



October 9, 2023

Anne Marie Smith, PE
Engineering Manager
Land Protection Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101

Re: Solid Waste Permit No.: None (Previously in 3533005)
Altus Municipal Landfill C&D Cell
Jackson County

Dear Ms. Smith:

On September 12, 2023, we received a request for additional information from the Department of Environmental Quality ("DEQ") noting comments on the submitted technical memorandum and permit modification for the Altus Municipal Landfill. Per the request, we are submitting additional information to address the comments, which are reproduced and addressed below:

1. *The response to NOD included states that the new permit boundary does not conflict with the restrictions listed in OAC 252:515-5-31, OAC 252:515-5-32, and OAC 252:515-5-52. However, no maps, letters, or other documentation were provided to support this statement.*

Please provide supporting documentation to address all location restrictions for the new permit boundary in accordance with the OAC 252:515-5-31, OAC 252:515-5-32, and OAC 252:515-5-52.

Please see map of **Oklahoma Scenic Rivers, FEMA, Wetlands Location Map, and Wellhead Protection Area**, and **Site Map** showing the nearest airport. See attached letters that have been sent to ODWC, OBS, and Oklahoma Fish and Wildlife for comments. No response has been received at this time and no concerns are expected for this project.

2. *The response to NOD included revisions to Section 31 35 26.13, Part 3.6 of the Contract Documents and Technical Specifications. However, the revisions included state that other verification test methods may be used if approved in advance by the engineer and/or owner and operator. In accordance with OAC 252:515-11-37(c)2(c), the use of other verification test methods must be approved in advance by DEQ.*

Please revise Section 31 35 26.13, Part 3.6 of the Contract Documents and Technical Specifications, to clarify that the use of other verification test methods must be approved in advance by DEQ.

Please see revised **Section 31 35 26.13, Part 3.6**.

3. *The Operational Plan included in the response to NOD addresses storm water management. The Operational Plan mentions the use of temporary berms along the perimeter of each disposal cell, stormwater drainage ditches, and, if needed, diversion berms or ditches. Additionally, the Operational Plan refers to a Stormwater Pollution Prevention Plan (SWP3) for the site. However, the location or design of stormwater control structures, the assessment of run-on and run-off control measures resulting from a 24-hour, 25-year storm, and a copy of the SWP3 were not included.*

In accordance with OAC 252:515-17-2, please provide the location and design of stormwater control structures, assessment of run-on and run-off control measures resulting from a 24-hour, 25-year storm, and a copy of the SWP3 for the new C&D landfill.

The Stormwater Pollution Prevention Plan will be provided by the contractor. Please see revised **Quantities & Notes** sheet.

A run-on control system is not needed. The contours can show on the **Drainage Area Map** that the site is at the top of a ridge and therefore no surface drainage originating offsite will run onto the site. Stormwater run-off will sheet flow to the existing retention pond or to the northeast corner of the site. Flow for a 25-year storm is approximately 19.33 cfs to the existing retention pond while 27.83 cfs will continue to flow offsite to the northeast. Existing ditches will be graded to drain.

4. *The Operational Plan and a Closure & Post-Closure Plan included in the response to NOD refer to an alternative daily cover. The alternative daily cover requested consists of 6-inches of foundry sand or posi-shells. However, the demonstration that the alternative is capable of controlling disease vectors, fires, odors, and blowing litter without presenting a threat to human health and the environment was not included.*

In accordance with OAC 252:515-19-51(d), please provide a demonstration that the alternative daily cover is capable of controlling disease vectors, fires, odors, and blowing litter without presenting a threat to human health and the environment was not included.

Please see revised **Operational Plan** and **Closure & Post-Closure Plans**.

5. *The Operational Plan and a Closure & Post-Closure Plan included in the response to NOD refer to an alternative final cover system. The alternative final cover system consists of an evapotranspiration system including the following layers from top to bottom: 12-inch-thick vegetation layer, 24-inch-thick vegetation support layer, and 12-inch-thick intermediate cover layer. However, the demonstration that the alternative provides equivalent protection to that afforded by OAC 252:515-19-53(a).*

In accordance with OAC 252:515-19-53(c), please provide a demonstration that the proposed alternative final cover system will provide equivalent protection as the requirements outlined in OAC 252:515-19-53(a).

Please see revised **Operational Plan** and **Closure & Post-Closure Plans**.

6. *The Closure and Post-Closure Plan included in the response to NOD did not include detailed plans for the following closure activities: reworking or replacing defective groundwater monitoring wells, gas wells, and other defective monitoring equipment, if any; collecting and analyzing soil and water samples; disposing of any affected soils; and an estimate of the largest area ever requiring final cover during the active life.*

In accordance with OAC 252:515-25-32(a)(3), OAC 252:515-25-32(a)(4)(B), (D) and (E), and

OAC 252:515-25-32(b)(1), please revise the closure activities in the Closure and Post-Closure Plan to include the following: reworking or replacing defective groundwater monitoring wells, gas wells, and other defective monitoring equipment, if any; collecting and analyzing soil and water samples; disposing of any affected soils; and an estimate of the largest area ever requiring final cover during the active life.

Please see revised **Closure and Post-Closure Plan Section V, Part B.**

7. *The Closure and Post-Closure Plan included in the response to NOD states that the facility may be closed in phases and specific design plans will be prepared for each final cover phase.*

Please revise the Closure and Post-Closure Plan to state that the requirements of OAC 252:515-25-32(b)(2) and OAC 252:515-25-32(b)(3) will be prepared and provided for each final cover phase.

Please see revised **Closure and Post-Closure Plan Section III, Part B.**

8. *The Closure and Post-Closure Plan included in the response to NOD did not include detailed plans for the following post-closure activities: reworking or replacing defective groundwater monitoring wells and other defective monitoring equipment and installing new wells and equipment as required.*

In accordance with OAC 252:515-25-53(4)(B), please revise post-closure activities in the Closure and Post-Closure Plan to include reworking or replacing defective groundwater monitoring wells and other defective monitoring equipment and installing new wells and equipment as required.

Please see revised **Closure and Post-Closure Plan Section VIII, Part A.**

We believe the statements and exhibits satisfactorily address the comments raised in the request for additional information. If you have any questions or comments, please contact me at 405-463-3369 or by email at michael@cowangroup.co.

Sincerely,

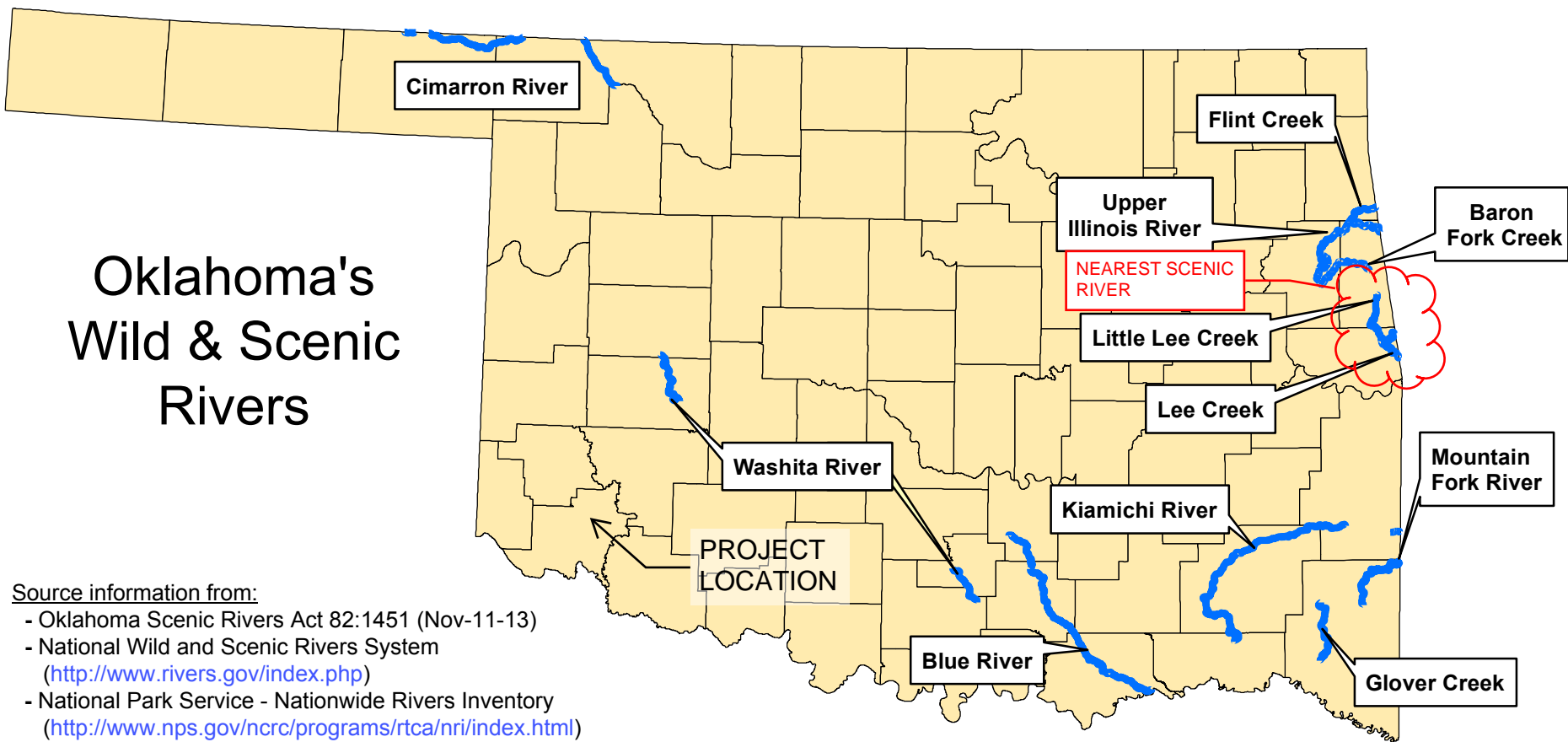
Cowan Group Engineering, LLC



Michael Taylor, PE
Managing Member

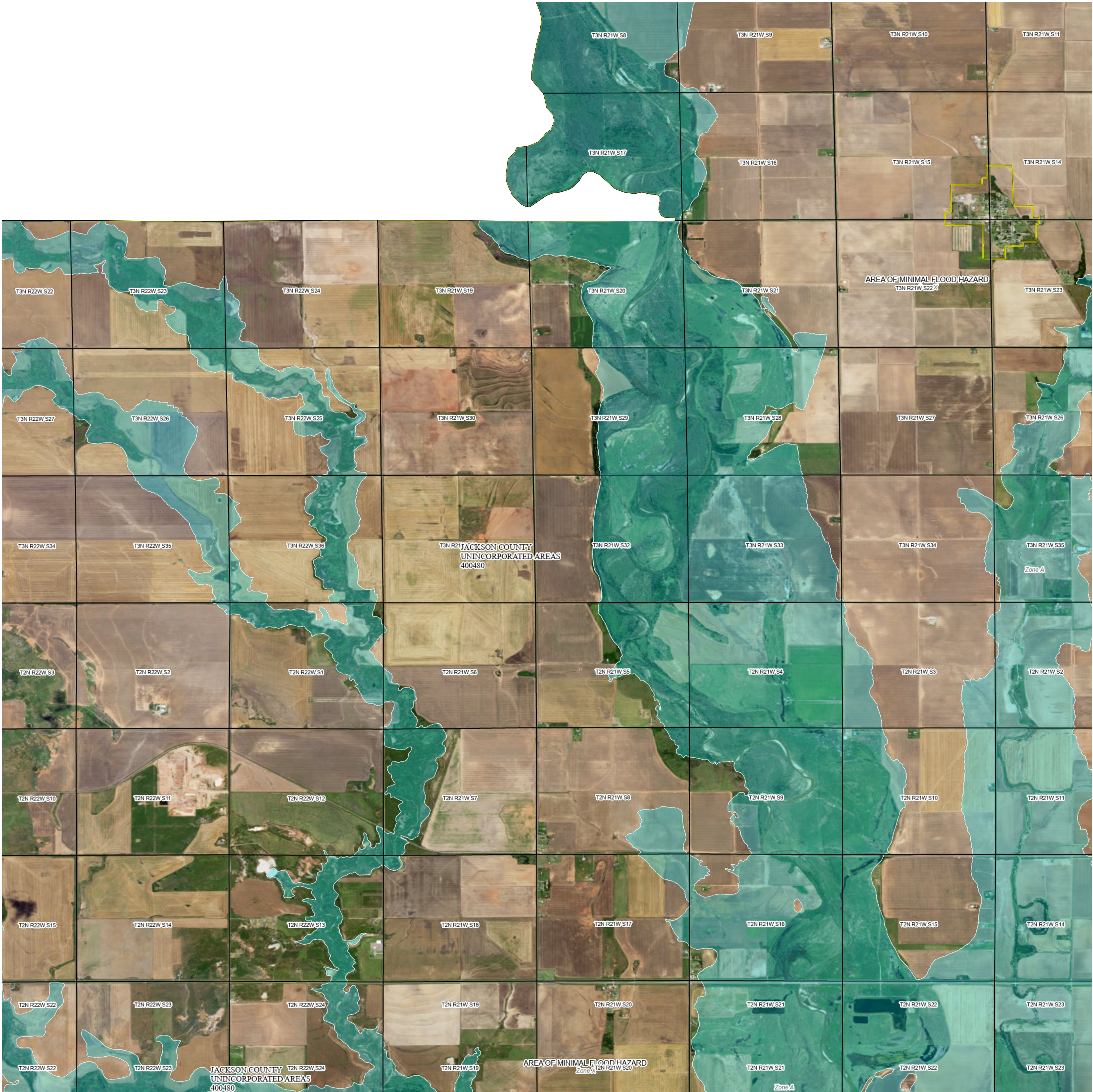
Enclosures: Oklahoma Scenic Rivers
FEMA Map
Wetlands Location Map
Wellhead Protection Area Map
Site Map – Nearest Airport
Quantities & Notes
Section 31 35 26.13
Operational Plan
Closure & Post-Closure Plan
Drainage Area Map

Oklahoma's Wild & Scenic Rivers



River/Creek	Source	County	Reach	Length (mi)	Values
Barren Fork Creek	Oklahoma Scenic River	Adair, Cherokee	From the present alignment of Highway 59 West (downstream) to the Illinois River	?	N/A
Blue River	Nationwide Rivers Inventory	Bryan, Johnston, Pontotoc	From confluence with Red River upstream to headwaters near Roff, OK	128	Scenery, Recreation, Geology, Fish & Wildlife
Cimarron River	Nationwide Rivers Inventory	Woods, Harper, Beaver	From confluence with Buffalo Creek in OK upstream to SH 23 crossing east of Liberal, KS.	94	Scenery, Geology & History

River/Creek	Source	County	Reach	Length (mi)	Values
Flint Creek	Oklahoma Scenic River	Delaware	Above the confluence of the Illinois River	?	N/A
Glover Creek	Nationwide Rivers Inventory	McCurtain	From confluence with Little River upstream to confluence with East and West Forks.	32	Scenery, Recreation, Fish, Wildlife & History
Illinois River	Oklahoma Scenic River	Cherokee, Adair, Delaware	Above the confluence of the Barren Fork Creek	?	N/A
Kiamichi River	Nationwide Rivers Inventory	Pushmataha LeFlore	From upper Hugo Lake upstream to Muse.	102	Scenery, Fish, & Wildlife
Lee Creek	Nationwide Rivers Inventory	Sequoyah	From the Oklahoma-Arkansas state line SE of Short, OK upstream to headwaters SE of Moffet, AR.	49	Scenery, Recreation, Fish, Wildlife & Cultural
	Oklahoma Scenic River	Sequoyah	Above the 420 foot MSL elevation , excluding that portion necessary for a dam to be built in the State of AR with a crest elevation of no more than the 420 foot MSL elevation	?	N/A
Little Lee Creek	Oklahoma Scenic River	Adair, Sequoyah	Beginning approximately four miles east/southeast of Stilwell, OK and ending at the conjunction with Lee Creek approximately two miles southwest of Short, OK	?	N/A
Mountain Fork Creek (River)	Nationwide Rivers Inventory	McCurtain	From upper end of Broken Bow Reservoir upstream to Oklahoma-Arkansas state line.	25	Scenery, Recreation, Fish & Wildlife
	Oklahoma Scenic River	McCurtain, LeFlore	Above the 600 foot elevation level of Broken Bow Reservoir	?	N/A
Washita River	Nationwide Rivers Inventory	Washita, Custer	From Cloud Chief-Cowden bridge south of SH 152 in Washita County upstream to Clinton	25	Scenery, Recreation, & Geology
	Nationwide Rivers Inventory	Carter, Murray	From Ardmore Air Park River Bridge in Carter County upstream to US 77 bridge south of Jollyville	20	Scenery, Recreation, Geology & Fish



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee See Notes <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance
		Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-6627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

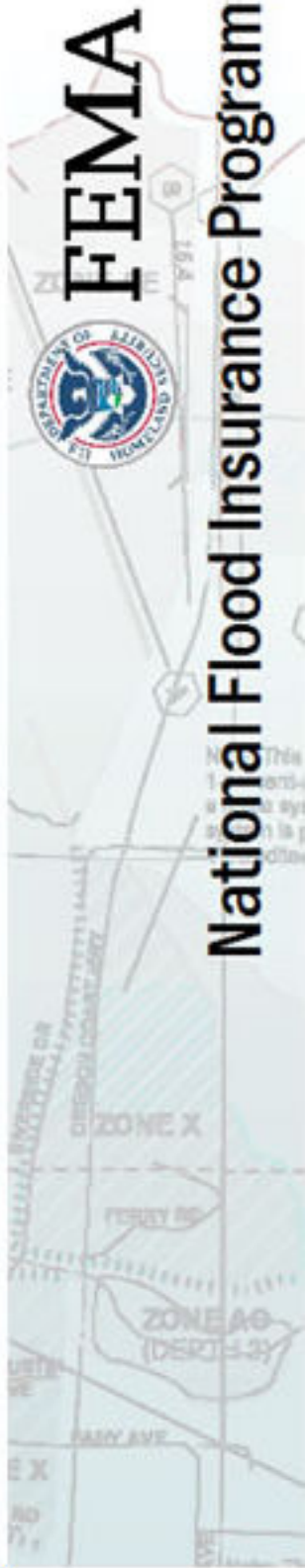
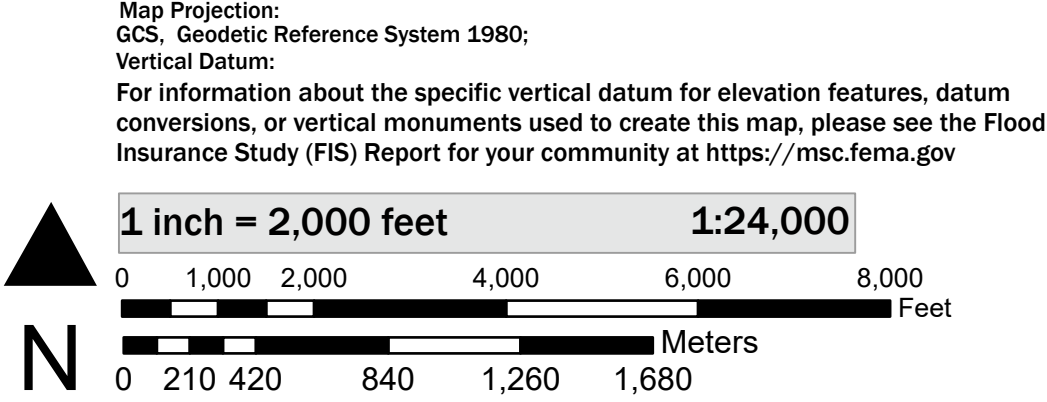
To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **10/9/2023 5:06 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at <https://www.fema.gov/media-library/assets/documents/118418>

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

PANEL 150 OF 675

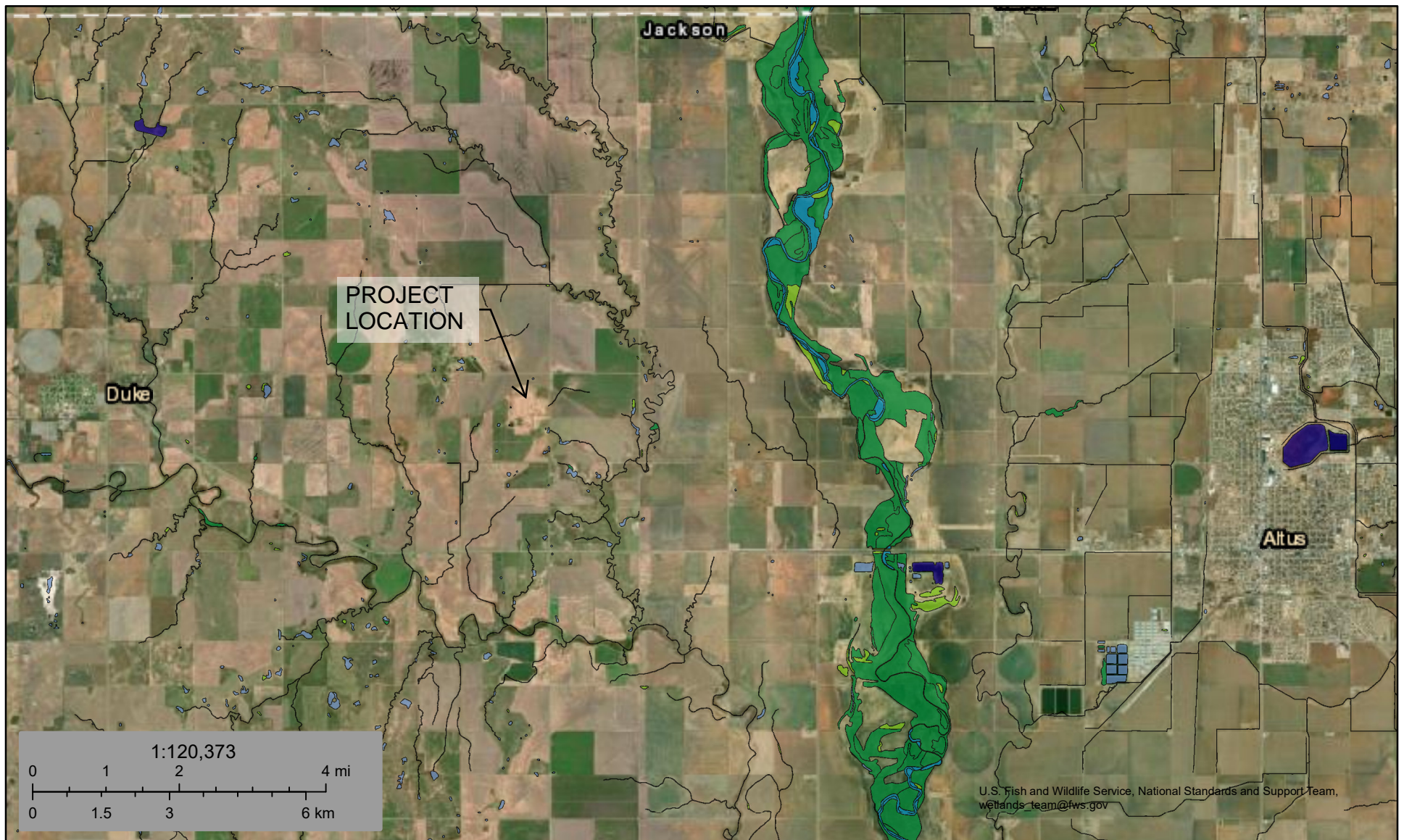
Panel Contains:		
COMMUNITY	NUMBER	PANEL
GREER COUNTY	400844	0150
JACKSON COUNTY	400480	0150
TOWN OF MARTHA	400307	0150



U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands Location Map

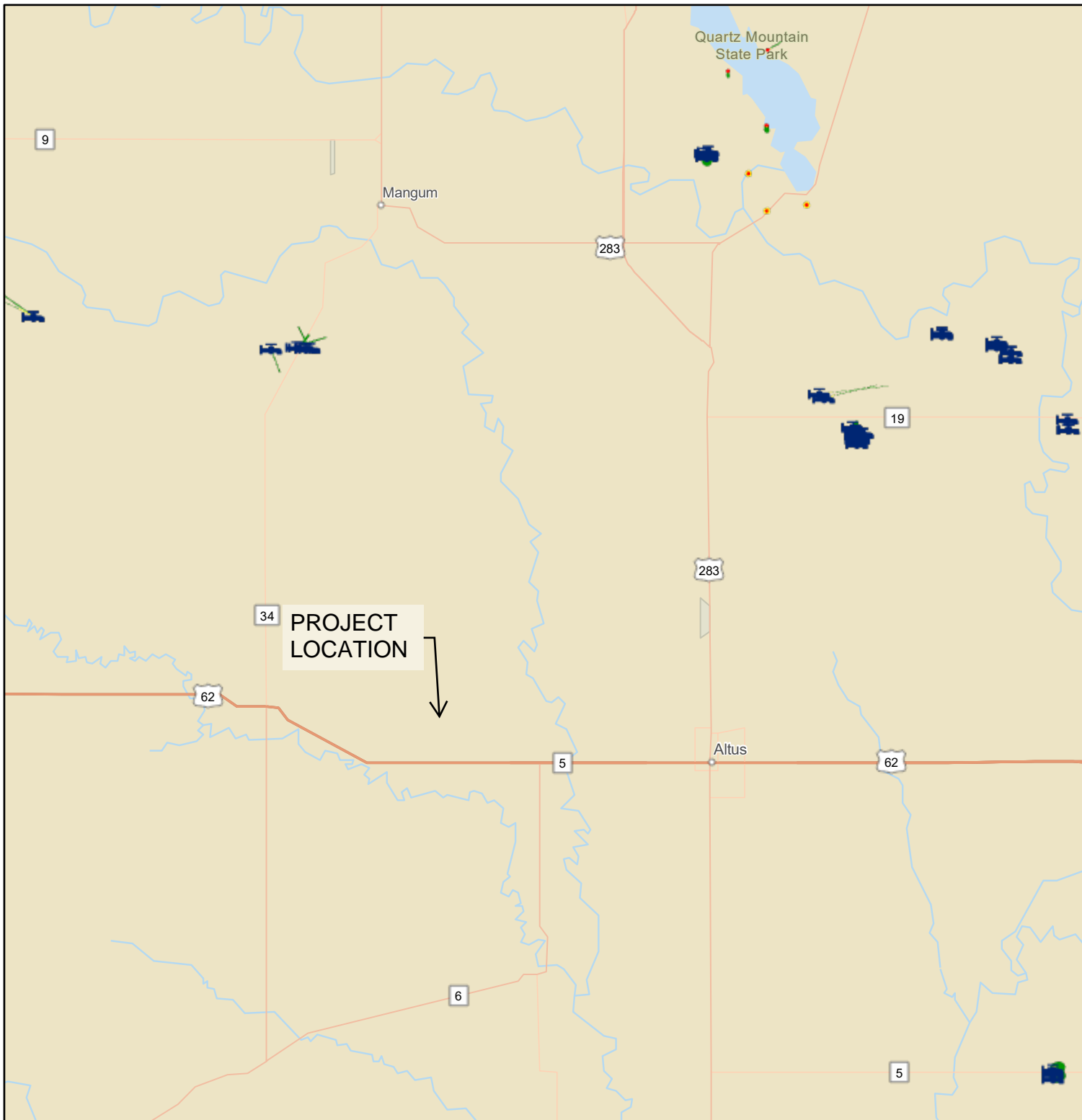


September 12, 2023

Wetlands

	Estuarine and Marine Deepwater		Freshwater Emergent Wetland		Lake
	Estuarine and Marine Wetland		Freshwater Forested/Shrub Wetland		Other
	Freshwater Pond		Riverine		

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



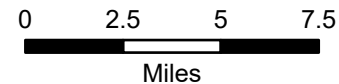
Legend

- PWS Surface Water Intakes
- PWS Wells

Wellhead Protection Areas (WHPAs)

ZONE

- A
- B
- C



Date: 9/12/2023

We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.





September 12, 2023

Oklahoma Biological Survey
111 W. Chesapeake Street
Norman, OK 73019

To Whom It May Concern:

Re: Altus Municipal Landfill Construction & Demolition Cell

The City of Altus owns and operates the Altus Municipal Landfill that serves the residents of the City of Altus, Altus Air Force Base, Hollis, Duke, and Eldorado. To increase the design life, the City is proposing to designate a portion of the municipal landfill to a construction and demolition (C&D) cell.

The proposed project consists of a permit modification to remove approximately 30-acres from the existing municipal solid waste site and a permit application for a 30-acre C&D area will be requested. The initial project includes an approximate 10-acre C&D cell. The project will be funded by the City of Altus or other internal funding.

The project location is Section 11, Township 2 North, Range 22 West, Indian Meridian, Jackson County, Oklahoma. All construction will be within the existing municipal solid waste site. **Location map is included.**

On-site inspections will be carried out while construction is in progress. No individuals will be displaced because of this project. To complete the permit process, we would appreciate a written response on the proposed project from your agency. **Please comment on any agency areas of concern.** We do not anticipate that the proposed project will have a significant impact on the environment and appreciate your assistance and response.

Sincerely,

A handwritten signature in blue ink that reads 'Michael Taylor'.

Michael Taylor, P.E.
Cowan Group Engineering



September 12, 2023

Oklahoma Department of Wildlife Conservation
PO Box 53465
Oklahoma City, OK 73152

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Michael Taylor, P.E.
Cowan Group Engineering



September 12, 2023

Oklahoma Ecological Services
Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

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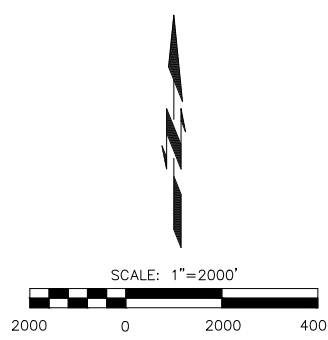
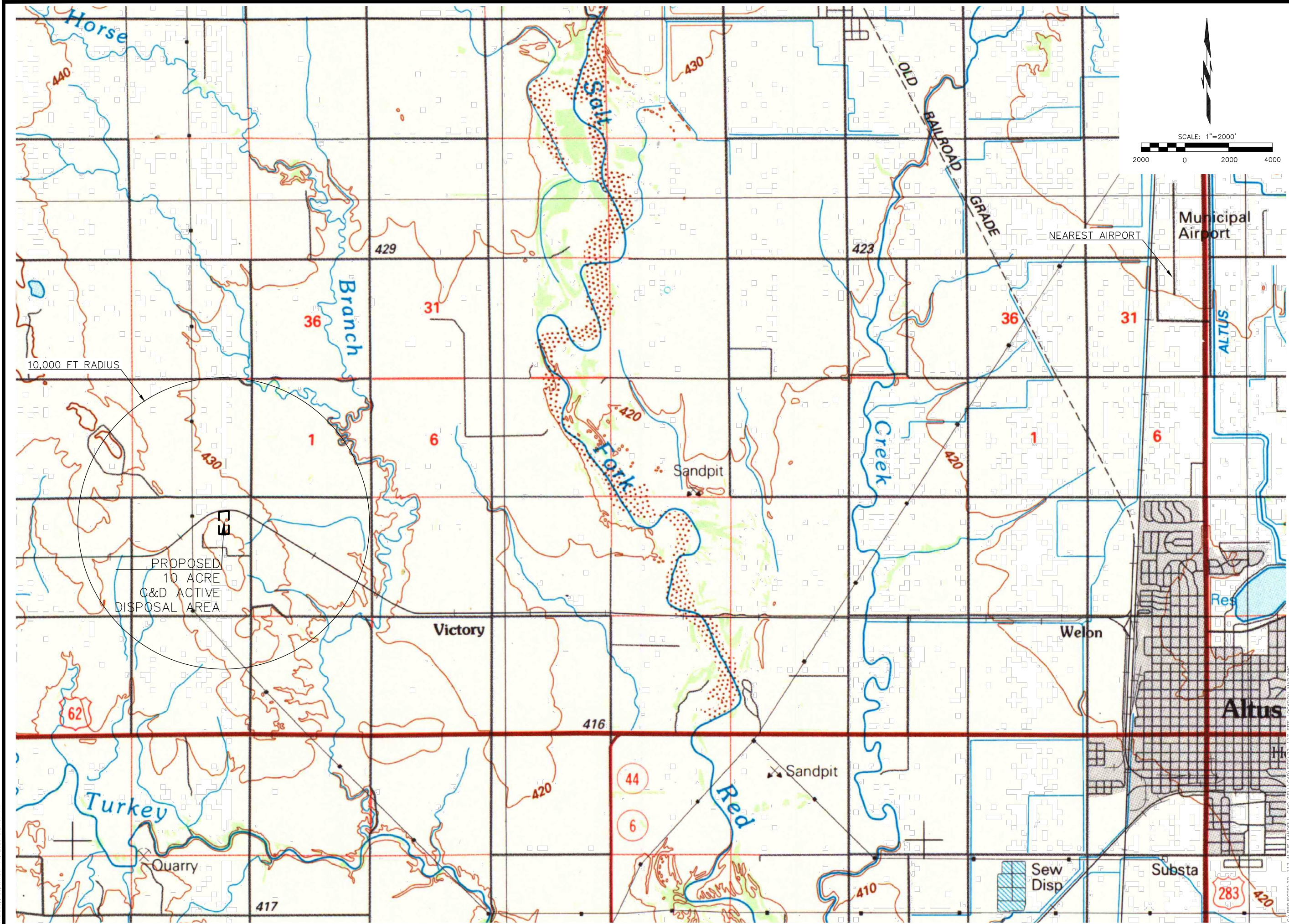
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Sincerely,

A handwritten signature in blue ink that reads 'Michael Taylor'.

Michael Taylor, P.E.
Cowan Group Engineering

Thursday, September 14, 2023 5:21:51 PM





COWAN GROUP ENGINEERING
7100 N GLASSEN, SUITE 500
OKLAHOMA CITY, OK 73116
405-463-3369 D 405-463-3381 F
WWW.COWANGROUP.COM
CA# 6414 EXPIRES 6/30/2024

ALTUS MUNICIPAL LANDFILL

C&D DEBRIS CELL

JACKSON COUNTY, OKLAHOMA

SITE LOCATION MAP	
DESIGNED BY	BSS
DRAWN BY	HMH
REVIEWED BY	RPR
PROJECT NUMBER	22-117
DATE	04/20/2022
REVISIONS	
SHEET NUMBER	1

PAY QUANTITIES					
ITEM	DESCRIPTION	NOTES	UNIT	QUANTITY	AS-BUILT
1	MOBILIZATION		LSUM	1	
2	UNCLASSIFIED EXCAVATION AND ON-SITE STOCKPILE	(1)(2)	CY	88,700	
3	PROTECTIVE SAND LAYER (1' THICKNESS)		CY	15,600	
4	GRADING, ACCESS ROAD		CY	1,400	
5	EXCAVATION AND RECOMPACTION OF 3' CLAY LINER		CY	50	
6	IN-SITU LINER BORINGS	(3)	EA	50	
7	IN-SITU LINER POST EXCAVATION/PRE-DISPOSAL TESTS	(4)	LSUM	1	

PAY QUANTITY NOTES

1. EXCESS UNCLASSIFIED SOIL EXCAVATION TO REMAIN ON PROPERTY OF THE CITY AND TO BE STOCKPILED ON SITE. STOCKPILE LOCATION(S) TO BE DETERMINED BY LANDFILL SUPERVISOR.
2. UNCLASSIFIED SOIL EXCAVATION SHALL BE PAID IN BANK CUBIC YARDS MEASURED BY PRE-CONSTRUCTION AND POST-CONSTRUCTION SURVEYS OF THE EXCAVATED AREA. PRICE BID TO INCLUDE SURVEYS, EXCAVATION, HAUL AND PLACEMENT IN ON-SITE STOCKPILE.
3. BID ITEM SHALL INCLUDE TESTING AS REQUIRED BY OAC 252:515-11-73(b). BID ITEM SHALL INCLUDE PLUGGING IF BOREHOLES IN ACCORDANCE WITH OAC 252:515-11-74.
4. BID ITEM SHALL INCLUDE TESTING IN ACCORDANCE WITH OAC 252:515-11-73(a),(c).

GENERAL CONSTRUCTION NOTES

1. EARTHWORK AND LINER INSTALLATION SHALL BE TESTED IN ACCORDANCE WITH ODEQ REGULATIONS AND AS IDENTIFIED IN THE QUALITY ASSURANCE TESTING AND REPORTING PROCEDURES PROVIDED IN THE CONTRACT DOCUMENTS AND CONSTRUCTION SPECIFICATIONS. THE MORE STRINGENT STANDARD SHALL BE USED IN THE CASE OF CONFLICTING REQUIREMENTS.
2. CONTRACTOR IS RESPONSIBLE FOR PROVIDING STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ) OAC 252:515-17-2.



COWAN GROUP ENGINEERING
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WWW.COWANGROUP.COM
CA# 6414 EXPIRES 6/30/2024

ALTUS MUNICIPAL LANDFILL

C&D DEBRIS CELL
JACKSON COUNTY, OKLAHOMA

QUANTITIES & NOTES

DESIGNED BY	BSS
DRAWN BY	MLP
REVIEWED BY	RPR
PROJECT NUMBER	22-117
DATE	7/5/2022

REVISIONS

SHEET NUMBER

02

G:\PROJECTS\22-117 ALTUS LANDFILL C&D CELL\CAD\SITE\22-117 QUANT NOTES.DWG

SECTION 31 35 26.13 - RECONSTRUCTED CLAY LINER (LANDFILLS)

PART 1 - GENERAL

1.1 SCOPE

- A. The CONTRACTOR shall furnish all labor, materials, supervision and equipment to complete the excavation, embankment and a reconstructed clay liner with a minimum thickness of two (2) feet, as shown on the Plans and as included in these Specifications.

1.2 DEFINITIONS

The following list of definitions is provided for reference:

- A. **"Authorized Representation"** shall mean a duly named individual who has the authority to execute a change order on behalf of the City.
- B. **"City"** shall mean the City of Altus, Oklahoma.
- C. **"Classification System"** shall mean the soil classification system shall be in accordance with the standard test method for classification of soils for engineering purposes (ASTM D2487- 83).
- D. **"Compaction"** shall mean the process of increasing the density of soil by rolling, tamping, vibrating, or other mechanical means.
- E. **"Contractor"** shall mean the party entering into this general contract.
- F. **"Atterberg Limits"** includes the liquid limit, plastic limit, and shrinkage limit for soils (ASTM D4318-84 and D427-83, respectively). The water content when the soil behavior changes from the liquid to the plastic state is the liquid limit; from the plastic to the semi- solid state is the plastic limit; and from the semi-solid to the solid state is the shrinkage limit.
- G. **"Density"** shall mean the mass density of a soil is its weight per unit volume; usually reported in pounds per cubic foot.
- H. **"Department"** shall mean the Oklahoma Department of Environmental Quality, Land Protection Service (ODEQ/LPS).
- I. **"Engineer"** shall mean the consulting engineering firm providing design and general supervision, monitoring of earthwork and liner construction, construction surveillance, and surveying services and who is responsible interpreting for and enforcing the Specifications outlined herein.
- J. **"EPA Document"** shall mean the EPA (U.S. Environmental Protection Agency) Technical Guidance Document "Quality Control and Quality Assurance for Waste Containment Facilities", EPA/600/R-93/182, dated September 1993.
- K. **"Gas Well"** shall mean a vertically installed slotted, perforated, or porous pipe with a solid riser pipe surrounded by a gravel-packed zone over the perforated pipe section to allow removal of landfill gas and any intercepted leachate.

- L. **"Geomembrane"** shall mean an impermeable membrane liner or barrier used in civil engineering for geotechnical products. It can also be reinforced with a fabric scrim for added strength.
- M. **"Geotextile"** shall mean a relatively porous construction or reinforcement fabric used in civil engineering for geotechnical projects. The fabric structure may be knit, woven, or nonwoven. Filter geotextile is a material, which provides separation of materials with different pore size openings to prevent clogging. Drainage geotextiles are materials with adequate transmissivity to provide planar flow of fluid. Reinforcing geotextile is a material with sufficient in-plane strength to support some or all of the load applied to a composite system (such as soil-geotextile).
- N. **"In Situ"** shall mean "as is", or as it exists in-place naturally.
- O. **"Moisture Content"** shall mean the ratio of quantity of water in the soil (by weight) to the weight of the soil solids (dry soil), expressed in percentage; also referred to as water content.
- P. **"Optimum Moisture Content (OMC)"** shall mean the moisture content corresponding to maximum dry density as determined in the Standard Proctor (ASTM D-698) or Modified Proctor (ASTM D-1557) Test.
- Q. **"OAC"** shall mean the Oklahoma Administrative Code.
- R. **"Permeability"** shall mean the ability of pore fluid to travel through a soil mass via interconnected void. "High" permeability indicates relatively rapid flow of pore fluid and vice versa. Coefficients of permeability are generally reported in centimeters per second.
- S. **"Plasticity"** shall mean the ability of soil mass to be remolded without raveling or breaking apart. The plasticity index, numerically equal to the difference between the liquid and plastic limit, is a comparative number, which describes the range of moisture contents over which a soil behavior is plastic.
- T. **"QCA Engineer"** shall mean an independent consulting engineer and/or testing firm, working directly for the City, providing subsurface soil investigations, soil testing laboratory, oversight of earthwork and liner construction, and assisting in the construction surveillance, who is responsible for final approval of cell liner construction according to the Plans and Specifications outlined herein.

PART 2 - PRODUCTS

2.1 RECONSTRUCTED CLAY LINER

- A. Preliminary Liner Soil Testing (Furnished by QAQC Firm)
 - 1. Suitability determination. The OWNER shall collect samples and test soil proposed to be used as liner material.
 - 2. Sample collection. At least one sample shall be collected for each type of material proposed for use as liner material. One composite sample shall be taken for every

10,000 cubic yards of soil or more frequently if visual observations indicate a change in material characteristics. At least five natural or in-place moisture and density tests per acre shall be taken.

3. Testing. The soil samples shall be tested by a soil's laboratory under the direction of an independent professional ENGINEER registered in the State of Oklahoma. The test samples and report shall be sealed by a Registered Professional ENGINEER.
4. Tests. The following tests shall be conducted on each type of soil samples:

a. Soil Classification	ASTM D-2487
b. Particle-Size Analysis of Soil	ASTM D-422
c. Sieve Analysis for the Following:	#4, #10, #40, #200
d. Percent Fines (- #200 sieve)	ASTM 1140
e. Atterberg Limits	ASTM D-4318
f. Moisture Content	ASTM D-2216 or ASTM D-4643
g. Moisture-Density Relationship	ASTM D698 or ASTM D1557
h. Hydraulic Conductivity	ASTM D-5084
5. Test Pad. A test pad for the liner can be constructed and used to verify that the construction methods to produce the hydraulic conductivity of 1.0×10^{-7} cm./sec. or less throughout the reconstructed area. However, hydraulic conductivity tests shall be performed in the top 12 inches of the finished liner per Part 3.6 below.
6. Soils Report. A laboratory report of soil and rock characteristics shall be submitted as part of the application. All test results shall indicate the type of test used the method of testing and the condition, preparation, and orientation of each sample.

2.2. PERFORMANCE STANDARDS OF LINER MATERIAL

- A. The soil tests required for preconstruction shall meet or exceed OAC 252:515-11-32. These tests shall be conducted at a minimum rate of one sample per 4,000 cubic yards and for each soil type or visual change in soil appearance.
- B. The minimum performance standards required of recompacted liner material include:
 1. Plasticity Index must be no less than 10 percent and should be less than 30 percent
 2. Liquid Limit must be no less than 24 percent.
 3. Percent Fines Passing #200 Mesh Sieve shall be at least 50 percent.
 4. The amount of gravel (dry-weight percentage retained on the No. 4 sieve) must be less than or equal to 20 percent.
 5. The largest particle size allowed must be less than one (1) inches in diameter.
 6. The water content of the soil must be wet of optimum at the time the soil is compacted. The recommended range is 1 to 3 percent wet of optimum moisture or as determine by field geotechnical testing.

7. After the soil is compacted, it must have a hydraulic conductivity that is no greater than 1.0×10^{-7} cm./sec.

PART 3 - EXECUTION

3.1 SEQUENCE OF CONSTRUCTION

- A. The two (2) foot reconstructed clay liner shall be constructed to the lines and elevations shown on the Contract Drawings and in accordance with these Specifications.
- B. The recompacted liner shall be constructed in the following sequence:
 1. Removal of Overburden
 2. Subgrade Preparation
 3. Two (2) Foot Reconstructed Clay Liner
- C. During all phases of the project, construction will be tested, inspected, and evaluated prior to approval.

3.2 REMOVAL OF OVERBURDEN

- A. CONTRACTOR shall remove and stockpile overburden on-site in a location coordinated with the OWNER.

3.3 SUBGRADE PREPARATION FOR RECOMPACTED LINER

- A. The upper six (6) inches of the surface on which the clay liner is to be placed must be scarified and recompacted to a minimum density of 95 percent of the standard proctor density.

3.4. RECOMPACTED LINER PLACEMENT AND COMPACTION

- A. The steps shall be followed in constructing each lift of a recompacted liner.
 1. Internal side slopes of disposal areas where liner shall be constructed shall be no steeper than 3:1 (run: rise).
 2. Liner material shall be placed at 1 to 3 percent wet of optimum moisture, or as indicated by soil tests. If the soil must be moistened to achieve the proper level of water content, then the water must be distributed equally throughout, and a full hydration of the soil must take place. This may require that the soil be moistened in a separate area and allowed to hydrate for some time before it is placed in the liner. Moisture content must be verified by either a 95% Standard Proctor Test or a 90% Modified Proctor test.
 3. Scarify the surface on which the lift shall be placed to a nominal depth of approximately one (1) inch.
 4. Place a lift of soil at a loose depth of nine (9) inches or less. On the final lift, no more than 5 percent of the final lift thickness determinations can exceed this requirement and no lift thickness can exceed the maximum allowable lift thickness by more than 1 inch.

5. Compact the lift to a depth of six (6) inches or less by the use of a heavy-footed roller with feet that fully penetrate the loose lift of soil and at least 1" into the underlying layer. The minimum weight of roller shall be 3,000 pounds per liner foot along the axis of the drum(s). The soil test results, and the type of compaction equipment used shall determine the minimum number of passes. A pass shall be constituted as one pass for a self-propelled roller or one pass of the drums(s) for a towed roller. The minimum compaction coverage (C) anticipated to meet compaction is 150 to 200 percent, where the Number of passes (N) can be estimated from the following:

$$N = C \cdot A_d / A_f / 100$$

Where:

C	=	Percent of coverage
A _d	=	Surface area drum
A _f	=	Sum of the area of the feet on the drums

6. At least 5 to 15 passes may be necessary to remold and compact the clay liner sufficiently to achieve the required permeability. The minimum density of the lift shall be greater than or equal to 95 percent of the standard proctor density or 90% of modified proctor density. Heavy compaction equipment may require the minimum density to be 95 percent of the modified proctor density, at the discretion of the ENGINEER. The required number of passes shall be observed/determine at least one time, per acre, per lift.
7. Inspect for and remove all rocks, cobbles, roots, and other foreign objects over one inch in diameter, as well as all surface rocks, regardless of size.
8. Inspect for flaws, cracks, and other defects; and,
9. Corrective action will be required in all areas that do not conform with specifications. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.

*The required inspections and removals must be continual as part of the placement of liner material.

3.5. RECOMPACTED LINER CONSTRUCTION TESTS

- A. The following moisture and density tests shall be performed on each compacted lift at a rate of at least three per acre for each approximately six-inch compacted lift. A minimum of two tests shall be performed on the bottom and one on side-slope areas.

1. Determination of moisture values of each lift by one of the following methods:

- | | |
|------------------------------------|-------------|
| a. Nuclear density method | ASTM D-2922 |
| b. Drive-cylinder method | ASTM D-2937 |
| c. Rubber balloon method | ASTM D-2167 |
| d. Sand-cone method | ASTM D-1556 |
| e. Microwave drying method | ASTM D-4643 |
| f. Conventional oven drying method | ASTM D-2216 |

- B. As part of the QC/QA procedures, every tenth sample tested with the above methods; must be tested by the conventional oven drying method (ASTM D2216). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
1. Determination of density values of each lift by one of the following methods:
 - a. Nuclear density method ASTM D-2922
 - b. Drive-cylinder method ASTM D-2937
 - c. Standard Proctor Test or ASTM D-698
Modified Proctor Test ASTM D-1557
- C. As part of the QC/QA procedures, every twentieth sample tested with ASTM D-2922 must be tested with the sand cone method (ASTM D-155, rubber balloon method (ASTM D-2167) or undisturbed sample method (ASTM D-1587). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
- D. Sampling patterns will be based on a grid system establish by the ENGINEER. Tests will be randomly staggered in successive lifts so that sampling points vary in successive lifts. Areas missed by randomly sampling will require additional tests for liner verification.

3.6. RECOMPACTED LINER CONSTRUCTION VERIFICATION TESTS

- A. After completion of recompacted liner construction, the following quality control measures shall be performed and documented.
1. A control survey shall be performed on a 100-foot grid which verifies the thickness of the constructed liner.
 2. A visual inspection shall be performed to ensure liner integrity.
 3. Hydraulic conductivity shall be tested with at least one test per acre performed on the side-slopes and two per acre on the bottom, at DEQ approved locations, in the top 12" of the liner using one of the following methods:
 - a. Laboratory testing of undisturbed soil sample can be done according to ASTM Test Method D-5084 with a maximum confining stress of 35 kPa (5 psi). ASTM Method D-1587 shall be used to retrieve the undisturbed soil sample for an in-situ laboratory test.
 - b. A field test for hydraulic conductivity shall be according to the sealed double ring infiltrometer test (ASTM D-5093).
 - c. Any other method approved in advance by the ENGINEER and/or the OWNER in accordance with OAC 252:515-11-37(c)(2)(c).
 - i. The use of other verification test methods must be approved in advance by ODEQ.
 4. Liner Test Holes
 - a. All test holes deeper than three feet shall be plugged in accordance with OAC 252 :515-7-3 and OAC 785:35-11-2 (b).

- (1) If no contaminated soil and groundwater is encountered in the boring, uncontaminated drill cuttings, uncontaminated surface clay, cement, and/or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout, pellets, or granules shall be placed from the bottom of the boring to an elevation fourteen (14) feet below land surface and a minimum of ten (10) feet shall be filled with cement grout to an elevation four (4) feet below land surface. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (2) If contaminated soil or contaminated groundwater is encountered in the boring, or if the boring is located at an underground storage tank site or within 300 feet of the outside perimeter of an existing wastewater lagoon or is located on a tract of land where a wastewater lagoon is proposed, cement grout shall be placed from the bottom of the borehole to an elevation four (4) feet below land surface. Cement grout shall be placed in the borehole through a tremie pipe and filled r pumped from the bottom upward. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (3) If the boring is twenty (20) feet or less in total depth and groundwater has not been encountered, the boring shall, at a minimum, be filled with compacted uncontaminated cuttings from the bottom of the boring to land surface.
- (4) Direct push geotechnical borings. Direct push geotechnical borings shall be plugged to prevent pollution of groundwater within thirty (30) days after completion of drilling or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter as follows:
 - (a) Bentonite chips shall be placed and effectively compressed within the annulus space from the bottom of the borehole to within ten (10) feet of the land surface.
 - (b) Cement grout shall be installed through a tremie pipe in the remaining annulus space from ten (10) feet to land surface, provide that no cement grout shall be required if the boring is less than ten feet (10') in total depth and no groundwater and no contaminated soil was encountered.
- b. All holes, three feet or less in depth shall be plugged in accordance with OAC 252:515-11-74. All boreholes must be plugged with pelletized or chipped bentonite and rehydrated after the core sampling is completed.
- c. Maximum allowable percentages of failing materials tests shall be as follows:

Test	Maximum Percentage of Outliers
Atterberg Limits	Water Content
Percent fines	Dry Density
Percent Gravel	Number of Passes Required
Clod Size	5%
Hydraulic Conductivity of Laboratory Compacted Soil	5%

10%	3% ^{*1}
10%	3% ^{*2}
	5%

5%

*1 No water content less than 2% nor more than 3% of the allowable value

*2 No dry density values less than 5 lbs. per cubic foot below the allowable Value

Failing tests concentrated in one lift or one area will not be acceptable even if the above percentages are met.

- f. A report, prepared by QCA ENGINEER, of the above quality control measures shall be submitted to the ENGINEER for approval of the Recompacted Clay Liner. All soil property values as required by OAC regulation or this specification shall also be included as well as a summary of all construction testing.

3.7. REPAIR AND/OR REPLACEMENT OF FLAWED RECOMPACTED CLAY LINER

- A. If the liner fails any construction verification tests, the liner shall be repaired or replaced until it meets the requirement. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.
- B. The CONTRACTOR may proceed, at his own risk, to place additional lifts before all test results are available; however, if the QCA ENGINEER rejects the lift based on completed test reports, the defective soil and all overlying materials that have been replaced will be removed and replaced.
- C. All repairs will be certified by the QCA ENGINEER and will be documented in the liner installation and testing report in accordance with QAC 252:515-11-38.

3.8. PROTECTION OF RECOMPACTED CLAY LINER

- A. The recompacted clay liner must be protected from desiccation, freezing, and excess surface water after construction and until the geomembrane liner is completely installed. The Quality Assurance ENGINEER shall certify that the moisture content was maintained in the liner until placement of the geomembrane liner.
1. The CONTRACTOR shall prevent the desiccation of the recompacted clay by any of the following methods or any other method approved by the ENGINEER and QCA ENGINEER:
 - a. Water the soil periodically (preferred).
 - b. Rolling the surface of the recompacted clay liner smooth with a drummed roller to produce a thin, dense layer of soil on the surface to minimize water transfer in and out of the liner.

ALTUS MUNICIPAL LANDFILL – C&D DEBRIS CELL

- c. Cover the recompacted clay liner, temporarily with a geomembrane, moist geotextile, or with moist soil.
2. Damage from freezing is not anticipated, however, should freezing temperatures occur, the recompacted clay liner shall be inspected as outlined in Section 2.9.2.3 of the EPA Document.
3. The CONTRACTOR shall provide adequate equipment to prevent ponding of water on the recompacted liner. Soils softened by excess rain, shall be removed, or allowed to dry by natural processes until the proper water content has been restored. The soil shall be disked and/or recompacted as necessary to restore the soils to meet the requirements of this section.
4. No additional payment shall be made for protecting and reworking the recompacted clay liner as outlined above. Costs to be included in the unit price bid for recompacted clay liner.

END OF SECTION 31 35 26.13

**ALTUS MUNICIPAL LANDFILL
2022 CONSTRUCTION/DEMOLITION CELL
OPERATIONAL PLAN**

FOR

THE CITY OF ALTUS, OKLAHOMA

SEPTEMBER 2023

**CITY OF ALTUS, OKLAHOMA
ALTUS MUNICIPAL LANDFILL
2022 CONSTRUCTION/DEMOLITION CELL
OPERATIONAL PLAN**

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I. GENERAL INFORMATION

This Operations Plan (Plan) is intended to assist the operators of the C&D Cell in operating the facility in accordance with the solid waste permit documents and Oklahoma Administrative Code (OAC) Rules and Regulations as promulgated by the Oklahoma Department of Environmental Quality (ODEQ). The Altus Municipal Landfill is an active municipal solid waste landfill owned and operated by the city of Altus under solid waste permit number 3533005. The Altus Municipal Landfill is located in the southwest quarter of Section 13 Township 2 South, Range 22 West of the Indian Meridian, Jackson County, Oklahoma, approximately 8 miles west of Altus, Oklahoma. The C&D Cell is located in the northern portion of the Altus Municipal Landfill. Any reference to "operator" in this Plan shall mean the individual responsible for the facility on any given day or shift. The individual in responsible charge may assign operational tasks to various personnel. In addition, this Operations Plan shall be available to employees for reference to operations of the facility. It is the responsibility of the C&D Cell to keep this information current. If changes to this Plan are to be made affecting the operations of the facility, then the Altus Municipal Landfill shall notify the DEQ within 5 working days prior to the change implementation.

A. Operating Hours

It is anticipated that the C&D Cell will be open from 7:30 a.m. to 4:00 p.m. Monday through Friday and Saturday from 8:00 a.m. to 11:30 p.m. The daily operation of equipment necessary for compaction and covering waste will normally cease within one hour after the daily closing time.

B. Personnel

The operation of the C&D Cell will be under the direction of a certified solid waste operator. The typical staffing level is listed below:

- Landfill Manager/Operator
- Equipment Operator
- Scalehouse Attendant
- General Maintenance Person
- Truck Drivers

Staff will be modified as necessary to accommodate changes to operations or to meet increased waste flows, as necessary. A properly trained equipment operator or other landfill employee will be present at the working face of the landfill to observe the unloading of waste and to perform and document random inspections of the waste.

C. Access Control

The C&D Cell is located approximately 8 miles west of Altus, Oklahoma on U.S. Highway 62. The site is accessed from N 1960 Road. The entrance to the landfill is on the east side of the property. Per OAC 252:515-19-32, artificial and/or natural barriers shall be used to discourage unauthorized traffic and uncontrolled dumping. Access to the landfill is controlled by a lockable entrance gate. Landfill personnel have appropriately placed signs directing waste hauling vehicles to the working face of the landfill. Scalehouse and operating personnel shall prohibit any unauthorized access and shall record all incidences of unauthorized access. At

the conclusion of each operating day, the entrance gate shall be locked to prohibit vehicle access.

1. Off Site Access Roads

Off site access roads are typically asphaltic construction. These roads were constructed and are maintained by Jackson County.

2. On Site Access Roads

On site access roads include a asphaltic type construction entrance road that runs from the scales to the employee shelter. As the C&D cell is constructed an access road will be constructed of coarse sand and gravel materials excavated from disposal areas from the entrance road to the C&D Cell. The roads are and will remain passable during inclement weather by normal vehicular traffic.

II. SOLID WASTE ACCEPTED/EXCLUDED

This section outlines accepted and excluded wastes, waste screening procedures, waste measuring requirements, and quantity limitation requirements which are applicable to the C&D Cell under OAC 252:515.

A. Waste Acceptance and Exclusion

The C&D Cell is allowed to accept construction and demolition waste. The disposal of any quantity of hazardous, radioactive, friable asbestos, regulated untreated infectious biomedical waste, or regulated polychlorinated biphenyl (PCB) waste is prohibited at the C&D Cell.

Waste should be visually screened at the scale to determine if the shipment contains acceptable waste. Shipments received at the facility shall be rejected if the waste is not deemed acceptable. Shipments of waste entering the State of Oklahoma that are subsequently rejected shall be removed from the State by those persons who transported the waste into the State.

Additional information such as sources of waste, amount received, transporters used, and any special handling or management practices to be employed shall be recorded at the scalehouse and filed within the site's operating record.

B. Waste Screening

The scalehouse attendant will be responsible for screening incoming waste to ensure that prohibited wastes are identified and handled properly. If the scalehouse attendant or other landfill staff refuses such wastes, they will inform customers of the proper disposal alternatives, such as directing them to local facilities that would accept those wastes. This practice is intended to avoid illegal dumping of refused wastes.

Personnel at the site shall conduct routine procedures for the screening and removal of wastes which are not acceptable for receipt at the landfill for disposal. These procedures consist of both routine load screening procedures and random load inspections. Routine load screening procedures include:

- Identifying incoming vehicles by company and vehicle number. Any placards will be noted. Review of paperwork included with incoming

wastes by the scalehouse attendant.

- Visually inspecting each load as it is pushed into the working face by operators trained to recognize regulated hazardous waste.
- Notifying the ODEQ if unacceptable waste is discovered at the site by the end of the next working day. The site's current Waste Exclusion Plan should be referenced for information to include with the notification.

Random load inspections will consist of:

- Conducting random inspections of incoming loads for unacceptable wastes. Inspection of vehicles which contain uncompacted or open top loads will primarily occur at the scalehouse. Enclosed vehicles, such as commercial refuse vehicles, will be inspected at the working face. Loads will be visually observed for unacceptable waste when deposited at the toe of the working face by a landfill employee.
- Ensuring records are maintained on all random inspections which are performed. The information maintained in the records should include, at a minimum, the company or person delivering the waste, type of vehicle, rate and time, type of waste delivered, and person performing the inspection. These records shall be maintained in the operating record of the facility.

Should a particular hauler or refuse from a particular waste generator be suspected of being a source of prohibited waste, routine or planned inspections will be made of the suspected waste at a pull-off area near the truck scale.

C. Waste Measuring

The scale at the C&D Cell is located on the site's access road at the east entrance. All waste delivered to and disposed of at the C&D Cell is weighed on a certified scale. The scale is tested and certified annually in accordance with the requirements of the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF) per OAC 252:515-19-33(a)(2). The SORD should request the ODAFF to test the weighing and measuring of the scale on an annual basis.

If the scale is inoperative, tonnage shall be estimated on a volume basis where one cubic yard of waste shall be calculated to weigh one-third (1/3) ton. Solid waste disposal fees shall be collected and remitted to the ODEQ, except for solid waste received from emergencies or other special events, with prior approval from the ODEQ. Monthly reports shall be filed in the operating record and submitted to the ODEQ no later than the 15th of the month following the reporting period.

D. Limitations on Waste Received

The C&D Cell accepts approximately 255 tons per day of waste. Therefore, the facility is required to prepare a Vegetative Cover Plan under OAC 252:515-19-54. However, the C&D Cell does not need to prepare a Disposal Plan as required under OAC 252-515-19-34(d) because the waste comes from locations less than 50 miles away from the facility.

III. **SURVEY CONTROL**

Horizontal and vertical control must be maintained at the landfill in order to construct the landfill according to the approved permit documents. All boundary markers, benchmarks, horizontal control stations, and construction stakes will be clearly marked and identified.

Permanent monuments designating horizontal and vertical control are already in place at the landfill in the form of monuments with surveyed, permanently stamped information. Evidence of permanent monuments and boundary markers placed by a registered land surveyor are shown on the approved Permit Documents maintained in the facility's operating record.

Permanent vertical control has been established by a registered surveyor on the property. In the event a control monument is damaged or destroyed, a registered land surveyor shall re-establish the monument. The permanent monuments at the property corners are established with markers embedded in concrete or other similar type permanent structures. Boundary markers have been established designating the entire permitted acreage.

Construction staking will be used to mark individual cells where waste is to be placed. Staking will be utilized during landfilling operations to maintain slopes and check filling elevations, as necessary. Stakes will generally be made of wood or some other suitable material for use on a landfill. Construction stakes and temporary benchmarks will be replaced during the landfill operations, as needed.

If established benchmark or horizontal control monuments are disturbed over the life of the facility, these monuments shall be replaced or re-established by or under the supervision of a registered land surveyor.

IV. WET WEATHER MANAGEMENT

Wet weather should not adversely impact landfill operations due to all-weather access roads. Throughout the landfill operation, adequate temporary landfill roads will be constructed to ensure access to the working face of the landfill during all weather conditions.

In order to meet daily cover requirements during wet weather, the landfill will have two options available. An alternative daily cover can be used to limit vectors, blowing litter, and infiltration, and soil material will be available from the borrow area for daily cover if approved in advance by ODEQ. The landfill operations should not be hindered by wet weather.

V. LINER SYSTEM

The liner system at the C&D Cell will be specified in the Quality Assurance/Quality Control (QA/QC) Plan for Liner System Installation and Testing. Liner system material conformance testing, general construction procedures and testing requirements are presented in the QA/QC Plan prior to construction. Each portion of the liner must be constructed under the supervision of a professional engineer licensed in the state of Oklahoma. Before waste can be placed in any newly constructed cell, approval of a Liner Installation and Testing Report must be obtained from the ODEQ.

VI. LEACHATE COLLECTION AND STORAGE

The C&D Cell will not add to the existing leachate retention pond on the southwest corner of the Altus Municipal Landfill per OAC 252:515-13-1(d).

VII. LANDFILLING PROCEDURES

A. Landfill Progression and Sequence of Fill

Refuse trucks will deposit waste in the area identified as the working face. The working face is a sloped surface upon which the waste is compacted in layers. The waste is compacted by the landfill compactor as it is spread. The slope of the working face will be no more than four feet horizontal to one foot vertical (4:1). The compactor will make multiple passes over the waste layer until the waste rebounds the same amount that it was depressed by the compactor. The height of waste will generally not exceed fifteen (15) feet in height and is referred to as a lift. The width of the working face will be kept as small as practical. The waste will be spread and compacted as it is received.

Under the area fill method, waste is placed next to the previous day's waste until an established row length is reached. Another row is then started parallel to the previously constructed row. As the rows form lifts over each area, the top of each landfill lift should slope in such a manner to allow surface runoff to drain away from the working face. After a number of rows have been constructed (creating a lift), a second lift is constructed over the first lift. Waste placement will alternate between various lifts of waste and will allow landfill traffic to discharge waste at various levels. This method will allow the earthmoving equipment to stockpile daily cover at the top of the day's waste, if necessary.

When the last load of refuse for the day has been spread and compacted, the application of 6 inches of daily cover soil or an alternative daily cover (ADC) will begin (see Section VIII.A). Waste will not be placed in areas where the presence of water would prohibit proper spreading of the waste or promote a mosquito problem.

1. Placement of Initial Layer of Waste

Upon completion of cell construction and receipt of approval from the ODEQ, the landfill may begin placing waste in a new disposal cell. Filling should begin at the lowest elevations of each cell and work toward higher elevations to prevent excess leachate generation. The initial lift of waste placed in a cell should be comprised of "select" waste that will not damage the composite liner system and will provide an additional protective layer against freeze/thaw effects. This lift of select waste should be comprised of waste which does not contain long, sharp objects, or bulky material. When placing this select waste lift, a compactor should not be used until a minimum of five feet of waste has been placed over the drainage/protective cover layer. A track dozer can be used to spread waste into the cell while operating on already-placed waste.

2. Placement of Bulky Solid Waste

Bulky waste should be crushed on the ground surface and then pushed onto the working face near the bottom of the fill area. Bulky waste that cannot be crushed should be placed near the bottom of the cell, though not in the first lift of waste.

3. Proper Disposal of Dead Animals

Dead animals accepted for disposal should be covered with solid waste or cover soil immediately upon placement at the open face.

4. Storm Water Management

Per OAC 252:515-19-38(a), solid waste shall not be placed or allowed to enter, accidentally or otherwise, waters that communicate with waters of the state located outside the permit boundary. Storm water that accumulates in or near the active landfill area will be managed to minimize contact with the working face or other exposed waste. Temporary berms will be constructed along the perimeter of each disposal cell to direct potential storm water run-on to the appropriate storm water ditches or structures and to prevent storm water run-off from the working face of the landfill from intermingling with "clean" storm water. In addition, temporary storm water diversion berms or "rain flaps" may be constructed to minimize storm water that enters the leachate collection system. The construction of such berms or "rain flaps" will be dependent on the rate and location of waste placement within each cell.

B. Equipment

The equipment to be used on the site will include but not necessarily be limited to the following (or equivalent):

- Dozer;
- Heavy excavator;
- Haul truck;
- Pan scraper; and
- Water truck

Available equipment will be modified as necessary to accommodate changes in operations or waste flows. All equipment will receive mechanical service on a routine basis. Fire extinguishers will be provided on all landfill equipment.

The manufacturer's recommendations on equipment maintenance will be followed for each piece of landfill equipment. Regularly scheduled equipment maintenance is essential if the landfill equipment is to be dependable. In addition, at the end of each operating day, the equipment operator will remove trash that may be lodged in the operating portion of the equipment tracks or the compaction equipment.

VIII. COVER AND BORROW SOIL

A. Daily Cover

Daily soil cover or an alternative daily cover (ADC) will be applied at the end of each operating day, regardless of weather, as required by ODEQ, to deter disease vectors, fires, odors, and blowing litter. The daily soil cover material should consist of nominally compacted earthen material free of garbage, trash, or other unsuitable material. The minimum thickness of the daily soil cover will be six inches. The frequency of daily cover application may need to be increased in order to provide adequate control of disease vectors, fires, odors, blowing litter, or scavenging.

As an alternative to daily soil cover, the City can seek ODEQ approval for an ADC permit. If a permit is granted, it should be maintained in the site's operating record.

B. Intermediate Cover

Intermediate cover shall be applied to inactive areas of the landfill that are not protected by final cover. The intermediate cover shall consist of 12-inches of nominally compacted earthen material free of garbage, trash, or other unsuitable materials.

C. Final Cover

When the C&D Cell has been filled to final waste elevations, the final landfill cap will be constructed. Terraces and storm water management structures will be constructed at the same time that the landfill cap is installed. The final cover at C&D Cell will be constructed in accordance with the approved Closure and Post-Closure Plan and QA/QC Plan. Cover system material conformance testing, general construction procedures, and testing requirements are presented in the QA/QC Plan.

The final cover will be an evapotranspiration cover system. The cover system will consist of a 12-inch thickness of intermediate cover, a 24-inch vegetation support layer, and a 12-inch vegetation layer (topsoil). Each layer will be constructed to support vegetative growth.

Final cover vegetation must be effective, long-lasting, and capable of self-regeneration and plant succession. Vegetation shall consist of species that are equal or superior to native vegetation during each season of the year. Permanent or interim vegetation shall be established in areas that have been undisturbed for 90 days or more.

Table 1: Typical Seeding Mixtures		
Spring/Summer Planting Season (Optimal Time for Planting — April 1 through May 30)		
Seed Mixture	Minimum Percent Pure Live Seed Required	Pounds Per Live Seeds Required Per Acre
Common Bermuda Grass	85	12
Blue Stem	65	4
Side Oats Grama	65	6
Rye	85	4
Total:		26
Fall/Winter Planting Season (Optimal Time for Planting — September 1 through February 15)		
Seed Mixture	Minimum Percent Pure Live Seed Required	Pounds Per Live Seeds Required Per Acre
Winter Wheat	75	40
Fescue or Rye	85	15
Total:		55

The Typical Seeding Mixtures table shown above lists typical seeding mixtures that will be used for the site during each season and is only provided as a reference. It is understood that a variety of application rates and types of seed mixtures will produce adequate vegetative cover. The seed may be applied to the landfill slopes by various typical application methods such as hydro mulch or seed drilling.

Fertilizer will be applied to the seeded area as needed. The following typical application method should be used:

- Additional soil will be added to the side slopes, as needed, and the soil will be processed using a disk to prepare the soil for seeding.
- Fertilizer will be applied using a commercial spreader at a rate of approximately 150 pounds per acre (lb/acre), and the soil will be simultaneously disked using a disk-harrow. The fertilizer rate may vary. However, an initial rate of 10 (nitrogen) - 20 (phosphate) -10 (potassium) may be used.
- The seed mixture will then be applied using a commercial spreader and the area simultaneously disked using a disk harrow.
- After disking the seeded area, hay will be mulched at a rate of approximately 3 bales (700 to 1,000 lbs each) per acre. To further minimize erosion potential and facilitate moisture retention, the hay will then be "crimped" using a roller to integrate the hay into the soil.

For future areas that will receive final cover, the initial seeding event will occur as follows:

- For final cover that is constructed in the winter, the initial seeding event will consist of a Fall/Winter seed mix, followed by permanent vegetation using a Spring/Summer seeding mixture.
- For final cover that is constructed in the spring, the initial seeding event will consist of a Spring/Summer seed mix, followed by permanent vegetation using a Fall/Winter seeding mixture.

Vegetation will be established during the first possible growing season. Maintenance of the permanent vegetation will typically consist of protection, replanting, maintaining existing grades, repair of erosion damage, and mowing. After the seeds have sprouted, the site will inspect the slopes for areas with no grass or with thin grass. These areas will be reseeded, watered, and fertilized to establish an acceptable permanent vegetation layer. If there are areas where establishing vegetation is unsuccessful, an alternative plan will be developed.

To prevent ponding, the final cover gradient on top of the fill (as measured from the center of the fill area to the break in slope between the top and sides of the fill) shall be four (4) percent, unless otherwise approved by the ODEQ. The final side slope gradient shall not exceed twentyfive (25) percent. Final cover surface contours shall prevent ponding water and erosion of fill areas.

The ODEQ shall be notified in writing prior to the beginning of final closure of the facility or closure of a disposal cell. Closure activities shall begin no later than 90 days after final receipt of wastes at the facility or final receipt of wastes into a disposal cell, as applicable. Closure activities shall be completed within 180 days after closure activities are initiated. Extensions of the closure period may be granted by the ODEQ if the C&D Cell demonstrates that closure will, of necessity, take longer than 180 days and that all steps have been taken, and will continue to be taken, to prevent threats to human health or the environment from the cell or facility.

Upon closing the facility, the C&D Cell shall have a licensed surveyor's plat of the site prepared. The survey plat and detailed description will show, at a minimum, the final contours of the entire site; the permit boundary and boundaries of the disposal areas; the location of gas monitoring wells and extraction systems; the location of groundwater monitoring wells; the location of leachate management systems or surface impoundments; the location of permanent surface drainage structures; aesthetic enhancements; and other relevant information. The site's approved Closure and Post-Closure Plan should be referenced for additional information required for a Certification of Final Closure submittal.

D. Borrow Source

Borrow area for the C&D Cell is located within the permitted waste boundary. Borrow areas which are no longer active shall be reshaped and re-vegetated or otherwise reclaimed to blend with surrounding terrain within 180 days of the date the area ceased being used. Borrow areas shall be maintained as outlined in the site's current Storm Water Pollution Prevention Plan (SWP3).

IX. VECTOR AND AESTHETICS

A. Vectors

In general, vectors will not find suitable harborage in the landfill due to the compaction and covering of the waste. However, if a vector problem should arise, an assessment of the operating conditions will be made and necessary corrective actions will be taken. If the vector problem persists after initial corrective action, a professional exterminator will be hired to mitigate the problem.

B. Litter Control

The C&D Cell will be receiving heavy waste such as concrete, rock, and metal that will prevent wind dispersal. Portable litter fences are used around the active disposal area. Additionally, signage is posted to advise customers to adequately cover their loads to prevent blowing litter and temporary labor used to pick up litter as needed. The site and approach roadways of the C&D Cell shall be cleaned of litter.

C. Special Covering

Waste that is received at the site that may cause a nuisance with blowing litter, dust, or odors will be covered immediately rather than waiting for cover at the end of the day.

X. ENVIRONMENTAL MONITORING

A. Surface Water Monitoring

Surface water will be monitored in accordance with the site's current SWP3. Utilizing sheet drainage as much as practicable and protecting the working face by temporary drainage structures to divert surface runoff from entering or crossing the face as needed. Runoff originating in the working face will be retained. The completed disposal area will be protected from erosion by drainage diversion. A copy of the SWP3 should be maintained within the site's operating record.

B. Storm Water Structure Maintenance

Storm water drainage control structures including diversion ditches and construction of temporary retention ponds will be used at the landfill. Routine maintenance must be conducted on these structures to ensure proper operation. These drainage structures will be inspected in accordance with the facility's SWP3. If erosion damage has occurred to a drainage structure, it will be repaired as soon as possible.

Temporary surface run-on and run-off control will be implemented as operationally necessary to reduce the amount of run-on and run-off coming into contact with the active refuse face of the landfill or to reduce erosion from disturbed areas of the site.

C. Groundwater Monitoring

Groundwater will be monitored in accordance with the approved Groundwater Monitoring Plan for the site, which is maintained in the facility's operating record.

D. Gas Monitoring

Landfill gas will be monitored in accordance with the approved Explosive Gas Monitoring Plan for the site, which is maintained in the facility's operating record.

E. Leachate Monitoring

Leachate monitoring will be conducted as required for recirculation, irrigation, or by the receiving facility when leachate is hauled offsite for disposal. Results of leachate monitoring will be retained in the operating records of the facility.

XI. AIR QUALITY

A. Dust Control

The C&D Cell shall be operated to prevent the discharge of visible fugitive dust emissions beyond the property boundaries. Fugitive dust emissions shall not damage or interfere with the use of adjacent properties or cause air quality standards to be exceeded. The C&D Cell should spray haul roads using a water truck, as needed, when the facility is in operation. Additionally, open burning of solid waste at the C&D Cell is prohibited.

XII. SAFETY

A. Fires

Protection against fires shall include providing fire extinguishers on all landfill equipment and proper maintenance and cleaning of the equipment to remove trash that may be ignited by equipment exhaust.

Landfill personnel will be on alert for indication that an arriving load of solid waste may be smoldering or have the potential to ignite. If a smoking or smoldering load is observed, the solid waste will immediately be pushed or directed away from the active working face and spread out as much as possible. A thick layer of soil will then be spread over the solid waste and compacted to effectively smother the fire. The sealed solid waste will be observed for several days, and if signs of smoke appear, more soil will be spread and compacted over the solid waste. It may be necessary to leave the "hot" solid waste sealed for an extended period of time before incorporating it into the active working face.

If an area of the daily cell should ignite or show signs of smoldering, the area will be excavated to ensure that all of the hot material is segregated from the active face. The excavated solid waste will be pushed as far as possible from the working face and sealed as described above.

B. Emergency Contacts

In the event of an emergency at the C&D Cell, personnel will dial 911 in order to direct the appropriate assistance to the site. Fire, police, and ambulance assistance is available to the site by dialing 911.

C. Communication Equipment

All vehicles, including the compactor, will have a two-way radio capable of communicating with the landfill office. Telephone service is available at the landfill office and can be used for calling emergency equipment (fire, police, or

ambulance) in the event of an accident or other emergency. Additional emergency telephone numbers will be clearly posted near the telephone.

D. Traffic Signs

In addition to the entrance sign described in Section I.C of this report, additional signs will be posted as necessary. These signs may include:

- Directions to active face of landfill,
- Speed limits, and
- Cautionary signs.

XIII. RECORDKEEPING AND REPORTING

The C&D Cell shall maintain operating records at the facility containing records concerning the planning, construction, operation, monitoring, closing, and post-closure monitoring of the facility. Such records shall be maintained until the post-closure monitoring period is terminated. A list of recordkeeping and reporting that should be completed by the C&D Cell is included in the ODEQ Guidance on Recordkeeping and Reporting.

**ALTUS MUNICIPAL LANDFILL
2022 CONSTRUCTION/DEMOLITION CELL
CLOSURE AND POST-CLOSURE PLAN**

FOR

THE CITY OF ALTUS, OKLAHOMA

SEPTEMBER 2023

CITY OF ALTUS, OKLAHOMA
ALTUS MUNICIPAL LANDFILL
2022 CONSTRUCTION/DEMOLITION CELL
CLOSURE AND POST-CLOSURE PLAN

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I. INTRODUCTION

This Closure and Post-Closure Plan provides the criteria necessary to properly close and maintain the C&D Cell area of the Altus Municipal Landfill.

The Closure Plan includes the necessary actions to be completed at the site before the facility can be certified closed and sets forth the maintenance and monitoring during the post-closure period.

The Post-Closure Plan will be in effect for a minimum 30-year period to ensure that the closed landfill facility will retain its integrity and will not pose a threat to human health or the environment.

II. REGULATIONS

This Closure and Post-Closure Plan has been prepared pursuant to OAC 252:515, as promulgated by the Oklahoma Department of Environmental Quality (ODEQ).

A. Closure Requirements

OAC 252:515 requires that all disposal facilities install a final cover system that is designed to minimize infiltration and erosion. The final cover system will consist of an erosion layer/vegetation layer underlain by an infiltration/vegetation support layer. The facility will be closed in accordance with the provisions included in this Closure Plan and in a manner that minimizes the need for further maintenance and controls and minimizes post-closure escape of waste and waste constituents into the environment.

Prior to beginning final closure of the landfill, the owner/operator is required to give notice of intent to close the site. ODEQ regulations require closure to begin a minimum of 90 days after final receipt of waste at the facility or for the disposal area, as applicable. ODEQ requires completion of all closure activities within 180 days following the beginning of closure unless otherwise approved.

ODEQ requires a Certification of Final Closure be prepared and sealed by an independent professional engineer licensed in the State of Oklahoma and signed by the site owner/operator.

ODEQ requires that upon approval of final closure, a notice shall be recorded in the property deed stating that the land has been used as a solid waste disposal facility. The notice shall specify the type, location, and quantity of wastes disposed of at the facility. In addition, the notice shall state that a survey plat and a record of disposal area locations and elevations has been filed with the ODEQ and with an identified city or county, and future uses may be restricted per OAC 252:515-25-57. A file stamped copy of the notice shall be provided to the ODEQ.

ODEQ also requires Closure/Post-Closure cost estimates to be updated if additional active areas are constructed, if final cover is constructed, or the landfill gas collection and control system (GCCS) is expanded. The cost estimates will be updated annually consistent with OAC 252:515- 27-34.

B. Post-Closure Requirements

For current active landfills, OAC 252:515-25-51 requires a 30-year post-closure maintenance period including maintenance of the integrity and effectiveness of the final cover, maintaining and operating the leachate collection system, monitoring

groundwater, and maintaining any gas venting, collection, or monitoring systems.

The ODEQ requires that a Certification of Post-Closure Performance be prepared and sealed by an independent professional engineer licensed in the State of Oklahoma.

III. FINAL COVER SYSTEM

A. Cover System Design

The final cover system for the C&D Cell shall meet the requirements of OAC 252:515-19-53(a). Including, but not limited to, the following requirements:

- The barrier layer shall be at least 24 inches of earthen material with a hydraulic conductivity: (A) less than or equal to the hydraulic conductivity of any bottom liner system or natural subsoils present; or (B) no greater than 1×10^{-5} cm/sec; whichever is less.
- An erosion layer shall be installed above the barrier layer, consisting of at least one foot of soil capable of sustaining plant growth..
- To prevent ponding, the final cover gradient on top of the fill, as measured from the center of the fill area to the break in slope between the top and sides of the fill, shall be four percent (4%) (25:1), unless otherwise approved by the DEQ.
- Final side slope gradient shall not exceed twenty-five percent (25%) (4:1).
- Vegetation. Vegetation meeting the requirements of OAC 252:515-19-54(3), (4), and (5) shall be established during the first growing season.
- Surface contours, including final grading of completed disposal areas, shall prevent ponding of water and erosion of fill areas. 70
- The final cover material shall be free of garbage, trash or other unsuitable material.
- A flexible membrane liner equivalent to that used in the bottom liner system shall be installed between the barrier layer and the erosion layer at MSWLFs equipped with a composite liner.

The DEQ may approve the use of an alternative final cover design upon a demonstration the alternative provides equivalent protection to that afforded by the requirements listed above.

B. Cover System Installation

The final cover should be constructed in accordance with the approved permit documents and design plans. The intermediate cover soils will be placed by the owner over the completed waste fill prior to installing the final cover system. The material used for the vegetation support layer shall classify as CL, CH, ML, SM, or SC according to the Unified Soil Classification System. The vegetation support layer material should be placed in one 24-inch lift. The material will be compacted by tracking in the material with low pressure earth moving equipment.

The vegetation layer will be placed over the vegetation support layer. This layer will consist of soil suitable for sustaining vegetative growth. The soil will be placed in one lift (12-inch minimum thickness) over the entire surface of the final cover and compacted in place with low pressure earth moving equipment.

Individual areas of the C&D Cell may be closed in phases. The requirements of OAC 252:515-25-32(b)(2) and OAC 252:515-25-32(b)(3) will be prepared and provided for each final cover phase. At this time, it is anticipated the final cover will be constructed in one phase at the time of closure. To reduce financial assurance for the disposal area closed in a phased closure scenario, a certification prepared and sealed by an independent professional engineer licensed in the State of Oklahoma shall be submitted to the ODEQ. The ODEQ must approve closure of the disposal area before financial assurance may be reduced. The certification shall:

- Certify that the area was closed according to the approved permit documents, design plans, QNQC plan, and applicable rules and regulations; and
- Contain a closure report with related drawings, plans, or specifications describing how closure was performed.

IV. BORROW AREAS

Onsite and offsite soil borrow areas will be re-shaped and vegetated to blend in with the surrounding terrain within 180 days of the time that they are no longer utilized. After vegetation is established in the borrow areas, these areas will be routinely inspected throughout the life of the site and the Closure/Post-Closure periods. The vegetation cover will be capable of self- regeneration and will require no maintenance. If bare spots develop, then the area will be re- seeded and maintained (e.g., watered and fertilized) until the vegetation is re-established. Also during these inspections, the slopes will be inspected and if necessary re-shaped to maintain their grades.

V. CLOSURE PROCEDURES

A. Closure Sequence

The C&D Cell will conduct ongoing closure of the landfill throughout its active life. This procedure allows for successive closures of fill areas by placement of final cover, construction of drainage and erosion control features, and establishment of vegetative cover. It is anticipated that, where possible, portions of the landfill will be closed as additional phases are constructed. If the site is to undergo premature closure, closure activities would be required only on those areas of the site that had been constructed and received waste. The C&D Cell will submit a permit modification to the ODEQ showing redesigned final contours and permanent storm water structures in accordance with the Oklahoma Administrative Code (OAC) Rules and Regulations prior to premature closure of the landfill.

B. Closure During Active Life

As described above, the final cover will be constructed as fill areas achieve the design grades. Should complete closure of the landfill become necessary at any time during the active life of the landfill, the following steps will be taken:

- Engineering plans will be developed to address site closure at the time of discontinued waste filling;
- The final waste received will be placed and properly compacted;
- Excavations will be filled with suitable material, and the site will be graded to promote runoff and prevent ponding;
- The final cover system will be constructed according to specifications;

- The top of the landfill will be re-graded and re-shaped as needed to provide the proper slope for positive drainage;
- During the first growing season, following application of final cover, the site will be vegetated with permanent vegetation;
- Additional soil will be added to the side slopes, as needed, and processed using a disc to prepare the soil for seeding;
- A surface water management system will be constructed to minimize erosion;
- Reworking or replacing defective groundwater monitoring wells, gas wells, and other defective monitoring equipment, if any;
- Collecting and analyzing soil and water samples;
- Disposing of final wastes and affected soils;
- A closure certification report will be prepared by an independent registered professional engineer in the State of Oklahoma and submitted to ODEQ for approval; and
- All proper notices and documentation will be filed with the appropriate agencies.
- The largest area ever requiring final cover during the active life would be 10 acres.
- It is estimated that the maximum inventory of waste ever on-site over the active life of the facility would be 455,929 cubic yards.

C. Additional Closure Information

There are currently two onsite structures. These structures along with all other structures that are on site at the time of final closure will be removed or decommissioned. The office and maintenance building are not located on the permit boundary. All equipment used during the operation and closure of the landfill will be removed from the site after final closure has been certified as complete.

The access roads will be maintained throughout the active life and post-closure period of the landfill. Facilities at the site, including the perimeter fencing, will be maintained throughout the post-closure period.

Prior to initiating closure, the existing conditions and applicable regulations will be re-evaluated to ensure that this Closure Plan is still applicable.

VI. CLOSURE SCHEDULE

The site will be closed in an orderly fashion, consistent with OAC 252:515-25-33. The final closure schedule is as follows:

- The ODEQ shall be notified in writing prior to beginning final closure of Altus Municipal Landfill or closure of the C&D Cell;
- Closure activities shall begin no later than 90 days after final receipt of wastes at the Altus Municipal Landfill or final receipt of wastes into the C&D Cell;
- Closure activities shall be completed according to the approved Closure Plan within 180 days after closure activities are initiated; and
- Extensions of the closure period may be granted by the ODEQ if Altus Municipal Landfill demonstrates that closure will, of necessity, take longer than 180 days, and that all steps have been taken, and will continue to be taken, to prevent threats to human health or the environment from the unclosed cell or facility.

A. Certification of Final Closure

Upon completion of closure activities, a professional engineer registered in the State of Oklahoma will submit a certification of final closure to the ODEQ, certifying that the facility or disposal cell was closed in accordance with approved permit documents and this closure plan. The certification of final closure shall:

- Be signed by the owner/operator;
- State the facility was closed according to the approved closure plan, the permit documents, and applicable rules;
- Contain a closure report with related drawings, plans, or specifications describing how closure was performed;
- Indicate whether inspection of gas, groundwater, or surface water monitoring has shown the presence of elevated levels of any constituent or if any evidence of contamination related to site operations has been found and, if so, what corrective measures were taken; and
- Include a final closure map. The final closure map shall show as-built conditions at the time of closure including but not limited to:
 - Final contours of the entire site;
 - The final permit boundary and boundaries of disposal areas;
 - The location of gas monitoring probes;
 - The location of groundwater monitoring wells;
 - The location of leachate management systems or surface impoundments;
 - The location of permanent surface drainage structures;
 - Aesthetic enhancements; and
 - Other relevant information.

B. County Land Records Notice

The ODEQ shall approve the final closure of the facility before the post-closure period can begin. Upon approval of the final closure of the facility, a notice shall be recorded in the land records of the property for Carter County giving notice in perpetuity that the site was used for the disposal of municipal solid waste and is now closed. The notice shall specify the type, location, and quantity of wastes disposed. The notice shall also identify the required post-closure monitoring period and state that the facility will be monitored for at least 30-years; that a survey plat and record of the disposal area's locations and elevations have been filed with the ODEQ and with an identified city or county; and that future uses may be restricted in accordance with OAC 252:515-25-57. The C&D Cell is responsible for providing a file-stamped copy of the notice to the ODEQ.

VII. CLOSURE COST ESTIMATE

Closure estimates and the amount of financial assurance provided must be increased if, at any time during the active life, changes to the closure plan of the facility increase the maximum cost of closure. Proposals for reduction of closure cost estimates and the amount of financial assurance required must be submitted to the ODEQ for approval. To qualify for a reduction, the cost estimate must be demonstrated to exceed the minimum cost of closure during the remaining life of the facility, the amount of security remaining after the reduction must adequately cover the estimated closure cost yet to be performed, and financial assurance shall not be reduced until ODEQ approval has been granted.

At a minimum, cost estimates for closure shall be adjusted no later than April 9th of each year; the adjustment must be submitted to the ODEQ for approval. In the adjustment, maximum costs of closure may be recalculated, in current dollars, in accordance with OAC 252:515-27-51. If there are no significant changes to the closure plan, the cost estimate may be adjusted by use of an inflation factor derived from the most recent annual Implicit Price Deflator for Gross National Product or the Implicit Price Deflator for Gross Domestic Product published by the U.S. Department of Commerce in its Survey of Current Business in a year for which the adjustment is made. The approved adjusted cost estimate shall be placed in the operating record.

VIII. POST-CLOSURE ACTIVITIES

A. Monitoring and Maintenance

In accordance with OAC 252:515-25-51(b), post-closure care maintenance will commence immediately upon ODEQ approval of final closure. Post-closure activities will continue for a period of 30 years, unless the ODEQ approves a post-closure period of a different duration. Documentation pursuant to OAC 252:515-3-34 is on file with DEQ showing that they have legal right to access all property subject to post-closure care requirements.

Post-closure inspections shall be performed on a quarterly basis. Additional inspections may be conducted to observe repairs or evaluate problem areas discovered during prior inspections.

The quarterly post-closure inspections will consist of the inspection and evaluation of the final cover system and vegetative cover, the drainage and erosion control structures, the leachate collection system, and the security system. The frequency and specific inspections associated with the groundwater monitoring and gas monitoring programs are addressed in the C&D Cell's Groundwater Monitoring Plan and Explosive Gas Control Plan. During inspections, in accordance with OAC 252:515-25-53(4)(B), reworking or replacing defective groundwater monitoring wells and other defective monitoring equipment and installing new wells and equipment as required will also take place.

1. Final Cover

Post-closure care will verify the integrity of the final cover system and its ability to minimize infiltration and erosion. The following conditions should be examined during the inspection:

- Settlement;
- Cracking;
- Erosion;
- Animal burrows; and
- Other disturbances affecting either the thickness or configuration of the final cover.

Maintenance and repairs should be conducted as soon as practical and may consist of filling in areas of settlement, re-grading, and slope restabilization. In areas of substantial settlement or displacement of the final cover, the integrity of the cap should be re-evaluated and any necessary repairs made. The final cover should be maintained to provide

the proper slope to promote surface water runoff and to assure continuity of the soil components to minimize infiltration and leachate production. Settlement that occurs on side slopes of the landfill will generally not require re- grading or placement of additional cover to maintain surface drainage. Side slopes are designed no greater than 4:1 (horizontal: vertical) slope, and the crown of the landfill area slopes at a minimum of four percent to minimize the effect of settlement. With these slope conditions, it is anticipated that minimal soil will be required during the post-closure care period for maintenance of this site.

Included as part of the final cover system inspection, the integrity of the vegetation and its ability to minimize infiltration and erosion will be determined. The following conditions should be examined during the inspection:

- Erosion;
- Overgrowth of shrubs, trees, and other deep-rooted vegetation; and
- Patches of dead vegetation.

Maintenance and repairs of the vegetative cover may consist of the following activities:

- Reseeding, fertilizing, liming, and mulching of washed out areas;
- Brush removal; and
- Mowing.

Reseeding should be conducted as necessary to assure proper vegetative growth over all areas of the final cover. Mowing and removal of deep-rooted brush and vegetation should be performed as necessary during the growing season.

2. Borrow Area Reclamation

The borrow areas will have a gently sloping topography to provide wet weather drainage. The borrow area will be excavated in a manner which results in final contours similar to those present before disturbance, except the area will have a lower elevation. The areas will be excavated in a manner to provide positive drainage and to possibly create one or more impoundments. In the case that impoundments are proposed/constructed, all applicable permits will be obtained and copies provided to the ODEQ.

Activities will be scheduled to minimize erosion and sedimentation. The borrow area will be re-graded in a manner to provide sufficient soil material for the re-establishment of vegetation. Re-vegetation activities will be completed as needed during the spring or fall growing seasons.

3. Drainage and Erosion Control Structures

Drainage and erosion controls will be inspected throughout the post-closure period to assure that surface water is conveyed away from the landfill to the perimeter drainage system. Items or conditions to be examined include the following:

- Erosion;
- Settlement;

- Structural integrity of berms, letdown structures, and other drainage and erosion control structures; and
- Silt and sediment buildup.

Maintenance and repairs should be conducted as soon as practical, and may consist of the following activities:

- Replacement of riprap, gabions, or other structural lining installed for erosion protection;
- Removal of obstructions to permit conveyance of surface water;
- Placement of fill and re-grading;
- Removal of silt and sediment;
- Repairs to berms; and
- Repair or replacement of stacked hay bales or silt fencing.

4. Leachate Collection System

Post-closure care of the leachate collection system consists of operation and maintenance of the leachate collection system, as well as any storage, pumping, or conveyance systems. As required per OAC 252:515-25-54(b)(2)(B), the leachate collection system will be equipped with a system for automatic and continuous leachate removal not requiring intervention by the owner/operator.

The leachate collection system will be observed during each scheduled inspection event throughout the post-closure period. Based on the results of the inspections, more frequent or less frequent monitoring may be required due to problems with the system or changes in the rate of production of leachate. During these inspections, leachate collection sumps and/or piping, cleanouts, or inspection points will be observed to determine the effectiveness of the system in removing leachate and minimizing the head on the liner system.

Maintenance, on an annual or otherwise as-needed basis, may include flushing and pressure cleaning of the leachate collection and removal pipes.

5. Groundwater Monitoring System

Semi-annual groundwater monitoring of the monitoring network wells will be completed in accordance with the most recently approved groundwater monitoring plan.

6. Surface Water Monitoring Plan

During site inspections, surface water control structures (drainage swales, letdown channels, perimeter channels, culverts, and detention ponds) will be inspected to ensure they are functioning properly. Any problems noted during the inspection will be addressed as soon as reasonably possible.

7. Landfill Gas Monitoring System

Monitoring of explosive gas monitoring wells located along the site boundary will be conducted on a semi-annual basis during the post-closure period as outlined in the most recently approved explosive gas monitoring plan.

8. Site Security and Access Control

Post-closure care of the security system is necessary to control unauthorized access and prevent illegal dumping of wastes. Inspection of the security system at the site should be performed during the post-closure inspections. Signs shall be posted on the outer perimeter indicating the site is a closed MSWLF, as required by OAC 252:515-25-54(a)(l). The closed facility will be maintained as necessary to provide access to the closed areas throughout the post-closure period.

IX. POST-CLOSURE COST ESTIMATE

A cost estimate for post-closure care of the landfill, including costs for the activities described above, is provided in Appendix A. This estimate includes the following costs:

- Quarterly site inspection,
- Site security and access control,
- Final cover erosion and seeding repair,
- Semi-annual groundwater monitoring,
- Surface water control structure maintenance,
- Semi-annual explosive gas monitoring,
- Leachate collection, disposal, and system maintenance,
- Annual reporting, and
- Certification and recordkeeping.

Post-closure estimates and the amount of financial assurance provided must be increased if, at any time during the active life, changes to the closure plan of the facility increase the maximum cost of post-closure. Proposals for reduction of post-closure cost estimates and the amount of financial assurance required must be submitted to the ODEQ for approval. To qualify for a reduction, the cost estimate must be demonstrated to exceed the minimum cost of post-closure during the remaining post-closure care period, the amount of security remaining after the reduction must adequately cover the estimated post-closure cost yet to be performed, and financial assurance shall not be reduced until ODEQ approval has been granted.

At a minimum, cost estimates for post-closure shall be adjusted no later than April 9th of each year; the adjustment must be submitted to the ODEQ for approval. In the adjustment, maximum costs of post-closure may be recalculated, in current dollars, in accordance with OAC 252:515-27-51. If there are no significant changes to the post-closure plan, the cost estimate may be adjusted by use of an inflation factor. The inflation factor can be derived from the most recent annual Implicit Price Deflator for Gross National Product or the Implicit Price Deflator for Gross Domestic Product published by the U.S. Department of Commerce in its Survey of Current Business in a year for which the adjustment is made. The approved adjusted cost estimate shall be placed in the operating record.

If corrective action is required at the C&D Cell, cost estimates for corrective action shall be submitted to the ODEQ for approval. The cost estimates shall be a detailed written estimate, in current dollars, of the cost of hiring a third party to perform the corrective action in accordance with an approved corrective action plan. The corrective action cost estimate shall be set by the ODEQ and account for the total costs of corrective action activities as described in an approved corrective action plan for the entire corrective action period. The amount of financial assurance provided must be increased to account for corrective action costs.

X. FINANCIAL ASSURANCE INSTRUMENT

At a minimum, the financial assurance instrument (FAI) shall be updated no later than April 9th of each year. Updates will address modifications to the landfill's closure and post-closure requirements, if any, and the associated cost estimates. If there are no significant changes to the post-closure plan, the cost estimate may be adjusted by use of an inflation factor. The inflation factor can be derived from the most recent annual *Implicit Price Deflator for Gross National Product* or the *Implicit Price Deflator for Gross Domestic Product* published by the U.S. Department of Commerce in its *Survey of Current Business* in a year for which the adjustment is made. The current FAI shall be placed in the operating record.

XI. POST-CLOSURE LAND USE

There are no current planned uses for the C&D Cell after closure. Should use of the closed landfill not associated with solid waste activities be considered, plans will be prepared and submitted to the ODEQ for review and approval per OAC 252:515-25-55.

XII. POST-CLOSURE REPORTING REQUIREMENTS

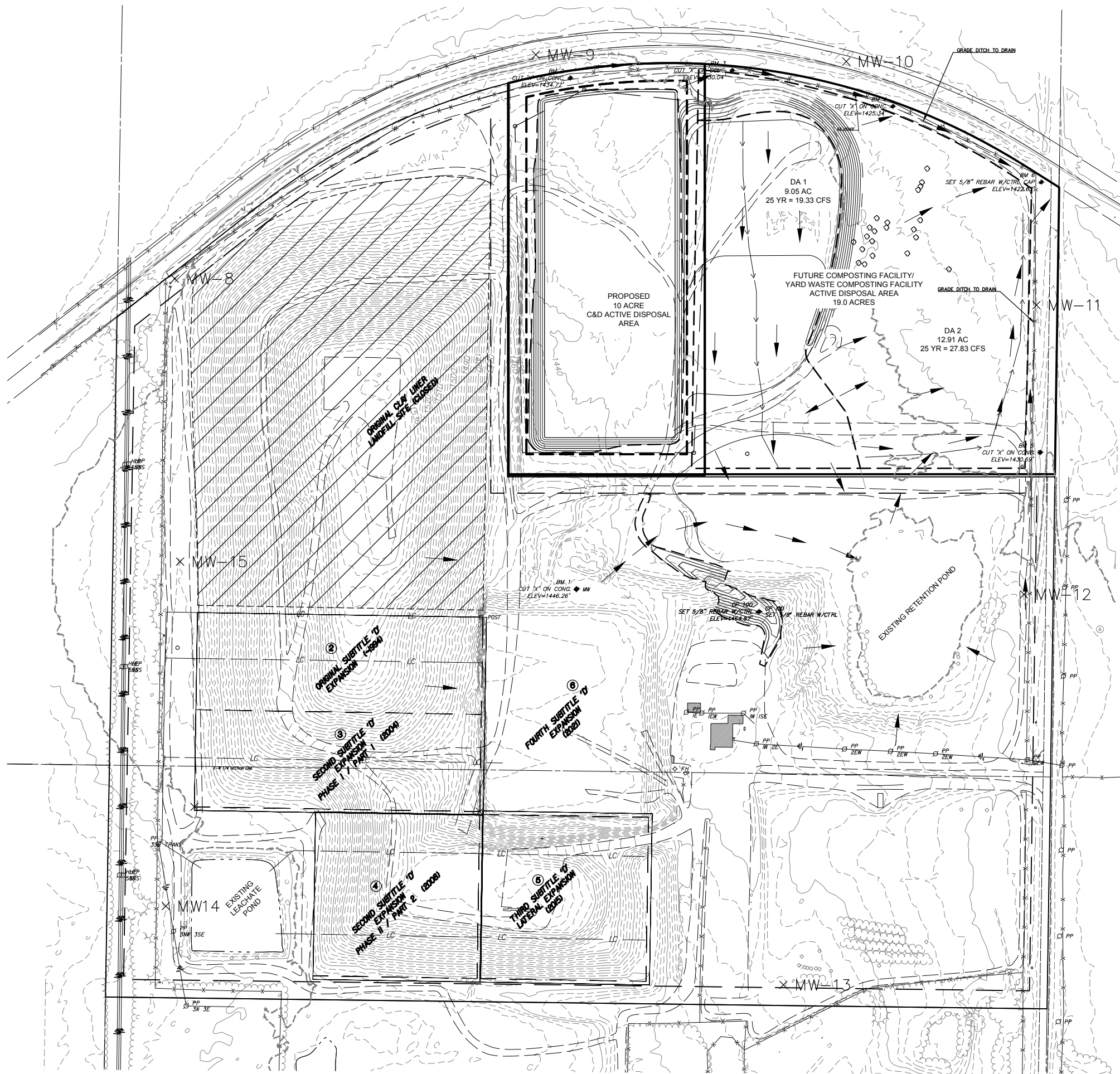
A. Annual Post-Closure Report

Beginning one year after the ODEQ's approval of the certification of final closure, Altus Municipal Landfill will submit an annual post-closure maintenance and monitoring report to the ODEQ until the post-closure period ends. This report will document the maintenance performed at the site and summarize all monitoring data for the previous year. The report shall be submitted by April 9th of each year after ODEQ's certification of final closure.

B. Certification of Post-Closure Performance

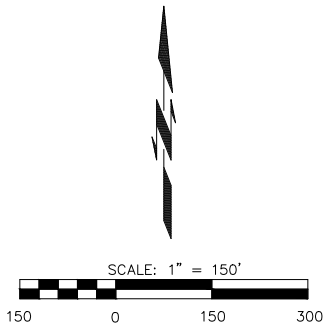
At the conclusion of the post-closure period, Altus Municipal Landfill will submit, in lieu of the annual post-closure report, a certification prepared and sealed by a professional engineer registered in the State of Oklahoma certification, indicating that the C&D Cell was maintained and monitored in accordance with the approved post-closure plan, the permit, and applicable regulations. This certification will also indicate whether monitoring throughout the post-closure period has shown the presence of elevated levels of any constituent or if any evidence of contamination related to site operations has been found and, if so, what corrective measures were taken. The certification will be maintained in the site operating record.

Monday, October 9, 2023 2:51:18 PM



LEGEND

- PROPOSED MSWLF
- 50' BUFFER FROM PERMIT BOUNDARY
- CELL IDENTIFICATION NUMBER
- APPROXIMATE LIMITS OF EXISTING LINER
- APPROXIMATE BOUNDARY OF C&D LANDFILL
- APPROXIMATE LIMITS OF PROPOSED ACTIVE DISPOSAL AREA OF C&D LANDFILL
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH



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CA# 6414 EXPIRES 6/30/2024

ALTUS MUNICIPAL LANDFILL
C&D DEBRIS CELL
JACKSON COUNTY, OKLAHOMA

DRAINAGE AREA MAP	
DESIGNED BY	BSS
DRAWN BY	MLP
REVIEWED BY	RPR
PROJECT NUMBER	22-117
DATE	10/09/2023
REVISIONS	
SHEET NUMBER	
1	

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