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**BRIDGETON LANDFILL LLC.**

**CONSTRUCTION QUALITY ASSURANCE  
ACCEPTANCE REPORT**

**2019 GCCS IMPROVEMENTS**

**BRIDGETON, ST. LOUIS COUNTY, MISSOURI**

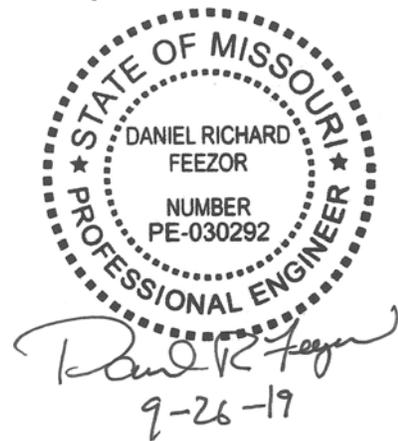
**Prepared For:  
Bridgeton Landfill LLC.  
13570 St. Charles Rock Road  
Bridgeton, MO 63044**

**SEPTEMBER 2019**

**Project No: BT-143-19**

**Prepared By:**

**Feezor Engineering, Inc.  
3377 Hollenberg Drive  
Bridgeton, MO 63044**



**CONSTRUCTION QUALITY ASSURANCE  
ACCEPTANCE REPORT**

**2019 GCCS IMPROVEMENTS**

**BRIDGETON LANDFILL, LLC**

**BRIDGETON, SAINT LOUIS COUNTY, MISSOURI**

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BT-143-19

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# 1 INTRODUCTION

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## 1.1 Overview of Project

Bridgeton Landfill, LLC is a closed municipal solid waste facility located at 13570 St. Charles Rock Road, Bridgeton, St. Louis County, Missouri. The facility is owned and operated by Bridgeton Landfill, LLC (BL) who operate the facility pursuant to Permit No 118912 (and subsequent modifications), issued by the Missouri Department of Natural Resources (MDNR).

During the 2019 construction season, BL installed (9) nine additional gas extraction wells. Recovery Drilling Service (RDS) of Dudley, MA was selected as the driller for the project. Hunt Environmental Services of St. Louis, MO, Fusion Solutions Inc. of Carlinville, IL and Sharp Services STL of St. Louis, MO were chosen to provide support and piping installation during the project. Feezor Engineering Inc. (FEI) of Bridgeton, MO, provided the initial and record surveying to document the location of the installed gas extraction wells and associated GCCS piping.

FEI was also selected as the Construction Quality Assurance (CQA) consultant to observe and document the construction of the GCCS upgrades. Daniel R. Feezor, P.E. of FEI was the Construction Quality Assurance Officer (CQAO). Mr. Feezor selected Bill Abernathy and Arron Webber to be the CQA technicians.

## 2 CONSTRUCTION DOCUMENTS

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### 2.1 Construction Drawings

FEI created a detailed set of construction drawings for this project. These drawings provided the detail to properly construct all the necessary project components. Construction drawings were also used for the proper selection of materials and provided adequate detail for the installation of the GCCS upgrades.

### 3.1 New Landfill Gas Extraction Wells Installation

Nine (9) new gas wells were installed throughout areas of the landfill to enhance landfill gas collection. RDS drilled the wells using a Soilmec SR-30 drill rig with a core barrel bucket. FEI observed and documented the drilling process including but not limited to logging of waste depth, temperature and composition. Daily Field Reports can be found in **Appendix A.1**.

Well piping consisted of 12" SDR-11 HDPE solid and perforated piping. The pipe sections were butt-fused together by Fusion Solutions. A low-pressure HDPE cap was installed at the bottom of each well casing and a pre-fabricated 12" flanged lid on the top of each well casing prior to installation.

The pipe was raised using a winch on the drill rig and lowered into the borehole to the appropriate depth. Granular backfill consisting of three-quarter (3/4) inch to two (2) inch diameter washed non-carbonate gravel was placed in the borehole around the perforated pipe. A single-axle dump truck transported the gravel to the well location and placed it into the borehole. The gravel was placed to a point generally about two feet above the perforated pipe. A geonet donut was then placed over the aggregate to prevent migration of fines into the collection aggregate. Before the bentonite was added, one (1) foot of clean soil was used as a plug. A two (2) foot bentonite seal was then placed above the soil plug. Water was added to the layers of bentonite to adequately hydrate the seal. Cover soil was then placed over the bentonite layer followed by another two (2) foot hydrated bentonite seal. A two (2) foot layer of clean soil was then placed above the upper bentonite seal. The remainder of the borehole was backfilled with a three (3) foot plug of sealant foam to the existing ground surface.

The as-built well depths and well construction details are shown on the as-built well logs in **Appendix B.1**.

The gradation for the gas well collection aggregate is included in **Appendix B.2**.

A three (3) inch diameter well head was installed and connected to the gas header system via lateral piping by Fusion Solutions Inc.

### 3.2 Construction Quality Assurance

#### 3.2.1 Construction Oversight

The construction technician inspected all materials for the gas collection system. This included piping, valves, fittings, and backfill material to ensure that these materials were acceptable and consistent with the construction plans. The construction technician inspected the materials to be constructed of HDPE pipe to determine if the materials meet the following requirements:

- All HDPE pipe was new, or first quality, and was furnished at lengths as indicated on the approved design plans. All HDPE piping was straight throughout its length and generally free from imperfections.
- The HDPE pipe and fittings had a minimum Standard Dimension Ratio (SDR) as noted on the design plans.

During installation of the landfill gas collection system enhancements, the construction technician documented that the construction adhered to the plans and specifications. This included:

- Pipe and appurtenances were installed true to line, grade, and location with the pipe supported and restrained against movement with all valve stems plumb.
- The pipe joints, except where flanged joints or electro-fusion couplers were specified on the approved design plans, were butt fused as recommended by the pipe manufacturer. All shavings from the preparation of pipe ends for fusion were removed from the pipe prior to installation.

During storage, the technician documented that pipes and fittings were stacked so as to prevent damage by marring, crushing or puncture. Maximum stacking height was limited to 6 feet.

The technician recorded applicable test data, areas of construction, problems and remedies, construction equipment and methodologies, survey data, and equipment calibration on the Daily Summary Reports and the Daily Inspection Reports, included herein as **Appendix A.1**.

## 4 FIBERGLASS WELL CASING INSTALLATION

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### 4.1 Fiberglass Well Casing

During the 2019 GCCS installation process, an alternate well casing material (12" Fiberglass) was attempted at the original proposed location of GEW-234. Due to the increased installation time and other factors, the borehole became unviable and it was decided to relocate GEW-234 to a new location. As the use of fiberglass was unsuccessful, the standard 12" HDPE material was used at the new location.

The original borehole was physically abandoned by Bulldog Drilling. Both the fiberglass casing pipe and annular space were grouted with cement. The casing pipe was grouted up to the existing ground surface and the annular space up to 11' below ground surface (bgs). Once grouting was complete, the annular space was backfilled with a 2' bentonite plug, followed by compacted soil up to 7' bgs. Another seal comprised of sealing foam was then installed above the compacted soil with the remaining annular space being backfilled with compacted soil up to the existing ground surface. Additionally, a safety wire grate was installed during backfill at 3' bgs and also at 0.5' bgs.

The technician recorded applicable test data, areas of construction, problems and remedies, construction equipment and methodologies, survey data, and equipment calibration on the Daily Summary Reports and the Daily Inspection Reports, included herein as **Appendix A.1**.

**5.1 Construction Surveying**

Feezor Engineering Inc. of Bridgeton, Missouri, provided surveying services.

**5.2 Final As-built Surveying**

Feezor Engineering Inc. of Bridgeton, Missouri provided the final certification survey for the as-built coordinates of the installed Gas Extraction Wells.

## 6 CERTIFICATION

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I, Daniel R. Feezor, P.E., do hereby certify to my best knowledge and belief, that the 2019 GCCS Improvements at the Bridgeton Landfill were constructed in accordance with the construction documents.

## **Appendix A**

### **FIELD INFORMATION**

#### **Sub-Appendices**

**A.1** Daily Summary Reports

**A.2** Equipment List

## **Sub-Appendix A.1**

### **Daily Summary Reports**

**Feezor Engineering, Inc.**  
406 E. Walnut St.  
Chatham, IL 62629  
(217) 483-3118



**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/16/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>1</u>
<b>Weather:</b> AM <u>Cloudy</u> PM _____	
<b>Temperature:</b> AM <u>74 F</u> PM _____	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0512 – Bill Abernathy arrives on-site. RDS rig positioned at GEW-234 location. Verify staked survey info, evaluate specs of 1/8" x 1/4" gap-graded stone against milled slots in fiberglass well casing.
- 0610 - Daily safety meeting held in back of office.
- 0706 - Begin drilling GEW-234. Temps measured at 5-ft intervals. Liquid & granular odor control products used during drilling. Odor Boss running.
- 1031 - GEW-234 drilling suspended while harness blocks are repositioned.
- 1120 - Drilling resumed.
- 1414 - GEW-234 drilling completed. Final drilled depth = 125 ft. Fiberglass well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1500 - Bottom 20-ft section of well screen lifted by rig, lowered into wellbore, and suspended.
- 1533 - 20-ft section of solid fiberglass well casing lifted by rig and threaded onto bottom section; 40-ft casing string lowered into wellbore and suspended.
- 1610 - 20-ft section of well screen lifted by rig and threaded onto string; 60-ft casing string lowered into wellbore and suspended.
- 1632 - 20-ft section of well screen lifted by rig and threaded onto string; 80-ft casing string lowered into wellbore and suspended.
- 1652 - 20-ft section of well screen lifted by rig and threaded onto string; 100-ft casing string lowered into wellbore and suspended.
- 1715 - Flange piece threaded onto suspended casing string.
- 1719 - 20-ft section of solid HDPE casing lifted by rig and bolted onto flange piece; 120-ft casing string lowered into wellbore and suspended.
- 1747 - Blind flange bolted onto top of solid HDPE casing; begin backfilling annulus with 1/8" x 1/4" stone.
- 1830 - Stone has bridged after 2 of 4.5 loads emplaced. Reviewing next steps.
- 2000 - Fusion buttoning up wellbore while working toward a plan of action for tomorrow.
- 2035 - BA off-site.

Copies To: Erin Fanning, Dan Feezor

FEI Representative:

A handwritten signature in blue ink, appearing to read "Mike J. [unclear]", is written over the "FEI Representative:" label.

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<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/17/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>2</u>
<b>Weather:</b> AM <u>          </u> Rain <u>          </u> PM <u>          </u>	
<b>Temperature:</b> AM <u>          </u> 77 F <u>          </u> PM <u>          </u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0737 – Bill Abernathy arrives on-site. RDS rig at GEW-234 location.
- 0810 - Daily safety meeting held in back of office.
- 0902 - Meeting at GEW-234 to discuss, observe, document approach to rectify bridging issue.
- 1013 - Attempting to vac out bridged stone with 6" vac truck suction hose, but causes additional sloughing of clay & gravel into annulus from upper subsurface horizon.
- 1132 - HES fabricates a combo suction line (2" suction line and guide rod).
- 1248 - Stone vacuumed from annulus down to 37-38 ft, still 2-3 ft above clay plug or viscous liquid believed responsible for bridging of small stone.
- 1426 - Vac truck off-site.
- 1615 - Vac truck back on-site, resumes vacuuming of annulus.
- 1910 - Vacuuming activities at 40 ft (top of clay plug). Unable to advance suction line or 2" HDPE pipe probe any deeper. Fusion begins buttoning up hole.
- 1929 - BA off-site.

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**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/18/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>3</u>
<b>Weather:</b> AM <u>Cloudy</u> PM <u></u>	
<b>Temperature:</b> AM <u>80 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0652 – Bill Abernathy arrives on-site.
- 0710 - Daily safety meeting held in back of office.
- 0730 - Fusion swaps out hole cover at GEW-234, preps to use stainless steel pipe to probe annular plug. RDS rig moves to GEW-235 location. BA verifies staked survey info with Dan Feezor.
- 0900 - Stainless steel pipe used to penetrate through about 4 feet of clay in GEW-234 annulus. Tip of pipe unthreaded, depth to leachate tagged through 3" ss pipe.
- 1002 - Begin drilling GEW-235. Temps measured at 5-ft intervals. Odor control products used, Odor Boss activated.
- 1323 - GEW-235 drilling completed. Final drilled depth = 85 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1356 - Bottom 20-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1408 - 20-ft section of solid HDPE well casing lifted by rig and bolted onto bottom section; 40-ft casing string lowered into wellbore and suspended.
- 1450 - 40-ft section of HDPE casing (lower half perforated) lifted by rig and bolted onto string; 80-ft casing string lowered into wellbore and suspended.
- 1500 - Casing string strapped down to blocks to hinder buoyancy.
- 1538 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-235 annulus with 2-3/4" x 1" (Large B) stone.
- 1650 - Stone backfilling activities completed. Buttoning up hole to allow for rock pack settling overnight.
- 1730 - BA off-site.

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<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/19/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>4</u>
<b>Weather:</b> AM <u>M. Cloudy</u> PM _____	
<b>Temperature:</b> AM <u>76 F</u> PM _____	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0634 – Bill Abernathy arrives on-site.
- 0710 - Daily safety meeting held in back of office.
- 0733 - RDS moving rig to GEW-233 location, Fusion prepping to finish GEW-235 backfill. BA verifies staked survey info for GEW-233 with Dan Feezor.
- 0858 - Topping off GEW-235 backfill with soil up to ground surface after emplacing a geocomposite “donut” on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a plug of sealing foam (3 ft thick after expanding/hardening).
- 0927 - Begin drilling GEW-233. Temps at 5-ft intervals, odor control products used, Odor Boss activated.
- 1050 - GEW-233 drilling completed. Final drilled depth = 54 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1128 - Bottom 30-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1137 - 20-ft section of solid HDPE well casing lifted by rig and bolted onto bottom section; 50-ft casing string lowered into wellbore and suspended.
- 1145 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-233 annulus with 2-3/4” x 1” (Large B) stone.
- 1251 - Topping off GEW-233 backfill with soil up to ground surface after emplacing the “donut” on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam. RDS moving rig to GEW-238 location; BA verifies staked survey info with Dan Feezor.
- 1352 - Begin drilling GEW-238. Temps at 5-ft intervals, odor control products used, Odor Boss operating.
- 1613 - GEW-238 drilling completed. Final drilled depth = 85 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1645 - Bottom 40-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1700 - 40-ft section of HDPE well casing (lower half perforated) lifted by rig and bolted onto bottom section; 80-ft casing string lowered into wellbore and suspended.
- 1728 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-238 annulus with 2-3/4” x 1” (Large B) stone.

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- 1832 - Topping off GEW-238 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam.
- 1850 - BA off-site.

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Page: 1 of 1

### Daily Field Summary Report

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<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/20/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>5</u>
<b>Weather:</b> AM <u>M. Cloudy</u> PM <u></u>	
<b>Temperature:</b> AM <u>80 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0645 – Bill Abernathy arrives on-site.
- 0710 - Daily safety meeting held in back of office.
- 0730 - RDS rig moves to GEW-237 location. BA verifies staked survey info with Dan Feezor.
- 0850 - Begin drilling GEW-237. Temps at 5-ft intervals, odor control products used, Odor Boss activated.
- 1110 - GEW-237 drilling completed. Final drilled depth = 85 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1141 - Bottom 40-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1155 - 40-ft section of HDPE well casing (lower half perforated) lifted by rig and bolted onto bottom section; 80-ft casing string lowered into wellbore and suspended.
- 1208 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-237 annulus with 2-3/4" x 1" (Large B) stone.
- 1309 - Topping off GEW-237 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam.
- 1328 - Lightning watch in effect – everyone off the hill.
- 1437 - Lightning watch cleared.
- 1447 - Lightning watch in effect again.
- 1519 - Lightning watch cleared. Project activities ended for the day.
- 1540 - BA off-site.

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<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/21/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>6</u>
<b>Weather:</b> AM <u>M. Cloudy</u> PM _____	
<b>Temperature:</b> AM <u>77 F</u> PM _____	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0533 – Bill Abernathy and Arron Weber arrive on-site.
- 0610 - Daily safety meeting held in back of office.
- 0620 - RDS moved rig to GEW-232 location. AW verifies staked survey info for GEW-232 with Dan Feezor.
- 0647 - Begin drilling GEW-232. Temps at 5-ft intervals, odor control products used, Odor Boss activated.
- 0708 - BA off-site for air monitoring tasks.
- 0815 - GEW-232 drilling completed. Final drilled depth = 70 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 0905 - Bottom 48-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 0917 - 20-ft section of solid HDPE well casing lifted by rig and bolted onto bottom section; 68-ft casing string lowered into wellbore and suspended.
- 0923 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-232 annulus with 2-3/4" x 1" (Large B) stone.
- 1025 - Topping off GEW-232 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam. Rig moving to GEW-239 location; AW verifies staked survey info for GEW-239 with Dan Feezor.
- 1040 - Begin drilling GEW-239. Temps at 5-ft intervals, odor control products used, Odor Boss operating.
- 1255 - GEW-239 drilling completed. Final drilled depth = 82 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1345 - Bottom 40-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1356 - 40-ft section of HDPE well casing (lower half perforated) lifted by rig and bolted onto bottom section; 80-ft casing string lowered into wellbore and suspended.
- 1400 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-239 annulus with 2-3/4" x 1" (Large B) stone.
- 1448 - Topping off GEW-239 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam. Rig moving to GEW-240 location; AW verifies staked survey info for GEW-240 with Dan Feezor.

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- 1458 - Begin drilling GEW-240. Temps at 5-ft intervals, odor control products used, Odor Boss operating.
- 1705 - GEW-240 drilling completed. Final drilled depth = 92 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1745 - Bottom 50-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1750 - 40-ft section of HDPE well casing (lower half perforated) lifted by rig and bolted onto bottom section; 90-ft casing string lowered into wellbore and suspended.
- 1755 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-240 annulus with 2-3/4" x 1" (Large B) stone.
- 1850 - Topping off GEW-240 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam.
- 1925 - AW off-site.

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FEI Representative:



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**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/22/2019</u>
<u>Recovery Drilling Service Inc. (RDS), Sharp Services (Sharp), Fusion Solutions Inc. (FSI),</u>	
<b>Contractor(s):</b> <u>Hunt Environmental Services (HES)</u>	<b>Report No.:</b> <u>7</u>
<b>Weather:</b> AM <u>Cloudy</u> PM <u></u>	
<b>Temperature:</b> AM <u>73 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0540 – Bill Abernathy and Arron Weber arrive on-site.
- 0610 - Daily safety meeting held in back of office.
- 0617 - RDS rig set up at GEW-236 location. AW verifies staked survey info with Dan Feezor.
- 0718 - Begin drilling GEW-236. Temps at 5-ft intervals, odor control products used, Odor Boss activated.
- 0940 - GEW-236 drilling completed. Final drilled depth = 93 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1055 - Bottom 50-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1059 - 40-ft section of HDPE well casing (lower half perforated) lifted by rig and bolted onto bottom section; 90-ft casing string lowered into wellbore and suspended.
- 1103 - Blind flange bolted onto top of solid HDPE casing; begin backfilling GEW-236 annulus with 2-3/4" x 1" (Large B) stone.
- 1200 - Topping off GEW-236 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 2 ft of soil, a second 2-ft layer of hydrated crumbles, 2 ft of soil, and a 3-ft plug of sealing foam.
- 1215 - BA off-site for air monitoring tasks.
- 1230 - AW off-site.

Copies To: Erin Fanning, Dan Feezor

FEI Representative:

*Arron Weber*

**Feezor Engineering, Inc.**  
406 E. Walnut St.  
Chatham, IL 62629  
(217) 483-3118



Page: 1 of 1

**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/23/2019</u>
<u>Bulldog Drilling, Sharp Services (Sharp), Fusion Solutions Inc. (FSI), Hunt</u>	
<b>Contractor(s):</b> <u>Environmental Services (HES)</u>	<b>Report No.:</b> <u>8</u>
<b>Weather:</b> AM <u>M. Sunny</u> PM <u></u>	
<b>Temperature:</b> AM <u>68 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0634 – Bill Abernathy arrives on-site.
- 0710 - Daily safety meeting held in back of office.
- 0720 - At GEW-234 location to assess annulus backfilling process through 3” stainless steel pipe mounted next to 12” fiberglass well casing.
- 1110 - Measurements of conditions made: 93 ft down to viscous liquid in annulus, 110 ft inside 12” casing.
- 1245 - Bulldog on-site to help assess the situation.
- 1330 - BA off-site for air monitoring tasks.
- 1600 - BA back on-site. Decide to grout annulus and inside 12” well casing up to 80 ft bgs, then emplace small stone after grout has set up.
- 1630 - BA off-site.

Copies To: Erin Fanning, Dan Feezor

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**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u>	<b>Date:</b> <u>8/24/2019</u>
<u>Bulldog Drilling, Sharp Services (Sharp), Fusion Solutions Inc. (FSI), Hunt</u>	
<b>Contractor(s):</b> <u>Environmental Services (HES)</u>	<b>Report No.:</b> <u>9</u>
<b>Weather:</b> AM <u>M. Sunny</u> PM <u></u>	
<b>Temperature:</b> AM <u>67 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0750 – Bill Abernathy arrives on-site.
- 0810 - Daily safety meeting held in back of office.
- 0930 - At GEW-234 location. Depth to annular viscous liquid = 85 ft. Bulldog unloads cement from trailer, preps area around wellbore for CME-75 set up. Will use grout pump and stock tank to mix/tremie cement grout.
- 1040 - Installing 1" tremie pipe through 3" stainless steel pipe.
- 1110 - Begin mixing cement grout.
- 1140 - Begin grouting well up to 80 ft per yesterday's plan.
- 1200 - Grouting activities suspended to allow grout time to set up before measuring depths emplaced.
- 1349 - Bulldog measurements: top of grout in annulus = 81 ft, 107 ft inside 12" well casing.
- 1410 - Pulling/disassembling tremie line.
- 1428 - Reassemble/install tremie line inside 12" casing.
- 1448 - Mix and emplace additional volume of cement grout inside 12" casing.
- 1550 - Begin trial backfill of annulus by slowly pouring small stone down 3" stainless steel pipe which extends 60 ft below ground surface.
- 1614 - Stone has bridged about 31 ft down after 5 gallons poured down the 3" pipe.
- 1657 - Vac truck used to vacuum lift small stone out of 3" pipe.
- 1732 - Small stone removed from 3" pipe. Depth to cement in annulus = 80 ft. Lower bailer to collect sample of liquid.
- 1750 - 2<sup>nd</sup> attempt to pour small stone through 3" pipe, with a fiberglass rod used to agitate rock as it's being poured, results in bridging again. Decision made to abandon well in-place and re-drill in different location.
- 1820 - Small stone again vacuum lifted out of 3" pipe by vac truck.
- 1845 - BA off-site.

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**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u> <u>RDS, Bulldog Drilling, Sharp Services (Sharp),</u> <u>Fusion Solutions Inc. (FSI), Hunt</u>	<b>Date:</b> <u>8/27/2019</u>
<b>Contractor(s):</b> <u>Environmental Services (HES)</u>	<b>Report No.:</b> <u>10</u>
<b>Weather:</b> AM <u>Cloudy</u> PM <u></u>	
<b>Temperature:</b> AM <u>74 F</u> PM <u></u>	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0630 – Bill Abernathy arrives on-site.
- 0645 - Daily safety briefing held at relocated GEW-234 drilling site. BA verifies staked survey info with Dan Feezor.
- 0703 - Begin drilling GEW-234 relocation. Temps at 5-ft intervals, odor control products used, Odor Boss activated.
- 0919 - GEW-234 drilling completed at relocated site. Final drilled depth = 89 ft. HDPE well casing being prepped. Vac box moved off of hole, hole cover positioned.
- 1012 - Bottom 40-ft section of perforated HDPE well casing lifted by rig, lowered into wellbore, and suspended.
- 1030 - 30-ft section of perforated HDPE well casing lifted by rig and bolted onto bottom section; 70-ft casing string lowered into wellbore and suspended.
- 1223 - 15-ft section of solid HDPE well casing lifted by rig and bolted onto string; 85-ft casing string lowered into wellbore and suspended.
- 1238 - Blind flange bolted onto top of solid HDPE casing; begin backfilling relocated GEW-234 annulus with ¾" x 1" gap-graded stone.
- 1344 - Topping off relocated GEW-234 backfill with soil up to ground surface after emplacing the "donut" on top of the annular rock pack, followed in order by 1 ft of soil, 2 ft of hydrated bentonite crumbles, 1 ft of soil, a second 2-ft layer of hydrated crumbles, 1 ft of soil, and a 3-ft plug of sealing foam. Bulldog on-site waiting for cement truck to begin abandonment of original GEW-234 construction.
- 1415 - Begin abandoning original GEW-234 with 6 cy of neat cement screened into stock tank and pumped via tremie into annulus.
- 1520 - Bulldog extracts tremie line then 3" stainless steel pipe out of annulus.
- 1620 - Resume abandonment activities using 6 cy of neat cement tremied into place inside the 12" casing.
- 1745 - Abandonment activities completed for the day. Bulldog buttons up area, re-establishes safety zone around original GEW-234 site.
- 1815 - BA off-site.

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FEI Representative:

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**Daily Field Summary Report**

<b>Client:</b> <u>Bridgeton Landfill, LLC</u>	<b>Job No.:</b> <u>BT-143-19</u>
<b>Project:</b> <u>2019 GCCS Updates</u>	<b>Task No.:</b> <u>CQA</u>
<b>Location:</b> <u>Bridgeton, MO</u> <u>Bulldog Drilling, Sharp Services (Sharp),</u> <u>Fusion Solutions Inc. (FSI), Hunt</u>	<b>Date:</b> <u>8/28/2019</u>
<b>Contractor(s):</b> <u>Environmental Services (HES)</u>	<b>Report No.:</b> <u>11</u>
<b>Weather:</b> AM <u>Sunny</u> PM _____	
<b>Temperature:</b> AM <u>67 F</u> PM _____	

Description of field activities (include labor, equipment, site conditions, sampling, etc.)

- 0640 – Bill Abernathy arrives on-site.
- 0710 - Daily safety briefing held in back of landfill office.
- 0840 - Bulldog checks grout levels in original GEW-234; 14 ft in annulus, 12 ft inside 12" casing.
- 0935 - Bulldog mixes hole plug grout and emplaces 200 gallons in the annulus and 80 gallons inside the 12" casing.
- 1017 - Grouting completed. Casing grouted to ground surface and up into stickup, annulus grouted up to 11 feet below ground surface.
- 1115 - BA off-site for scheduled meeting.
- 1345 - BA back on-site. Fusion cutting out liner around original GEW-234 to assess conditions. Vac truck used to suction off accumulated leachate on top of annular grout.
- 1420 - Installed 16 bags of bentonite crumbles in annulus on top of setting grout, followed by compacted soil up to 7 ft below ground surface and 4 bags of sealing foam. Once the foam set, compacted soil was emplaced up to 3 ft below ground surface and a 5 ft x 5 ft wire cage was installed around the well casing. Compacted soil was then emplaced up to 6" below ground surface and a 2<sup>nd</sup> wire cage was installed around the casing.
- 1520 - Abandonment of original GEW-234 completed.
- 1615 - BA off-site.

Copies To: Erin Fanning, Dan Feezor

FEI Representative:

## **Sub-Appendix A.2**

### **Equipment List**



## **Bridgeton Landfill LLC.**

### **2019 GCCS Updates**

## **Construction Equipment List**

### **Recovery Drilling Services**

1 -Soilmec SR-30 Hydraulic Drilling Rig

### **Sharp Services STL**

1 – Bobcat Skidsteer

1 – Water Truck

### **Hunt Environmental Services**

1 – Volvo Front End Loader

1 – CAT Mini-Excavator

1 – Vac Truck

1 – Vac container

### **Fusion Solutions Inc.**

1 – McElroy 1218 Butt-Fusion Machine

1 – McElroy 6” Bulldog Fusion Machine

1 – Polaris Ranger UTV

1 – Single-Axle Dump Truck

## **Appendix B**

### **INSTALLATION INFORMATION**

#### **Sub-Appendices**

- B.1** As-built Well Logs
- B.2** Gas Well Aggregate Gradation

## **Sub-Appendix B.1**

### **As-Built Well Logs**



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Arron Weber**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,882.1**  
 Northing: **1,067,533.5**  
 GS Elevation: **477.77**  
 Drill Date(s): **8/21/2019**  
 Drilled Depth: **70 feet**

Gas Well ID: **GEW-232**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 480.672)
0			Ground Surface (Elev. 477.772) 5 ft x 5 ft Safety Grate
5	81.9	Soil fill / Dry	Elev. Top of Foam Seal : 473.772 (4' bgs)
			Elev. Top of Upper Soil : 470.772 (7' bgs)
10	87.4	As above	Elev. Top of Upper Bentonite Seal : 468.772 (9' bgs)
			Elev. Top of Middle Soil : 466.772 (11' bgs)
15	98.6	As above	Elev. Top of Lower Bentonite Seal : 464.772 (13' bgs)
		Top of Waste = 15 feet	Elev. Top of Lowest Soil : 462.772 (15' bgs)
			Elev. Top of Rock Pack / "Donut" : 461.772 (16' bgs)
20	114.5	50% plastics, 40% soil, 10% paper / Dry / None	Elev. Top of Perforated Pipe : 457.772 (20' bgs)
25	132.5	40% soil, 30% plastics, 20% paper, 10% wood / Dry / Little	
30	148.6	30% paper, 30% plastics, 20% textiles, 20% metal / Dry / Little	
35	164.1	30% plastics, 30% textiles, 30% paper, 10% metal / Normal / Little	
40	171.4	40% textiles, 30% paper, 20% plastics, 10% wood / Normal / Little	
45	188.7	40% wood, 40% textiles, 10% paper, 10% plastics / Damp / Some	
50	195.7	40% plastics, 40% paper, 20% textiles / Wet / Moderate	Elev. Top of Free Liquid : 427.772 (50' bgs)
55	196.6	50% black/brown muck, 30% plastics, 20% textiles / Wet / Moderate	
60	184.0	40% black/brown muck, 30% plastics, 20% textiles, 10% wood / Wet / Much	
65	196.5	30% black/brown muck, 30% textiles, 20% plastics, 10% paper, 10% wood / Saturated / Severe	
70	197.8	100% black/brown muck / Saturated / Severe	Elev. Bottom of Perf. Pipe Cap : 409.772 (68' bgs)
			Bottom of Hole = 70 ft Elev = 407.772



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,519.7**  
 Northing: **1,067,180.0**  
 GS Elevation: **470.58**  
 Drill Date(s): **8/19/2019**  
 Drilled Depth: **54 feet**

Gas Well ID: **GEW-233**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 473.144)
0			Ground Surface (Elev. 470.584) 5 ft x 5 ft Safety Grate
5	94.1	Brown and gray clay fill / Normal	Elev. Top of Foam Seal : 464.584 (6' bgs)
		As above	Elev. Top of Upper Soil : 461.584 (9' bgs)
10	103.0	Top of Waste = 9 feet 60% plastics, 20% textiles, 20% gray clay / Dry to Normal / Little to Some	Elev. Top of Upper Bentonite Seal : 459.584 (11' bgs)
			Elev. Top of Middle Soil : 457.584 (13' bgs)
15	125.2	50% plastics, 25% paper & cardboard, 20% gray brown clay, 5% metal & textiles / Dry to Normal / Some	Elev. Top of Lower Bentonite Seal : 455.584 (15' bgs)
			Elev. Top of Lowest Soil : 453.584 (17' bgs)
20	127.3	80% gray clay, 20% plastics & textiles / Dry to Normal / Some	Elev. Top of Rock Pack / "Donut" : 452.584 (18' bgs)
			Elev. Top of Perforated Pipe : 450.584 (20' bgs)
25	168.8	40% wood & paper/cardboard, 25% plastics, 25% textiles, 10% glass & metal / Dry to Normal / Some to Moderate	
30	187.3	40% textiles, 35% plastics, 15% wood & metal, 10% gray clay / Dry to Normal / Some to Moderate	
35	198.5	50% wood, 45% plastic, 5% rebar/metal / Dry to Normal / Moderate	
40	204.2	50% plastics, 35% textiles, 15% metal and wood / Normal to Wet / Moderate to Much	
45	207.0	75% black indiscernable, 25% wood and plastics / Wet to Saturated / Severe	Elev. Top of Free Liquid : 425.584 (45' bgs)
50	205.8	As above	Elev. Bottom of Perf. Pipe Cap : 420.584 (50' bgs)
	207.9	100% black indiscernable / Saturated / Severe	
55			Bottom of Hole = 54 ft Elev = 416.584
60			
65			
70			



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,522.578**  
 Northing: **1,066,943.272**  
 GS Elevation: **481.17**  
 Drill Date(s): **8/27/2019**  
 Drilled Depth: **89 feet**

Gas Well ID: **GEW-234**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 482.839)
0			Ground Surface (Elev. 481.172)
			5 ft x 5 ft Safety Grate
5	81.6	Brown clay fill / Normal	Elev. Top of Foam Seal : 478.172 (3' bgs)
			Elev. Top of Upper Soil : 475.172 (6' bgs)
10	87.1	90% brown clay fill, 10% gray clay & gravel / Normal	Elev. Top of Upper Bentonite Seal : 474.172 (7' bgs)
			Elev. Top of Middle Soil : 472.172 (9' bgs)
			Elev. Top of Lower Bentonite Seal : 471.172 (10' bgs)
15	100.9	As above Top of Waste = 11 feet 50% plastics, 30% wood, 20% rubber, wire, and cardboard / Dry / Little	Elev. Top of Lowest Soil : 469.172 (12' bgs)
			Elev. Top of Rock Pack / "Donut" : 468.172 (13' bgs) (3/4" x 1" gap-graded rock used as backfill)
20	114.4	45% wood, 25% plastics, 10% metal, 10% paper/cardboard, 10% textiles & gray clay / Dry to Normal / Little	Elev. Top of Perforated Pipe : 466.172 (15' bgs)
25	154.7	50% gray clay & gravel, 30% plastics, 20% textiles / Dry to Normal / Little to Some	
30	171.9	40% plastics, 30% wood, 20% textiles, 10% metal / Normal / Some	
35	180.7	50% plastics, 25% textiles, 15% wood, 10% cardboard / Dry to Normal / Some	
40	178.9	50% gray clay, 30% plastics, 20% wood / Normal / Some	
45	186.3	40% plastics, 20% textiles, 10% wood, 10% metal, 10% cardboard, 10% gravel / Normal / Some to Moderate	
50	198.4	40% plastics, 30% textiles, 10% metal, 10% wood, 10% cardboard / Normal / Some to Moderate	
55	202.5	60% plastics, 40% textiles / Normal / Moderate	
60	197.7	50% cardboard, 30% plastics, 10% black indiscernable, 10% metal & wood / Normal w/ Damp zones / Moderate to Much	
65	198.9	As above, hard drilling at 63 ft	
70	198.0	40% plastics, 40% textiles, 20% black indiscernable / Normal / Moderate to Much	

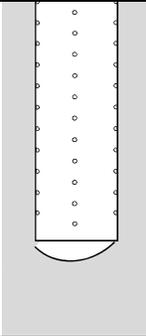
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Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,522.578**  
 Northing: **1,066,943.272**  
 GS Elevation: **481.17**  
 Drill Date(s): **8/27/2019**  
 Drilled Depth: **89 feet**

Gas Well ID: **GEW-234**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
75	201.7	As above	(continued from previous page)    Elev. Bottom of Perf. Pipe Cap : 396.172 (85' bgs) .....
80	198.0	50% black indiscernable, 20% plastics, 10% cardboard, 10% textiles, 10% gravel / Normal / Moderate	
85	201.3	40% textiles, 30% plastics, 30% black indiscernable / Dry to Normal / Moderate	
	not measured	Drilling stopped due to gas pressure in hole	
90  95  100			



Client: **Bridgeton Landfill LLC**  
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 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,508.1**  
 Northing: **1,066,832.7**  
 GS Elevation: **479.66**  
 Drill Date(s): **8/18/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-235**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 482.401)
0			Ground Surface (Elev. 479.661) 5 ft x 5 ft Safety Grate
5	86.9	Brown clay fill / Normal	Elev. Top of Foam Seal : 473.661 (6' bgs)
10	92.7	Gray clay fill / Normal	Elev. Top of Upper Soil : 470.661 (9' bgs)
15	102.9	Gray clay fill / Normal	Elev. Top of Upper Bentonite Seal : 468.661 (11' bgs)
20	118.6	As above Top of Waste = 17 feet 50% wood, 30% plastics, 20% gray clay & wire / Normal / Some	Elev. Top of Middle Soil : 466.661 (13' bgs)
25	153.7	60% plastics, 20% textiles, 10% wood, 10% brown & gray clay with wire / Dry to Normal / Little	Elev. Top of Lower Bentonite Seal : 464.661 (15' bgs)
30	152.7	50% textiles, 30% wood & metal, 20% plastics / Dry to Normal / Little to Some	Elev. Top of Lowest Soil : 462.661 (17' bgs)
35	184.4	70% plastics, 20% textiles, 10% wood / Dry / Little to Some	Elev. Top of Rock Pack / "Donut" : 461.661 (18' bgs)
40	190.7	60% plastics, 20% paper/cardboard, 10% wood, 10% gray clay / Dry to Normal / Some to Moderate	Elev. Top of Perforated Pipe : 459.661 (20' bgs)
45	197.6	Gray clay / Dry / Some	Elev. Top of Solid Pipe : 439.661 (40' bgs)
50	202.9	95% gray clay, 5% plastics / Dry / Little to Some	Elev. Bottom of Solid Pipe : 419.661 (60' bgs)
55	205.5	Gray brown clay / Dry / Little	Elev. Top of Free Liquid : 414.661 (65' bgs)
60	205.0	Gray clay / Normal to Damp / Little to Some	
65	198.5	75% gray clay, 25% gravel / Damp to Wet / Moderate	
70	202.9	60% black indiscernable, 30% plastics, 10% plywood / Saturated / Much to Severe	

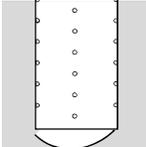
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Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,508.1**  
 Northing: **1,066,832.7**  
 GS Elevation: **479.66**  
 Drill Date(s): **8/18/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-235**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
75	205.1	As above, with <10% wood & plastics / Saturated / Much to Severe	(continued from previous page)    Elev. Bottom of Perf. Pipe Cap : 399.661 (80' bgs) .....
80	202.0 - 204.6	50% gravel, 40% black indiscernable, 10% plastics / Saturated / Much	
85	204.6	As above	
			Bottom of Hole = 85 ft      Elev = 394.661
90			
95			
100			



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Arron Weber**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,764.580**  
 Northing: **1,067,086.723**  
 GS Elevation: **497.71**  
 Drill Date(s): **8/22/2019**  
 Drilled Depth: **93 feet**

Gas Well ID: **GEW-236**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 499.961)
0			Ground Surface (Elev. 497.709) 5 ft x 5 ft Safety Grate
5	88.1	Soil fill / Dry	Elev. Top of Foam Seal : 491.709 (6' bgs)
10	92.6	Soil fill / Dry	Elev. Top of Upper Soil : 488.709 (9' bgs) Elev. Top of Upper Bentonite Seal : 486.709 (11' bgs)
15	95.7	Soil fill / Dry	Elev. Top of Middle Soil : 484.709 (13' bgs) Elev. Top of Lower Bentonite Seal : 482.709 (15' bgs)
20	104.3	As above Top of Waste = 20 feet	Elev. Top of Lowest Soil : 480.709 (17' bgs) Elev. Top of Rock Pack / "Donut" : 479.709 (18' bgs)
25	118.5	50% soil, 35% wood, 15% plastics / Dry / Little	Elev. Top of Perforated Pipe : 477.709 (20' bgs)
30	124.4	40% textiles, 30% plastics, 30% paper / Dry / Little	
35	143.3	50% plastics, 20% textiles, 20% paper, 10% soil / Normal / Some	
40	156.2	70% plastics, 20% paper, 10% textiles / Normal / Some	
45	174.2	50% plastics, 30% paper, 10% textiles, 10% metal / Normal / Some	
50	185.8	50% plastics, 20% paper, 10% textiles, 10% metal, 10% wood / Normal / Moderate	
55	186.1	40% textiles, 30% paper, 20% plastics, 10% wood / Normal / Moderate	
60	195.1	50% plastics, 50% paper / Normal / Moderate	
65	197.1	60% black/brown muck, 30% plastics, 10% paper / Damp / Much	
70	202.6	50% black/brown muck, 30% plastics, 20% paper / Damp / Much	

(continued on next page)





Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **516,794.7**  
 Northing: **1,067,232.5**  
 GS Elevation: **498.01**  
 Drill Date(s): **8/20/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-237**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 500.958)
0			Ground Surface (Elev. 498.008)
			5 ft x 5 ft Safety Grate
5	90.4	Brown clay fill / Normal	Elev. Top of Foam Seal : 492.008 (6' bgs)
		As above	Elev. Top of Upper Soil : 489.008 (9' bgs)
10	103.0	Top of Waste = 6 feet 75% plastics, 10% metal, 5% clay, 5% paper/cardboard, 5% wood / Normal / Little	Elev. Top of Upper Bentonite Seal : 487.008 (11' bgs)
			Elev. Top of Middle Soil : 485.008 (13' bgs)
15	126.4	30% textiles, 30% plastics, 30% gray clay, 10% wood / Dry to Normal / Little	Elev. Top of Lower Bentonite Seal : 483.008 (15' bgs)
			Elev. Top of Lowest Soil : 481.008 (17' bgs)
20	137.2	40% wood, 30% plastics, 20% paper/cardboard, 10% wire & textiles / Normal / Little to Some	Elev. Top of Rock Pack / "Donut" : 480.008 (18' bgs)
			Elev. Top of Perforated Pipe : 478.008 (20' bgs)
25	176.7	40% plastics, 25% wood, 20% paper, 15% gravel & rebar / Normal / Some	
30	169.2	35% wood and branches, 30% plastics, 25% textiles, 10% metal / Dry to Normal / Some to Moderate	
35	191.4	As above, with gray clay / Normal / Some to Moderate	
40	188.1	30% plastics, 25% textiles, 25% wood, 20% wire, paper, & cardboard / Dry to Normal / Some to Moderate	
45	186.0	30% textiles, 30% plastics, 15% wood, 15% paper/cardboard, 10% wire / Dry to Normal / Some	
50	191.9	As above / Normal / Some	
55	188.7	60% plastics, 20% metal, 20% wire, timbers, auto parts / Normal / Some	
60	187.1	40% black indiscernable, 30% wood, 30% gravel & clay / Damp to Wet / Moderate to Much	
65	182.9	80% black indiscernable, 10% wood, 10% plastics / Wet / Much to Severe	Elev. Top of Free Liquid : 433.008 (65' bgs)
70	176.8	As above with clay & gravel / Wet / Much	

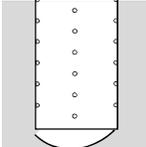
(continued on next page)



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **516,794.7**  
 Northing: **1,067,232.5**  
 GS Elevation: **498.01**  
 Drill Date(s): **8/20/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-237**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
75	168.4	70% black indiscernable, 15% wood, 15% plastics / Wet / Much	(continued from previous page)    Elev. Bottom of Perf. Pipe Cap : 418.008 (80' bgs) .....
80	173.9	70% black indiscernable, 20% stiff plastic sheeting, 10% clay / Wet / Moderate to Much	
85	160.7	30% black/gray indiscernable, 25% clay, 25% textiles, 20% plastics / Wet / Moderate to Much	
			Bottom of Hole = 85 ft      Elev = 413.008
90			
95			
100			



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,763.4**  
 Northing: **1,067,455.3**  
 GS Elevation: **483.35**  
 Drill Date(s): **8/19/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-238**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 485.311)
0			Ground Surface (Elev. 483.351) 5 ft x 5 ft Safety Grate
5	93.1	Brown clay fill / Normal	Elev. Top of Foam Seal : 477.351 (6' bgs)
		As above	Elev. Top of Upper Soil : 474.351 (9' bgs)
10	100.7	Top of Waste = 9 feet 70% plastics, 20% gray clay, 10% wood / Dry / Little	Elev. Top of Upper Bentonite Seal : 472.351 (11' bgs)
		60% plastics, 30% textiles, 10% gray clay & wood / Dry to Normal / Some	Elev. Top of Middle Soil : 470.351 (13' bgs)
15	133.2		Elev. Top of Lower Bentonite Seal : 468.351 (15' bgs)
		40% wood, 30% plastics, 20% brown & gray clay, 10% textiles / Normal / Some	Elev. Top of Lowest Soil : 466.351 (17' bgs)
20	149.4		Elev. Top of Rock Pack / "Donut" : 465.351 (18' bgs)
		50% textiles, 25% plastics, 15% wood & concrete, 10% wire/metal / Dry to Normal / Some	Elev. Top of Perforated Pipe : 463.351 (20' bgs)
25	165.9		
		40% textiles, 30% wood & metal, 30% plastics & wire / Dry to Normal / Some	
30	191.8		
		50% plastics, 25% gray clay, 10% wood, 10% paper, 5% textiles / Dry to Normal / Some	
35	195.7		
		30% textiles, 25% plastics, 25% paper/cardboard, 10% wood, 10% gray clay / Normal / Some	
40	194.7		
		30% plastics, 20% wood, 20% clay, 15% black indiscernable, 15% textiles & paper / Normal / Some to Moderate	
45	202.9		
		35% textiles, 35% wood, 30% plastics / Normal / Moderate	
50	204.4		
		35% wood, 35% black indiscernable, 30% plastics / Normal / Moderate	
55	203.0		
		30% wood, 25% paper, 25% plastics, 20% metal / Normal / Moderate	
60	202.6		
		75% black indiscernable, 15% plastics, 10% wood & paper / Damp / Moderate to Much	
65	204.2		
		As above with gray clay & gravel / Damp / Moderate to Much	
70	203.5		

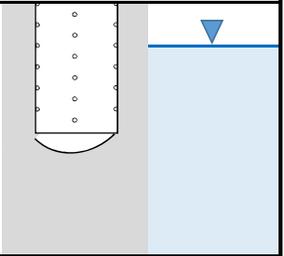
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Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Bill Abernathy**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **515,763.4**  
 Northing: **1,067,455.3**  
 GS Elevation: **483.35**  
 Drill Date(s): **8/19/2019**  
 Drilled Depth: **85 feet**

Gas Well ID: **GEW-238**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
75	204.8	35% plastics, 35% wood, 30% clay / Damp to Wet / Moderate to Much	(continued from previous page) <i>Elev. Top of Free Liquid : 408.351 (75' bgs)</i>    <i>Elev. Bottom of Perf. Pipe Cap : 403.351 (80' bgs)</i>
80	208.2	As above	
85	209.7 - 210.7	As above	
90 95 100			Bottom of Hole = 85 ft      Elev = 398.351



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Arron Weber**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **516,377.1**  
 Northing: **1,067,517.5**  
 GS Elevation: **485.66**  
 Drill Date(s): **8/21/2019**  
 Drilled Depth: **82 feet**

Gas Well ID: **GEW-239**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 488.210)
0			Ground Surface (Elev. 485.664)
			5 ft x 5 ft Safety Grate
5	89.2	Soil fill / Dry / None	Elev. Top of Foam Seal : 481.664 (4' bgs)
			Elev. Top of Upper Soil : 478.664 (7' bgs)
10	93.5	As above	Elev. Top of Upper Bentonite Seal : 476.664 (9' bgs)
		Top of Waste = 10 feet	Elev. Top of Middle Soil : 474.664 (11' bgs)
			Elev. Top of Lower Bentonite Seal : 472.664 (13' bgs)
15	110.3	55% plastics, 25% paper, 15% textiles, 5% wood / Dry / Little	Elev. Top of Lowest Soil : 470.664 (15' bgs)
			Elev. Top of Rock Pack / "Donut" : 469.664 (16' bgs)
20	121.2	60% paper, 20% plastics, 20% wood / Dry / Little	Elev. Top of Perforated Pipe : 465.664 (20' bgs)
25	144.2	33% plastics, 33% paper, 33% textiles / Dry / Little	
30	156.4	40% plastics, 30% textiles, 20% paper, 10% wood / Normal / Some	
35	193.8	50% paper, 30% plastics, 20% textiles / Normal / Some	
40	195.3	33% plastics, 33% paper, 33% textiles / Normal / Some	
45	198.4	40% plastics, 40% paper, 20% textiles / Normal / Some	
50	196.0	40% textiles, 30% plastics, 30% paper / Normal / Some	
55	200.0	40% plastics, 30% paper, 30% textiles / Damp / Moderate	
60	182.6	60% plastics, 30% textiles, 10% paper / Damp / Moderate	
65	199.7	50% plastics, 20% paper, 20% textiles, 10% wood / Damp / Moderate	
70	201.1	50% textiles, 20% plastics, 20% paper, 10% concrete / Damp / Moderate	

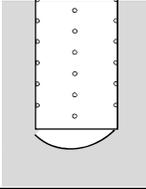
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Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Arron Weber**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **516,377.1**  
 Northing: **1,067,517.5**  
 GS Elevation: **485.66**  
 Drill Date(s): **8/21/2019**  
 Drilled Depth: **82 feet**

Gas Well ID: **GEW-239**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
75	203.5	60% textiles, 30% plastics, 10% paper / Normal / Moderate	(continued from previous page)  Elev. Bottom of Perf. Pipe Cap : 405.664 (80' bgs) .....
80	205.2	50% plastics, 30% textiles, 20% paper / Normal / Moderate	
80	209.2	33% plastics, 33% paper, 33% textiles / Norm / Mod	
<div style="display: flex; justify-content: space-between;"> <span>Bottom of Hole = 82 ft</span> <span>Elev = 403.664</span> </div>			



Client: **Bridgeton Landfill LLC**  
 Project Location: **Bridgeton, MO**  
 Project Name: **2019 GCCS CQA**  
 FEI Project Number: **BT-143**  
 FEI Inspector: **Arron Weber**  
 Drilling Contractor: **Recovery Drilling (RDS)**  
 Driller: **Stan Garrison**

Drilling Method: **36" Core Barrel/Bucket**  
 Well Casing Material: **12" SDR-11 HDPE**  
 Easting: **516,082.9**  
 Northing: **1,066,987.7**  
 GS Elevation: **502.35**  
 Drill Date(s): **8/21/2019**  
 Drilled Depth: **92 feet**

Gas Well ID: **GEW-240**

Depth in Feet	Temperature (F)	Waste/Soil Description	Well Completion Details
+3			Top of Flange (Elev. 503.890)
0			Ground Surface (Elev. 502.347)
			5 ft x 5 ft Safety Grate
5	87.9	Soil fill / Normal	Elev. Top of Foam Seal : 496.347 (6' bgs)
10	99.1	Soil fill / Normal	Elev. Top of Upper Soil : 493.347 (9' bgs)
		As above	Elev. Top of Upper Bentonite Seal : 491.347 (11' bgs)
15	102.1	Top of Waste = 13 feet	Elev. Top of Middle Soil : 489.347 (13' bgs)
		50% plastics, 30% paper, 20% textiles / Normal / Little	Elev. Top of Lower Bentonite Seal : 487.347 (15' bgs)
20	106.8	50% plastics, 30% paper, 20% textiles / Normal / Little	Elev. Top of Lowest Soil : 485.347 (17' bgs)
			Elev. Top of Rock Pack / "Donut" : 484.347 (18' bgs)
25	114.8	60% plastics, 20% paper, 10% textiles, 10% metal / Dry / Little	Elev. Top of Perforated Pipe : 482.347 (20' bgs)
30	144.1	70% plastics, 20% wood, 10% textiles / Dry / Little	
35	142.1	50% textiles, 30% plastics, 20% paper / Dry / Little	
40	177.7	40% plastics, 30% paper, 30% textiles / Dry / Little	
45	178.2	40% plastics, 30% paper, 20% textiles, 10% metal / Dry / Little	
50	197.4	40% plastics, 20% paper, 20% textiles, 20% metal / Damp / Moderate	
55	203.3	50% plastics, 20% paper, 20% textiles, 10% wood / Damp / Moderate	
60	209.3	30% plastics, 30% textiles, 20% paper, 10% metal, 10% wood / Damp / Moderate	
65	198.9	60% black/brown muck, 30% plastics, 10% textiles / Wet to Damp / Much	Elev. Top of Free Liquid : 437.347 (65' bgs)
70	188.9	30% black/brown muck, 30% plastics, 30% paper, 10% textiles / Damp / Much	

(continued on next page)



## **Sub-Appendix B.2**

### **Gas Well Aggregate Gradation**

# Winter Brothers Material Company

13098 Gravois Road  
Saint Louis, MO 63127  
(314) 843-1400  
FAX (314) 843-1400

13977 Tesson Ferry  
Saint Louis, MO 63128  
(314) 849-5096  
FAX (314) 849-5258

"Producers of Meramec Sand & Gravel for over 70 years"

Source- Meramec River  
Aggregate Type- Bulk Meramec Large B Gravel  
Sieve- Gradation by Weight

Sieve Analysis- ASTM C 33 / D 448 / AASHTO M 43 No. 2

We are not responsible for segregation during the transport of any fine or coarse aggregate

U.S. Standard Sieve Size	Cumulative Percent		Specification Percent Passing
	% Retained	% passing	
3"	0	100	100
2 1/2"	4.8	95.2	90-100
2"	36.6	63.4	35-70
1 1/2"	87.8	12.2	0-15
3/4"	99.5	0.5	0-5

## SPECIFIC GRAVITY AND ABSORTION OF FINE AGGREGATE - ASTM C 128

<b>Fineness Modulus = 2.28</b>	<b>Absortion, % 2.21</b>	<b>Apparent Specific Gravity = 2.65</b>
<b>Effective Grain Size = 38mm</b>	<b>Bulk Specific Gravity = 2.52</b>	<b>Bulk Specific Gravity, SSD = 2.51</b>
<b>Uniformity Coefficient = 1.37</b>	<b>W.C.F. (Loose) = 76.8</b>	<b>W.C.F. (Dry Rodded) = ----</b>

## APPENDIX C

### CONSTRUCTION CERTIFICATION DRAWINGS (REDUCED SET)

<b>Drawing 000</b>	Title Page
<b>Drawing 001</b>	2019 GCCS Plan View
<b>Drawing 002</b>	Details

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AS-BUILT RECORD DRAWINGS FOR THE

# BRIDGETON LANDFILL

# 2019 GCCS INSTALLATION

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SEPTEMBER 2019  
PREPARED FOR:

***Bridgeton Landfill, LLC***

13570 ST. CHARLES ROCK ROAD  
BRIDGETON, MISSOURI 63044



3377 HOLLENBERG DRIVE  
BRIDGETON, MO 63044  
TEL. (217) 483-3118



LOCATION MAP



INDEX OF DRAWINGS

	TITLE PAGE
001	GCCS PLAN VIEW
002	DETAILS





**LEGEND**

	SOLID WASTE BOUNDARY
	QUARRY WALL
	GAS EXTRACTION WELL
	PERIMETER GAS EXTRACTION WELL
	SURFACE EXTRACTION WELL
	CONDENSATE SUMP
	PERIMETER GAS EXTRACTION WELL
	GAS INTERCEPTOR WELL
	GAS INTERCEPTOR WELL/HEAT EXTRACTION POINT
	GAS EXTRACTION WELL WITH 4" STINGER
	2019 GAS EXTRACTION WELL
	4" ABOVE GROUND LFG COLLECTION LATERAL PIPING
	6" ABOVE GROUND LFG COLLECTION LATERAL PIPING

NOTES:  
 \* AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS CO. AND IS DATED DECEMBER 12, 2018

	PREPARED BY: DANIEL RICHARD FEEZOR	PROJECT: BRIDGETON LANDFILL 2019 GCCS INSTALLATION BRIDGETON, ST. LOUIS COUNTY, MO	PREPARED FOR: BRIDGETON LANDFILL, LLC 13570 ST. CHARLES ROCK ROAD BRIDGETON, MISSOURI 63044	DESIGNED BY: AMR APPROVED BY: DRF	DRAWING # <b>001</b>
	3377 Holenberg Dr. Bridgeton, MO 63044, Ph: 217-483-3118 Missouri State Certificate Of Authority #: E-200912213		DRAWING TITLE: <b>2019 GCCS PLAN VIEW</b>	REVISIONS:	DATE    DSN    APV.

