in the facility's operating record: (9) The periodic inspection report as required by §257.84(b)(2)."

This Report will be placed within the Facility Operating Record upon Westar's review and approval.

7.2 Notification Requirements

§257.106(g) of 40 CFR Part §257 provides guidelines for the notification of the availability of the initial and periodic plan. Specifically, §257.106(g) stipulates:

§257.106(g): (g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must notify the State Director and/or appropriate Tribal authority when information has been placed in the operating record and on the owner or operator's publicly accessible internet site. The owner or operator must: (7) Provide notification of the availability of the periodic inspection reports specified under §257.105(g)(9)."

The State Director and appropriate Tribal Authority will be notified upon placement of this Plan in the Facility Operating Record.

§257.107(g) of 40 CFR Part §257 provides publicly accessible Internet site requirements to ensure that this Plan is accessible through the Westar Energy webpage. Specifically, §257.107(g) stipulates:

§257.107(g): (g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site: (7) The periodic inspection reports specified under §257.105(g)(9)."

This Plan will be uploaded to Westar Energy's CCR Compliance reporting Website upon Westar's review and approval.



8.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined the Lawrence Energy Center or has supervised examination of the Lawrence Energy Center by appropriately qualified personnel. I hereby certify based on a review of available information within the facility's operating records and observations from my personal on-site inspection (including the photographs contained in **Appendix A**), that the Lawrence Landfill does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the Lawrence Energy Center CCR Unit. The unit is being operated and maintained consistent with recognized and generally accepted good engineering standards and practices. This certification was prepared as required by 40 CFR Part §257.84(b).

Name of Professional Engineer: Richard Southorn

Company: CB&I

Signature: 

Date: Jan 12, 2017

PE Registration State: Kansas

PE Registration Number: PE25201

Professional Engineer Seal:

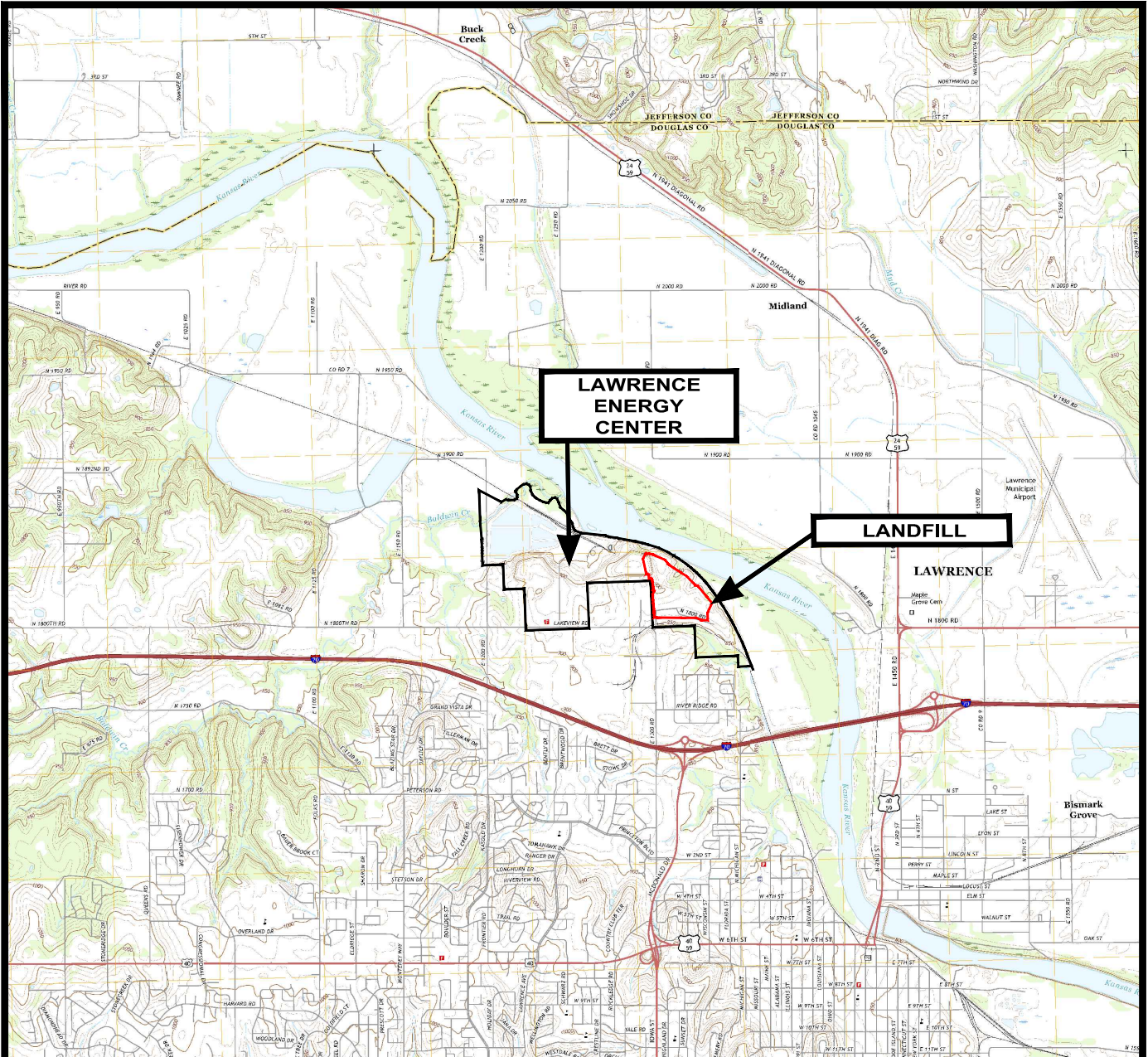


FIGURES

Figure 1 - Lawrence Landfill, Site Location Plan

Figure 2 - Lawrence Landfill, Existing Site Topography

Figure 3 - Lawrence Landfill, Photo Log Plan View

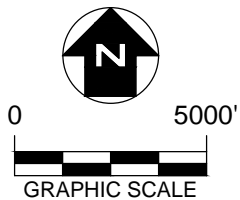


LEGEND

- LAWRENCE ENERGY CENTER FACILITY BOUNDARY
- CCR UNIT BOUNDARY

NOTES

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, LAWRENCE EAST, LAWRENCE WEST, MIDLAND AND WILLIAMSTOWN QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE.



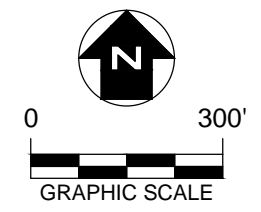
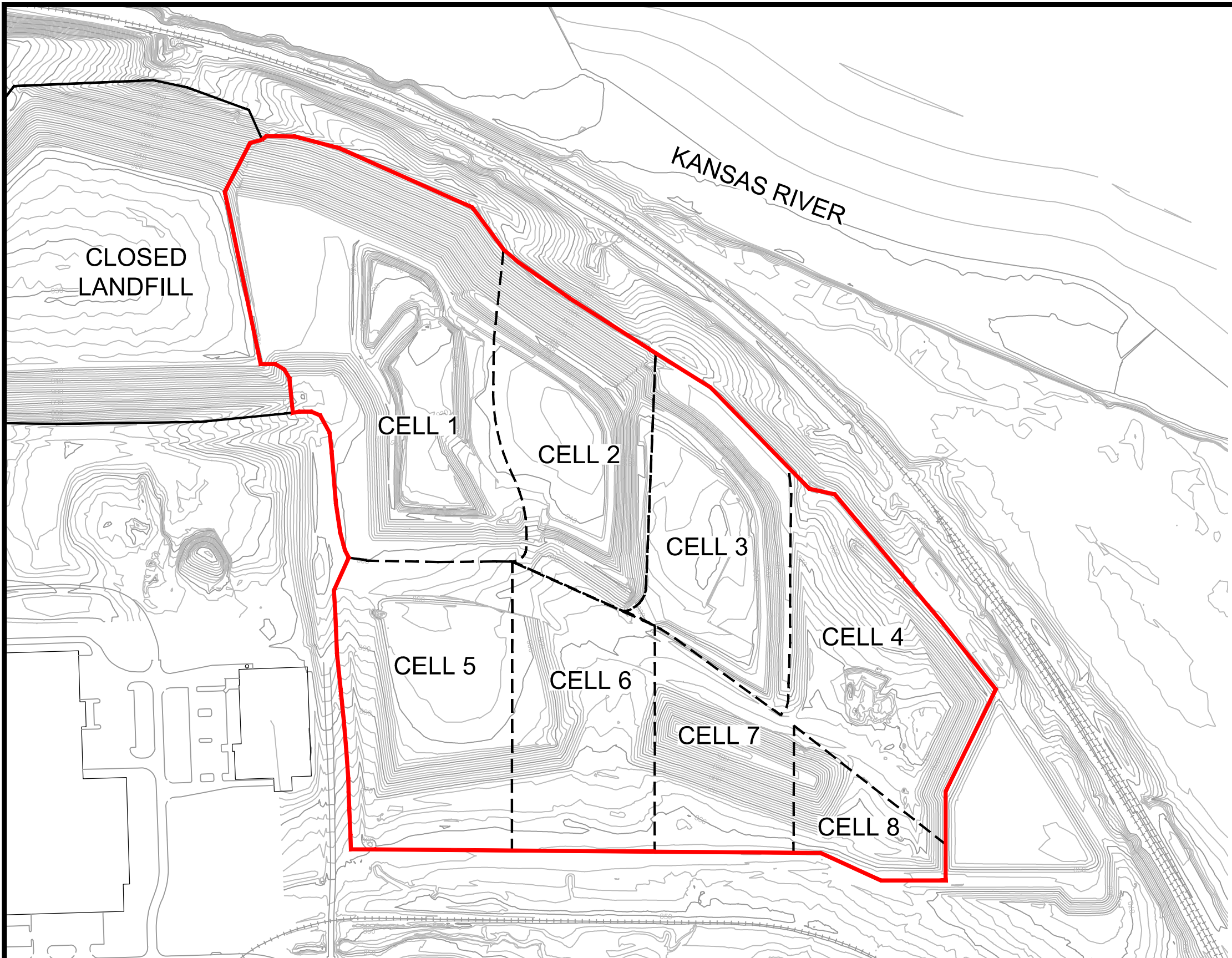
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**LAWRENCE ENERGY CENTER
1250 N. 1800 RD., LAWRENCE, KS.**

**FIGURE 1
LAWRENCE LANDFILL
SITE LOCATION PLAN**

APPROVED BY: RDS PROJ. NO.: 631214397 DATE: JANUARY 2017




LEGEND

- CCR UNIT BOUNDARY
- - - - - LANDFILL CELL BOUNDARY

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. CCR UNIT BOUNDARY IS APPROX. 57.3 ACRES.
4. ALL BOUNDARIES ARE APPROXIMATE.

REV. NO.	DATE	DESCRIPTION



CB&I Environmental & Infrastructure, Inc.

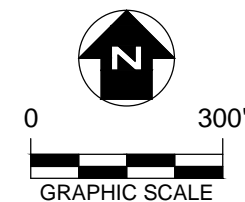
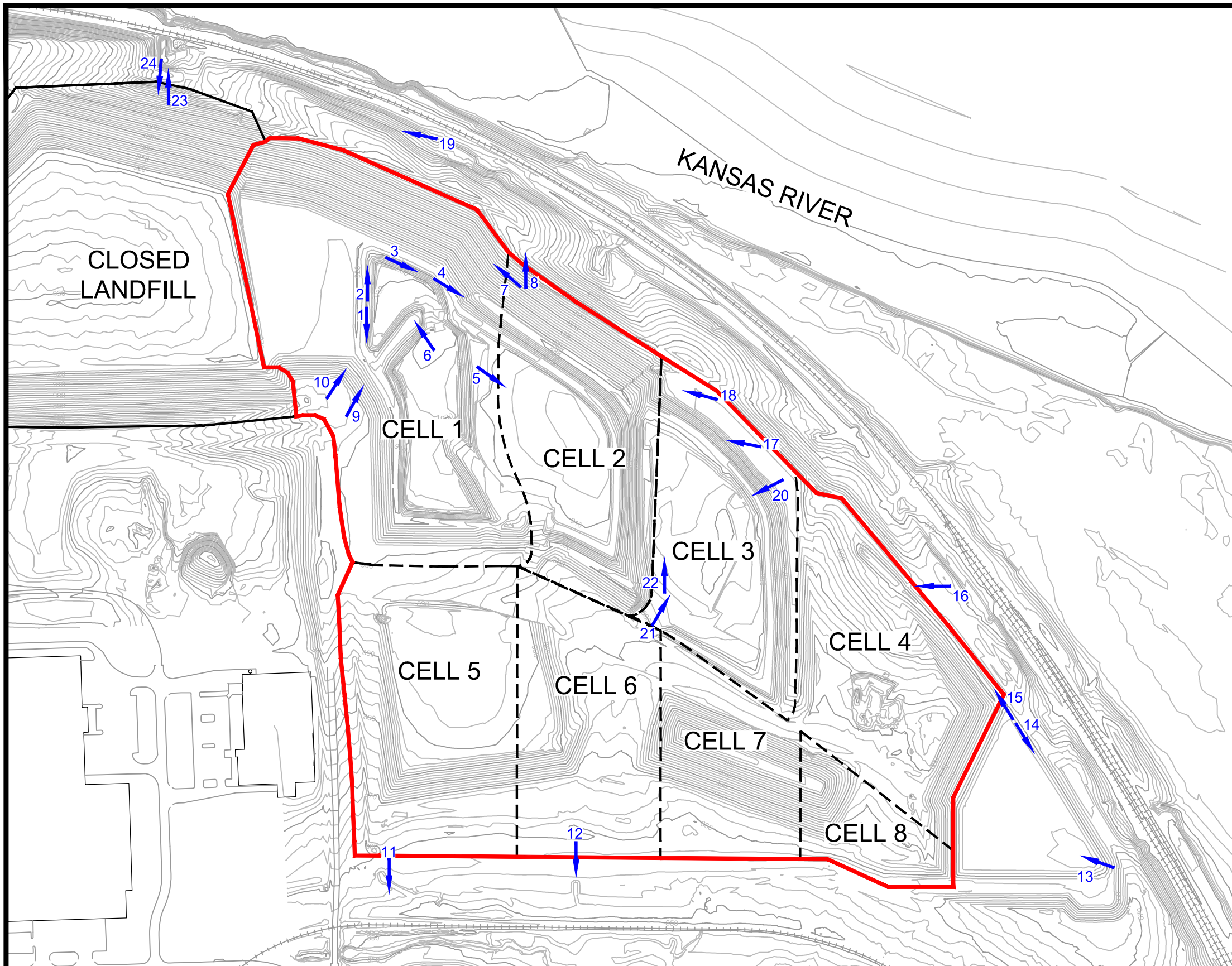
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**LAWRENCE ENERGY CENTER
1250 N 1800 RD., LAWRENCE, KANSAS**

**FIGURE 2
LAWRENCE LANDFILL
EXISTING SITE TOPOGRAPHY**

DRAWN BY:	NV	APPROVED BY:	RDS	PROJ. NO.:	631214397	DATE:	JANUARY 2017
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LEGEND

- CCR UNIT BOUNDARY
- - - LANDFILL CELL BOUNDARY

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. CCR UNIT BOUNDARY IS APPROX. 57.3 ACRES.
4. ALL BOUNDARIES ARE APPROXIMATE.
5. REFER TO APPENDIX A FOR PHOTOGRAPHIC DOCUMENTATION.

REV. NO.	DATE	DESCRIPTION



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**FIGURE 3
LAWRENCE LANDFILL
PHOTO LOG PLAN VIEW**

DRAWN BY:	NV	APPROVED BY:	RDS	PROJ. NO.:	631214397	DATE:	JANUARY 2017
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APPENDIX A

Annual Inspection Photo Log





<p>Photograph No. 1</p> <p>Date: November 30, 2016</p> <p>Direction: South</p>	
<p>Description: Observing the newly constructed berm and erosion control blanket. No evidence of tensile cracking.</p>	

<p>Photograph No. 2</p> <p>Date: November 30, 2016</p> <p>Direction: North</p>	
<p>Description: Observing the newly constructed berm and erosion control blanket. No evidence of tensile cracking.</p>	



<p>Photograph No. 3</p> <p>Date: November 30, 2016</p> <p>Direction: East</p>	
<p>Description: Observing the newly constructed berm and erosion control blanket. No evidence of tensile cracking.</p>	


<p>Photograph No. 4</p> <p>Date: November 30, 2016</p> <p>Direction: East</p>	
<p>Description: Observing the newly constructed berm and erosion control blanket. Cell 2 is pictured in the background.</p>	



<p>Photograph No. 5</p> <p>Date: November 30, 2016</p> <p>Direction: Southeast</p>	
<p>Description: Observing the active area within Cell 2. No evidence of ponding or airborne dust particles.</p>	

<p>Photograph No. 6</p> <p>Date: November 30, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Contact water wick drain located within Cell 1.</p>	



<p>Photograph No. 7</p> <p>Date: November 30, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Observing Cell 2 final cover system. Vegetation is well-established and maintained. No evidence of erosion or sloughing.</p>	

<p>Photograph No. 8</p> <p>Date: November 30, 2016</p> <p>Direction: North</p>	
<p>Description: Observing monitoring wells at toe of slope between the landfill and the Kansas River.</p>	



<p>Photograph No. 9</p> <p>Date: November 30, 2016</p> <p>Direction: Northeast</p>	
<p>Description: Observing the Lawrence CCR Landfill signage.</p>	


<p>Photograph No. 10</p> <p>Date: November 30, 2016</p> <p>Direction: Northeast</p>	
<p>Description: Observing the stormwater discharge structure at Cell 1. No evidence of erosion or malfunction.</p>	




<p>Photograph No. 11</p> <p>Date: November 30, 2016</p> <p>Direction: South</p>	
<p>Description: Observing a monitoring well along the eastern border.</p>	


<p>Photograph No. 12</p> <p>Date: November 30, 2016</p> <p>Direction: South</p>	
<p>Description: Signage designating Outfall 017 along the southern border.</p>	



<p>Photograph No. 13</p> <p>Date: November 30, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Overview of the contact water basin.</p>	

<p>Photograph No. 14</p> <p>Date: November 30, 2016</p> <p>Direction: Southeast</p>	
<p>Description: Observing the contact water basin liner system with leak detection. No evidence of leaks or malfunctions.</p>	




<p>Photograph No. 15</p> <p>Date: November 30, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Observing the inlet of contact water basin. No evidence of erosion or malfunction.</p>	


<p>Photograph No. 16</p> <p>Date: November 30, 2016</p> <p>Direction: West</p>	
<p>Description: Observing a monitoring well located along the eastern border.</p>	



<p>Photograph No. 17</p> <p>Date: November 30, 2016</p> <p>Direction: West</p>	
<p>Description: Overview of the transition of closed to active areas between Cells 2 and 3, respectively.</p>	

<p>Photograph No. 18</p> <p>Date: November 30, 2016</p> <p>Direction: West</p>	
<p>Description: Observing the final cover at Cell 2. Vegetation is well-established and maintained. No evidence of erosion or sloughing.</p>	



<p>Photograph No. 19</p> <p>Date: November 30, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Observing the exterior berm at Cell 3. Vegetation is well-established and maintained. No evidence of erosion or sloughing.</p>	

<p>Photograph No. 20</p> <p>Date: November 30, 2016</p> <p>Direction: Southwest</p>	
<p>Description: Observing a wick drain located within Cell 3.</p>	



<p>Photograph No. 21</p> <p>Date: November 30, 2016</p> <p>Direction: Northeast</p>	
<p>Description: Observing active filling operations at Cell 3. No evidence of ponding or airborne dust particles.</p>	

<p>Photograph No. 22</p> <p>Date: November 30, 2016</p> <p>Direction: North</p>	
<p>Description: Observing active filling operations at Cell 3. No evidence of ponding or airborne dust particles.</p>	



<p>Photograph No. 23</p> <p>Date: November 30, 2016</p> <p>Direction: North</p>	
<p>Description: Observing Outfall 006 under railroad tracks along the northern border.</p>	

<p>Photograph No. 24</p> <p>Date: November 30, 2016</p> <p>Direction: Southwest</p>	
<p>Description: Recently-lined landfill stormwater pipe located above groundwater outlet pipe, discharging to riprap apron. Riprap apron to be expanded to prevent wash-out.</p>	