Scott A. Thompson
Executive Director

OKLAHOMA Environmental Quality

Kevin Stitt
Governor

August 6, 2022

Scot Rigby, City Manager
City of Edmond
c/o Kris Neifing, Director of Water Resources
P.O. Box 2970
Edmond, Oklahoma 73083

Re: Amendment to Add Biosolids Land Application Site - Approved
City of Edmond Coffee Creek Wastewater Treatment Facility
Sludge Management Permit No. 3555039
Facility No. S-20724
OPDES Permit No. OK0026026

Dear Mr. Rigby:

On June 23, 2022, the Oklahoma Department of Environmental Quality (DEQ), Water Quality Division (WQD), received the City of Edmond's request to add two (2) land application sites. On July 28, 2022, DEQ received additional information on the sites' characteristics. Approval of the sites is granted based on the information provided.

APPROVED:

Site KP03: 31 acres located within the NE¼ of Section 16, Township 13 N, Range 1 E of the Indian Meridian, Oklahoma County, Oklahoma.

Site MAC1: 42 acres located within the SW¼ of Section 27, Township 15 N, Range 1 E of the Indian Meridian, Oklahoma County, Oklahoma.

The site application approved is subject to the provisions of City of Edmond Sludge Management Permit No. 3555039 and should be made a part of the permanent record. Any change or deviation from the permit must be approved in writing by DEQ.

If you have any questions, you can contact me at (405) 702-8109.

Sincerely,

Toby Harden, P.E., District Engineer
Municipal Wastewater Enforcement Section
Water Quality Division

TWH/MM/hb

cc: Ruben Ayala, WRRF Supervisor, City of Edmond
Stephen Henry, ECLS, OKC DEQ Office
Ryan McIntosh, Regional Manager, ECLS, DEQ

Oklahoma Department of Environmental Quality
707 N. Robinson, OKC OK 73102-6010

Application for Municipal Sludge Land Application Permit

As required by the Oklahoma Environmental Quality Code

This application is to be submitted to obtain a Municipal Sludge Land Application Permit.
Application, plans, and specifications submitted in triplicate through the County DEQ personnel.

To the Executive Director of The Department of Environmental Quality
Department of Environmental Quality
Water Quality Division
P.O. Box 1677
Oklahoma City, OK 73101-1677

Date: 6-10-2022

Application

The applicant, Ruben Ayala (Name of Applicant (Print or Type)), proposes to land apply sludge generated at Coffee Creek WRRF (Name of Treatment Plant (Print or Type)), facility ID No. S-20724, located at 1600 N. Midwest Blvd, Edmond, OK 73034 (Legal Description).

Ruben Ayala (Name of Applicant), hereby makes application for a permit to land apply sludge as required by OAC 252:606 of the Oklahoma Environmental Quality Code, 27A O.S. Supp. 2000, Section 2-1-2-101 et seq., the Solid Waste Management Act, 27A:2-10-101 et siq., Article VI of the Code [Water Quality], 27A:2-6-101 et siq., the Oklahoma Pollutant Discharge Elimination System Act, 27A:2-6-201 et sig. And any rules and regulations pursuant thereto.

Applicant Signature

Note: Application must be signed by the authorized chief elective or executive officer of the applicant. Information must be legible.

Signature	City of Edmond (Name of Organization (Print or Type))
Kris Neifing (Name of Authorized Signature (Print or Type))	1600 N. Midwest Blvd (Street Address (Print or Type))
Director of Water Resources (Title)	Edmond, OK 73034 (City State Zip Code)

COUNTY DEQ PERSONNEL ONLY	DO NOT USE THIS SPACE - ODEQ ONLY
I have had the opportunity to review this application and comment on it. Signature: _____ Title: _____ County: _____ Date: _____	

SITE NAME/ DESIGNATION	STREET NAME (if applicable)	LEGAL DESCRIPTION (including county)	LONGITUDE LATITUDE
KP03		Section 16-T13N-R1E	Lat. 35,60613°N Lon. 97, 19,559° W
MAC1		Section 27-T15N-R1E	Lat 35,91415°N Lon 97,45076°W

EDMOND WATER RESOURCES

June 23, 2022

Facility ID # S-20724

Compliance Unit

Water Quality Division

Oklahoma Department of Water Quality

PO box 1677, Oklahoma City, OK

RE: Additional Biosolids Land Application Sites

Dear Myles Mungle

Please find attached copies of land owner/farmer agreements, associated lab sample data, and appropriate maps for the following new land application sites.

KP03) 31 acres located in Oklahoma County in the NE ¼ section of Section 16, Township 13 N Range 1 East of North Peebly Road.

MAC 1) 42 acres located in Logan County in the SW ¼ section of Section 27, Township 15 N Range 1 East of Luther Road.

The sites subject to approval is part of the City of Edmond, Coffee Creek WRRF's Sludge Management Plan permit # OK0026026 and should be made part of the permanent record.

If you have any question regarding this report, please contact Ruben Ayala, Coffee Creek supervisor at (405)216-7709

Sincerely ,

Ruben Ayala, Coffee Creek WRRF Supervisor

LAND OWNER AGREEMENT

Land Owners Name: _____

Address: _____

Phone Number: _____

This letter is for the purpose of authorizing the application of biosolids to my farm located: (include county & legal description)

OKla -

KP03 - Oklahoma County Section 16, T13N, R1E

Below is a list of conditions I have agreed to follow and report any of these conditions which are violated.

1. All animals shall be excluded for 30 days from the area where biosolids has been applied.

2. Direct human consumption food chain crops, which touch the amended soil, shall not be grown for 14 months.

3. The access to general public shall be controlled for 12 months.

4. Biosolids shall be incorporated the same day it is delivered.

5. Biosolids applied to land within the 100 year flood plain shall be applied prior to the rainy season and a vegetative crop established.

6. Biosolids shall not be applied within two feet of the highest seasonal water table.

7. Biosolids shall not be applied to land having a slope exceeding 10 percent.

8. Biosolids shall not be applied to land within 100 feet of stream or a standing body of water used for a potable water source.

9. Biosolids shall not be applied within 250 feet of a private water supply or 600 feet of a public water supply.

10. No on site storage of biosolids. No stockpiling of biosolids.

11. Each annual application shall be followed by a crop.

Date: 6-21-22 Signature: _____

FARM OPERATOR'S AGREEMENT
AGRICULTURAL BENEFICIAL BIOSOLIDS
APPLICATION PROGRAM

NAME: _____

ADDRESS: _____

PHONE NUMBER: _____

ACRES: 31

CROPS: Bermuda & wheat

COUNTY: OKLA

This letter is for the purpose of requesting application of sludge to agricultural land I operate. Below is a list of conditions I have agreed to follow and will report any of these conditions which are violated.

1. All animals shall be excluded for 30 days from the last date of application based on the area where biosolids have been applied.

2. Direct human consumption food chain crops that are grown above the ground shall not be grown for 14 months.

3. The access to general public shall be controlled for 12 months.

4. Biosolids shall be incorporated into the soil at the time of application.

5. Biosolids applied to land within the 100 year flood plain shall be applied prior to the rainy season and a vegetative crop established.

6. Biosolids shall not be applied within two feet of the highest seasonal water table.

7. Biosolids shall not be applied to land having a slope exceeding 10 percent.

8. Biosolids shall not be applied to land within 100 feet from a stream or United States body of water, or which is intended for human consumption.

9. Biosolids shall not be applied with 250 feet of a private water supply or 600 feet of a public water supply.

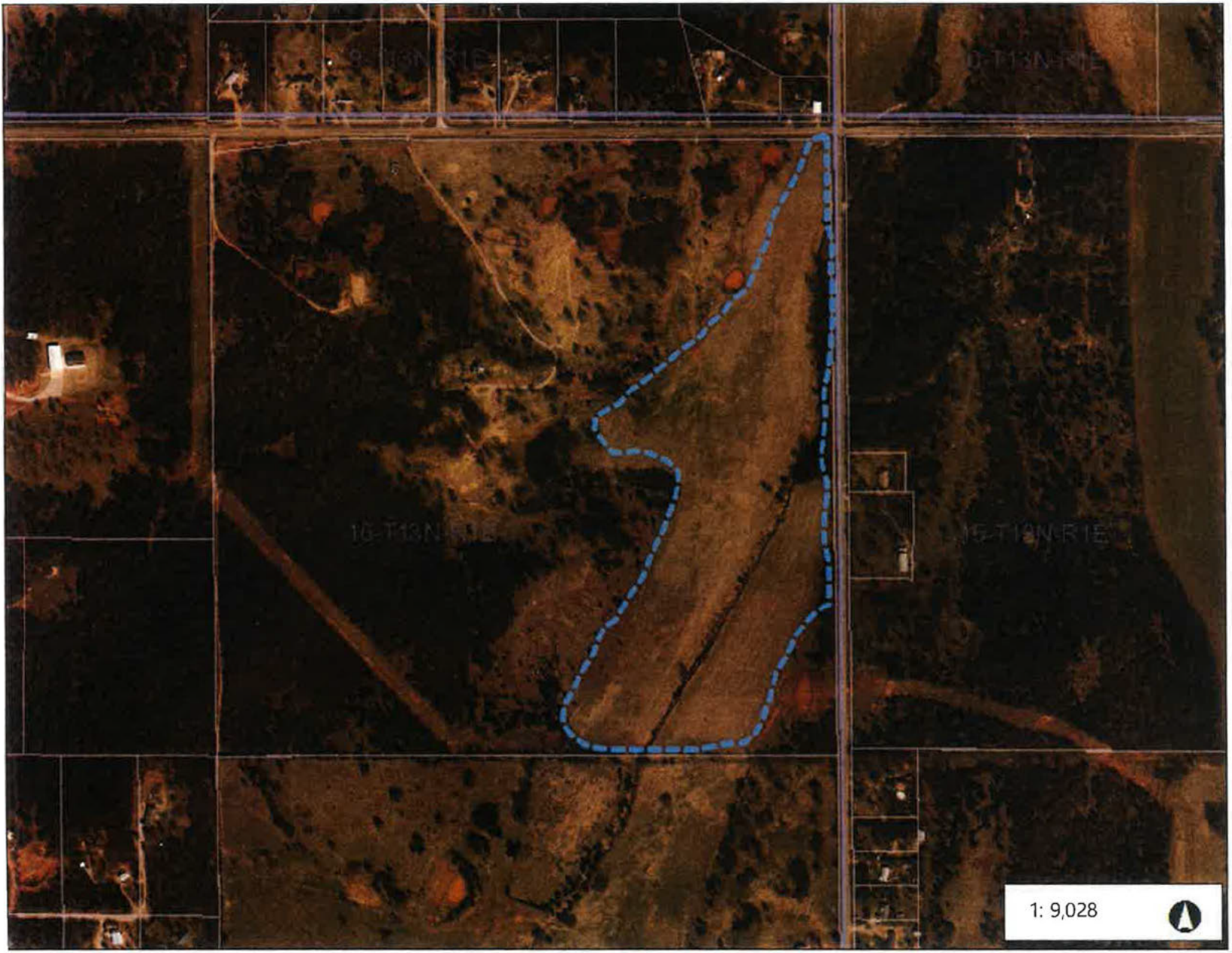
10. No on site storage of biosolids. No stockpiling of biosolids off site.

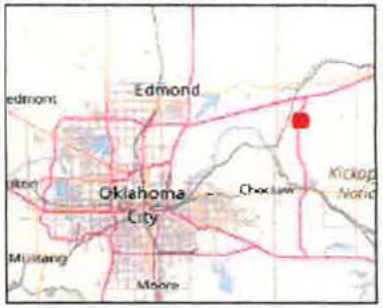
11. Each annual application shall be followed by a crop.

Date: 6-22-22 Signature: Kenneth Lam

Larry Stein Oklahoma County Assessor
Online Mapping

Oklahoma County Assessor KP03





Legend

- Sections (>1:40,000)
- Parcels
- OK County Boundary

16-T13N-R1E NE

31 Acre

LAT: 35,60613°N
LON: 97,19559° W

1: 9,028

0.3 0 0.14 0.3 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

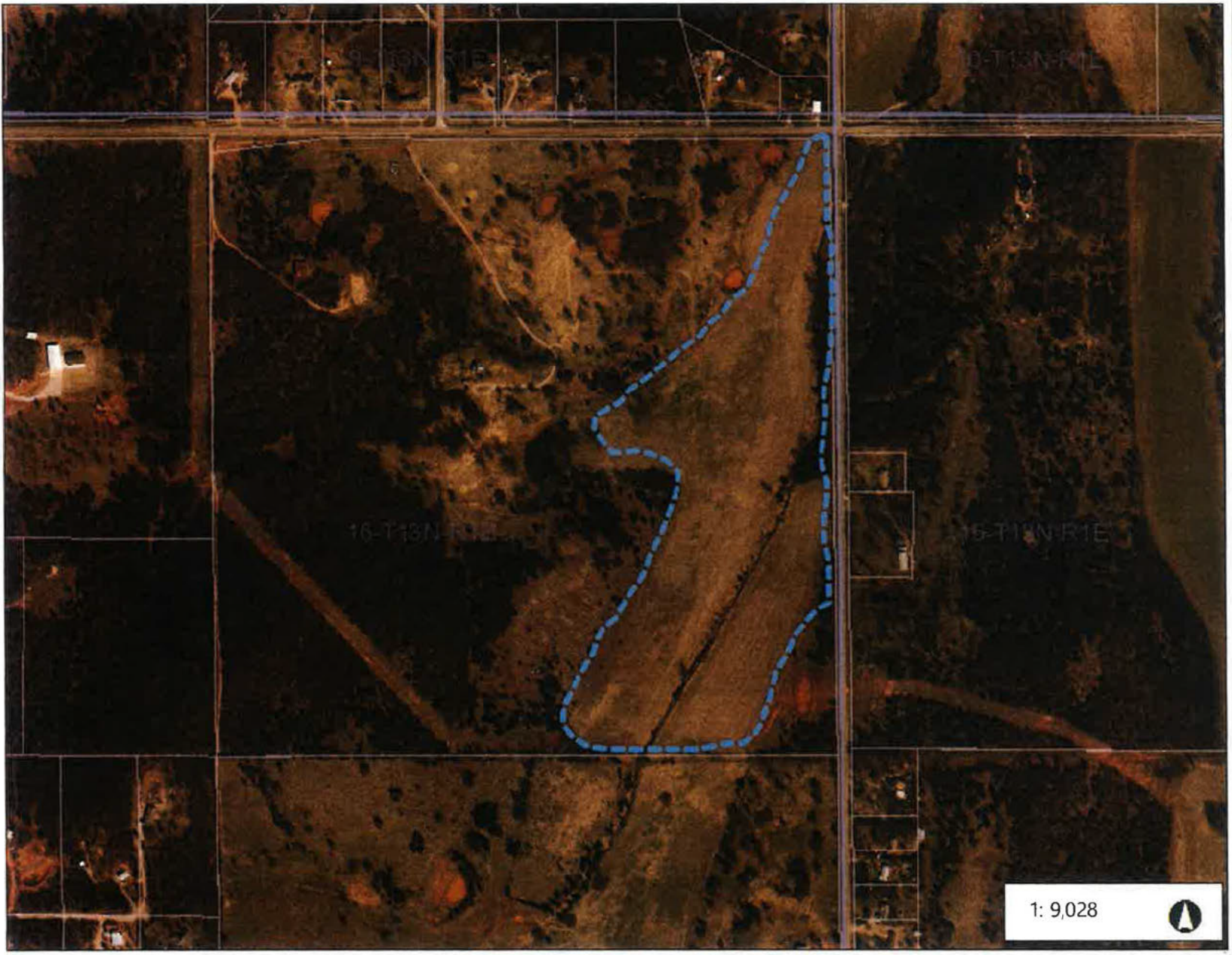
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

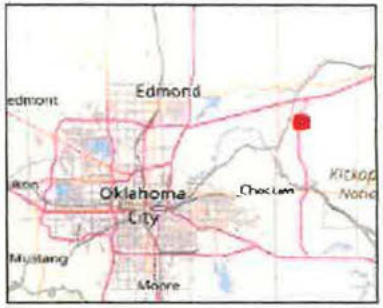
Notes

Enter Map Description

Larry Stein Oklahoma County Assessor
Online Mapping

Oklahoma County Assessor KP03





Legend

- Sections (>1:40,000)
- Parcels
- OK County Boundary

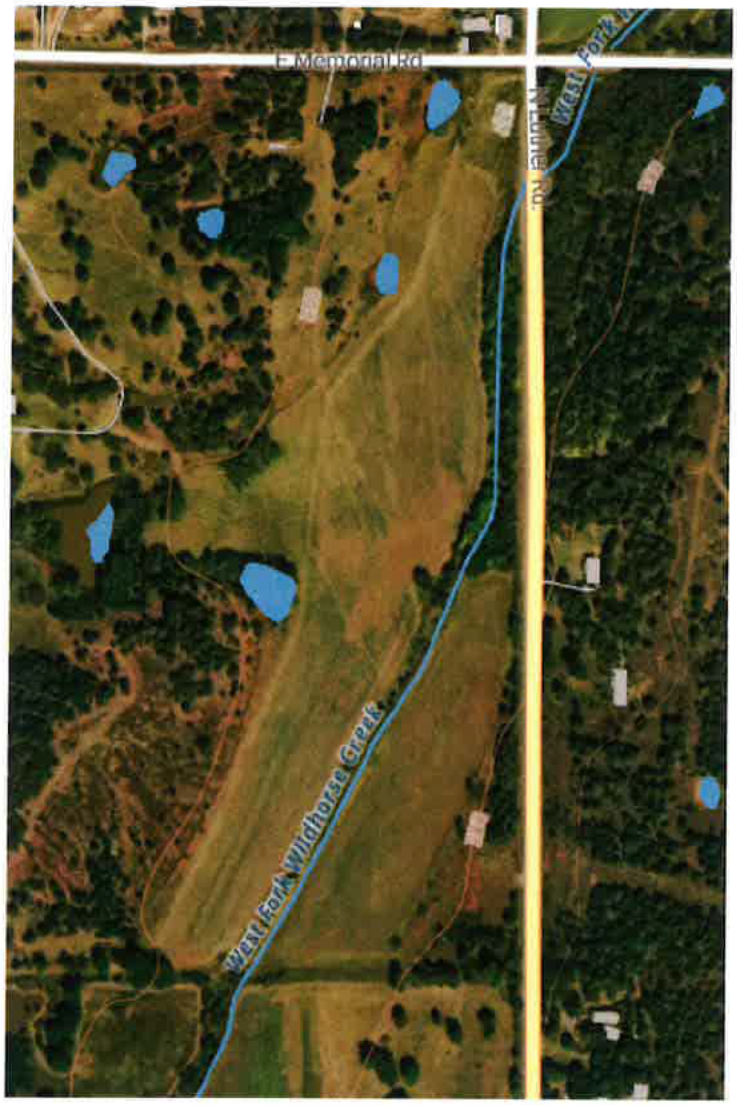
1: 9,028

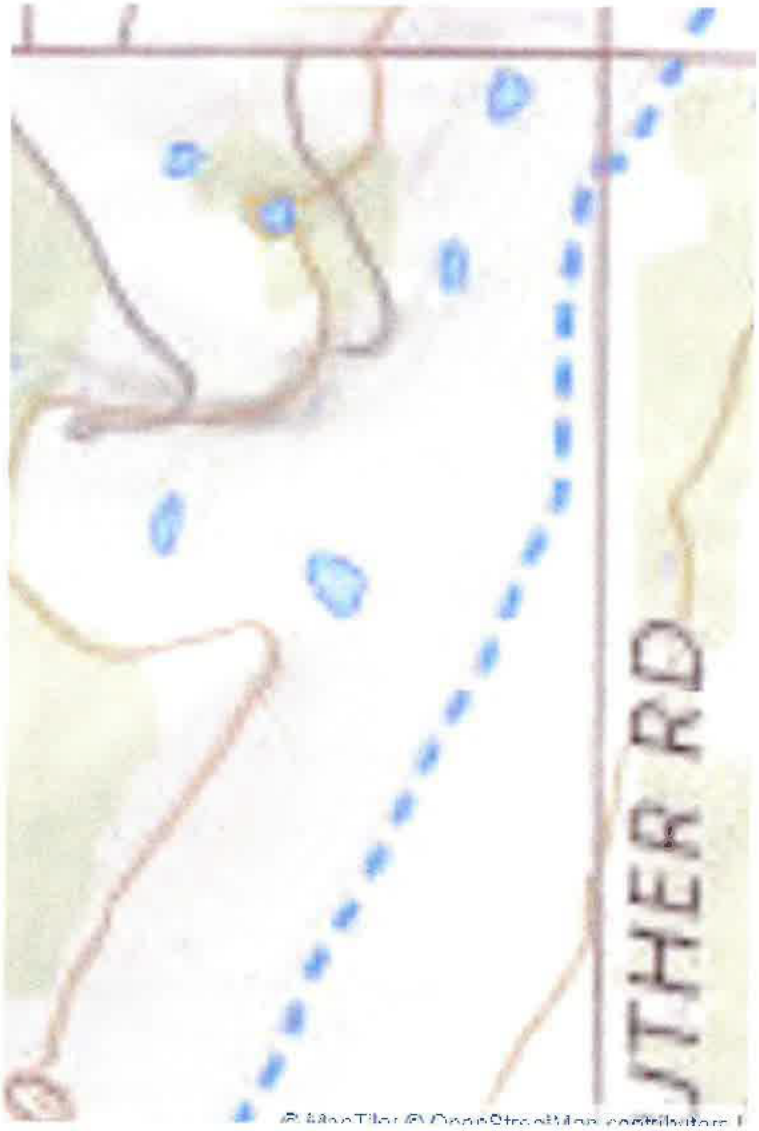
Notes

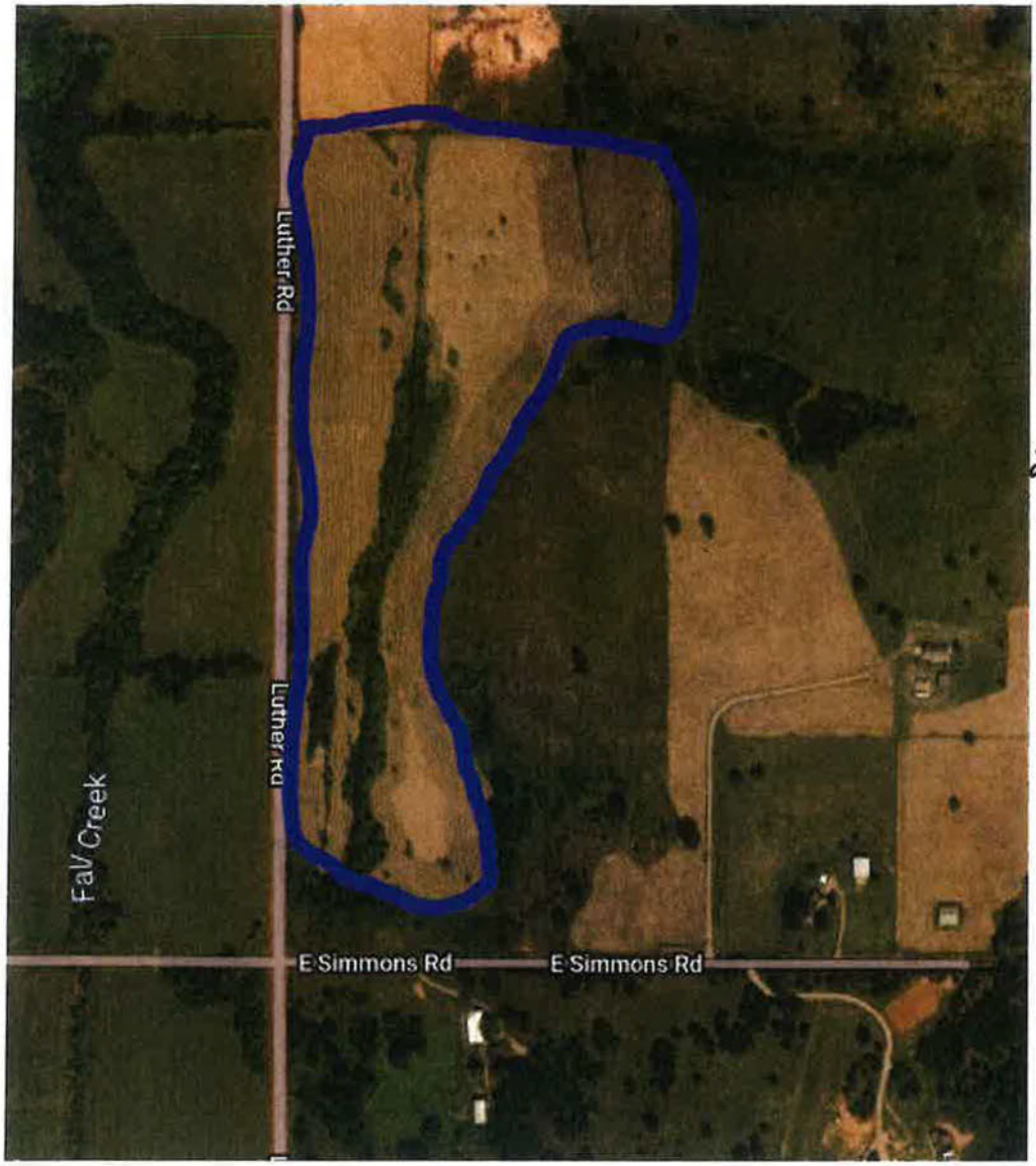
Enter Map Description

0.3 0 0.14 0.3 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere


E Memorial Rd
N Eastern Rd
West Fork Wildhorse Creek


JTHER RD



42 acres

Lat +35.9141513°N
Long -097.4507643°W

27-T15N-R1E SW

MAC 1


Fall Creek
Lauher Road
E Simmons Rd

Accurate Environmental Laboratories

June 09, 2022

Client: Edmond, Coffee Creek Plant

PO Box 2970 1600 North Midwest Blvd.

Edmond, OK 73083

Requested By: -

National Environmental Laboratory Accreditation Program
ODEQ TNI Certified

Sample Project Name:

Date Samples Received: June 02, 2022 Time: 16:15 sample temp upon arrival at lab = 4.50°C - On Ice

Matrix: Solid

Lab Log Numbers: **EF02107-01** **EF02107-02**

Work Order: EF02107

Report # EF02107-0609221631

EPA Lab ID#'s: **Stillwater OK00092** **Tulsa OK00983** **OKC OK00129** **ICR OK 001**

Oklahoma Certification: Stillwater NELAP WasteWater, ODEQ 8316/ Drinking Water, DEQ D9602

NELAP Tulsa WasteWater, ODEQ 9905 / Drinking Water, DEQ D9901

Oklahoma City NELAP WasteWater ODEQ 7202 / Drinking Water, DEQ D9937

Kansas Certification: Stillwater NELAP CERT # E-10219

Method Reference: 40 CFR 136, 141, and 261 Methods for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1983. Test Methods for Evaluating Solid Wastes, SW-846, Final Update III. Standard Methods 1998 (20th Edition), Standard Methods 2005 (21st Edition) and Standard Methods 2011 (22nd Edition) for the Examination of Water and Wastewater.

Analysis Reference: If qualifiers present in "Prep Info" or "Analysis Info", then analysis performed as follows: @= Tulsa Lab and * = OKC Lab. If no qualifiers present, then analysis performed at Stillwater Lab.

Accurate Environmental Laboratories certify that the test results performed at the Stillwater lab meet all requirements of NELAP. Any exceptions to this can be found in the report footer or Quality Control Section of the report.

This report is to only be replicated in its entirety.

Accurate Environmental sampling protocol was followed for any sampling performed by Accurate Field Services.

Sample: *KPO3* **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 5/31/22 10:35 **Lab Log#** EF02107-01

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
pH in Lab EPA 9045D	pH	7.26 pH Units	#03	0.0100	06/07/22 13:00 CPL	06/07/22 16:31 CPL
Phosphorus (P), Total - EPA 365.1	Phosphorus	554 mg/kg dry		25.0	06/07/22 08:55 KMK	06/07/22 16:24 KMK
Temperature SM2550 B	Temperature	21.9 °C			06/07/22 13:00 CPL	06/07/22 16:31 CPL
Ammonia, Total SM4500NH3 C	Ammonia as N	72.2 mg/kg dry		0.75	06/08/22 12:49 CPL	06/08/22 15:15 CPL
Nitrate EPA 300.0	Nitrate as N	16.6 mg/kg dry		5.00	06/08/22 12:15 RND	06/08/22 17:10 RND
Nitrite EPA 300.0	Nitrite as N	BPQL mg/kg dry		1.00	06/08/22 12:15 RND	06/08/22 17:10 RND
Solids, Percent SM2540 B	Percent Solids	87.5 %		0.100	06/06/22 12:18 MHM	06/09/22 15:52 MHM
Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	980 mg/kg dry		2.00	06/08/22 12:25 CPL	06/09/22 09:49 CPL
Arsenic (As) EPA 6010B	Arsenic	BPQL mg/kg dry		25.0	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Cadmium (Cd) EPA 6010B	Cadmium	BPQL mg/kg dry		2.50	06/07/22 15:00 CJS	06/09/22 10:31 SMV
Chromium (Cr) EPA 6010B	Chromium	17.2 mg/kg dry		12.5	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Copper (Cu) EPA 6010B	Copper	BPQL mg/kg dry		12.5	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Lead (Pb) EPA 6010B	Lead	BPQL mg/kg dry		25.0	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Mercury (Hg) EPA 7471A	Mercury	0.0257 mg/kg dry		0.0100	06/07/22 09:35 LF	06/07/22 16:18 LF
Molybdenum (Mo) EPA 6010B	Molybdenum	BPQL mg/kg dry		5.00	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Nickel (Ni) EPA 6010B	Nickel	8.79 mg/kg dry		5.00	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Potassium (K) EPA 6010B	Potassium	1890 mg/kg dry		125	06/07/22 15:00 CJS	06/08/22 16:15 SMV
Selenium (Se) EPA 6010B	Selenium	BPQL mg/kg dry		12.5	06/07/22 15:00 CJS	06/09/22 10:31 SMV
Zinc (Zn) EPA 6010B	Zinc	49.1 mg/kg dry		12.5	06/07/22 15:00 CJS	06/09/22 10:31 SMV
Cation Exchange Capacity EPA 9081 (No Cert.)	Exchange Capacity	15.2 meq/100g		0.005	06/09/22 09:10 LF	06/09/22 14:11 SMV
PCB Analysis by SW846 8082	PCB-1016	BPQL mg/kg dry	MS	0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1221	BPQL mg/kg dry		0.0076	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1232	BPQL mg/kg dry		0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1242	BPQL mg/kg dry		0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1248	BPQL mg/kg dry		0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1254	BPQL mg/kg dry		0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ
PCB Analysis by SW846 8082	PCB-1260	BPQL mg/kg dry		0.0038	06/03/22 09:55 SJ	06/03/22 16:11 SJ

Sample: *MAC1* **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 5/31/22 14:04 **Lab Log#** EF02107-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
pH in Lab EPA 9045D	pH	8.12 pH Units	#03	0.0100	06/07/22 13:00 CPL	06/07/22 16:31 CPL
Phosphorus (P), Total - EPA 365.1	Phosphorus	115 mg/kg dry		2.50	06/07/22 08:55 KMK	06/07/22 16:28 KMK
Temperature SM2550 B	Temperature	22.0 °C			06/07/22 13:00 CPL	06/07/22 16:31 CPL
Ammonia, Total SM4500NH3 C	Ammonia as N	61.8 mg/kg dry		0.75	06/08/22 12:49 CPL	06/08/22 15:15 CPL

Sample: **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 5/31/22 14:04 **Lab Log#** EF02107-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Nitrate EPA 300.0	Nitrate as N	7.51 mg/kg dry		5.00	06/08/22 12:15 RND	06/08/22 17:33 RND
Nitrite EPA 300.0	Nitrite as N	BPQL mg/kg dry		1.00	06/08/22 12:15 RND	06/08/22 17:33 RND
Solids, Percent SM2540 B	Percent Solids	85.6 %		0.100	06/06/22 12:18 MHM	06/09/22 15:52 MHM
Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	798 mg/kg dry		2.00	06/08/22 12:25 CPL	06/09/22 09:49 CPL
Arsenic (As) EPA 6010B	Arsenic	BPQL mg/kg dry		25.0	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Cadmium (Cd) EPA 6010B	Cadmium	BPQL mg/kg dry		2.50	06/07/22 15:00 CJS	06/09/22 10:35 SMV
Chromium (Cr) EPA 6010B	Chromium	25.6 mg/kg dry		12.5	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Copper (Cu) EPA 6010B	Copper	BPQL mg/kg dry		12.5	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Lead (Pb) EPA 6010B	Lead	BPQL mg/kg dry		25.0	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Mercury (Hg) EPA 7471A	Mercury	BPQL mg/kg dry		0.0100	06/07/22 09:35 LF	06/07/22 16:20 LF
Molybdenum (Mo) EPA 6010B	Molybdenum	BPQL mg/kg dry		5.00	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Nickel (Ni) EPA 6010B	Nickel	16.2 mg/kg dry		5.00	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Potassium (K) EPA 6010B	Potassium	3560 mg/kg dry		125	06/07/22 15:00 CJS	06/08/22 16:19 SMV
Selenium (Se) EPA 6010B	Selenium	BPQL mg/kg dry		12.5	06/07/22 15:00 CJS	06/09/22 10:35 SMV
Zinc (Zn) EPA 6010B	Zinc	31.2 mg/kg dry		12.5	06/07/22 15:00 CJS	06/09/22 10:35 SMV
Cation Exchange Capacity EPA 9081 (No Cert.)	Exchange Capacity	20.7 meq/100g		0.005	06/09/22 09:10 LF	06/09/22 14:15 SMV
PCB Analysis by SW846 8082	PCB-1016	BPQL mg/kg dry	MS	0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1221	BPQL mg/kg dry		0.0078	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1232	BPQL mg/kg dry		0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1242	BPQL mg/kg dry		0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1248	BPQL mg/kg dry		0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1254	BPQL mg/kg dry		0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ
PCB Analysis by SW846 8082	PCB-1260	BPQL mg/kg dry		0.0039	06/03/22 09:55 SJ	06/03/22 17:04 SJ

Notes and Definitions

MS	Insufficient sample volume received to perform MS/MSD for this analysis.
MB-2	The method blank contains analyte at a concentration above the MDL; however, the concentration is less than 2.2 times the MDL, which is negligible according to Metals analysis method criteria.
#52	Analyte recoveries are outside of acceptance limits for the matrix spike sample. This failure does not invalidate data reported.
#03	This sample was received outside of EPA recommended holding time.
MCL	Analyte concentration may exceed Maximum Contaminant Limit (MCL) for EPA Primary or Secondary Drinking Water Regulations.
###	Analyte concentration may exceed regulatory limit.
PQL	Practical Quantitation Limit - the method reporting limit (MRL) adjusted for any dilutions or other changes made to the sample to deal with interferences/matrix effects
BPQL	Below Practical Quantitation Limit (if applicable).

The "Prep Date" of the QC analysis coincides with the characters of the appropriate QC Lab ID. (Example: 19 A 02 15 - BLK = 2019, Jan 2, Batch #15 - Blank)

Lab Manager

Quality Control Data

Blank Data

QC Lab #	Test Group	Test	Result	PQL	Flags
22F0715-BLK1	Phosphorus (P), Total - EPA 365.1	Phosphorus	BPQL mg/kg wet	2.50	
22F0835-BLK1	Ammonia, Total SM4500NH3 C	Ammonia as N	BPQL mg/kg wet	0.75	
22F0831-BLK1	Nitrate EPA 300.0	Nitrate as N	BPQL mg/kg wet	0.500	
22F0831-BLK1	Nitrite EPA 300.0	Nitrite as N	BPQL mg/kg wet	0.10	
22F0842-BLK1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	BPQL mg/kg wet	2.00	
22F0758-BLK1	Arsenic (As) EPA 6010B	Arsenic	BPQL mg/kg dry	25.0	
22F0758-BLK1	Cadmium (Cd) EPA 6010B	Cadmium	BPQL mg/kg dry	2.50	MB-2
22F0758-BLK1	Chromium (Cr) EPA 6010B	Chromium	BPQL mg/kg dry	12.5	
22F0758-BLK1	Copper (Cu) EPA 6010B	Copper	BPQL mg/kg dry	12.5	
22F0758-BLK1	Lead (Pb) EPA 6010B	Lead	BPQL mg/kg dry	25.0	
22F0714-BLK1	Mercury (Hg) EPA 7471A	Mercury	BPQL mg/kg wet	0.0100	
22F0758-BLK1	Molybdenum (Mo) EPA 6010B	Molybdenum	BPQL mg/kg dry	5.00	
22F0758-BLK1	Nickel (Ni) EPA 6010B	Nickel	BPQL mg/kg dry	5.00	
22F0758-BLK1	Potassium (K) EPA 6010B	Potassium	BPQL mg/kg dry	125	
22F0758-BLK1	Selenium (Se) EPA 6010B	Selenium	BPQL mg/kg dry	12.5	
22F0758-BLK1	Zinc (Zn) EPA 6010B	Zinc	BPQL mg/kg dry	12.5	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1016	BPQL mg/kg wet	0.0033	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1221	BPQL mg/kg wet	0.0067	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1232	BPQL mg/kg wet	0.0033	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1242	BPQL mg/kg wet	0.0033	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1248	BPQL mg/kg wet	0.0033	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1254	BPQL mg/kg wet	0.0033	
22F0316-BLK1	PCB Analysis by SW846 8082	PCB-1260	BPQL mg/kg wet	0.0033	

Duplicate Sample Data

QC Lab #	Test Group	Test Name	Source	Dup Result	Samp Result	% RPD	RPD Limit	Flags
22F0752-DUP1	pH in Lab EPA 9045D	pH	EF02107-01	7.33	7.26	1	20	
22F0752-DUP1	Temperature SM2550 B	Temperature	EF02107-01	22.0	21.9	0.5	20	
22F0943-DUP1	Cation Exchange Capacity EPA 9081 (No Cert.)	Exchange Capacity	EF02107-02	19.7	20.7	5	20	

Quality Control Data

Laboratory Control Sample Data

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
22F0715-BS1	Phosphorus (P), Total - EPA 365.1	Phosphorus	51.7	50.00	mg/kg wet	103	90 - 110	
22F0752-BS1	pH in Lab EPA 9045D	pH	7.02	7.000	pH Units	100	99 - 101	
22F0831-BS1	Nitrate EPA 300.0	Nitrate as N	0.892	0.9040	mg/kg wet	99	90 - 110	
22F0831-BS1	Nitrite EPA 300.0	Nitrite as N	5.74	6.090	mg/kg wet	94	90 - 110	
22F0835-BS1	Ammonia, Total SM4500NH3 C	Ammonia as N	5.10	5.000	mg/kg wet	102	90 - 110	
22F0835-BS2	Ammonia, Total SM4500NH3 C	Ammonia as N	10.1	10.00	mg/kg wet	101	90 - 110	
22F0842-BS1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	20.9	20.00	mg/kg wet	104	90 - 110	
22F0842-BS2	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	39.7	40.00	mg/kg wet	99	90 - 110	
22F0714-BS1	Mercury (Hg) EPA 7471A	Mercury	0.418	0.4167	mg/kg wet	100	85 - 115	
22F0758-BS1	Arsenic (As) EPA 6010B	Arsenic	479	496.6	mg/kg dry	96	85 - 115	
22F0758-BS1	Cadmium (Cd) EPA 6010B	Cadmium	502	496.6	mg/kg dry	101	85 - 115	
22F0758-BS1	Chromium (Cr) EPA 6010B	Chromium	475	496.6	mg/kg dry	96	85 - 115	
22F0758-BS1	Copper (Cu) EPA 6010B	Copper	478	496.6	mg/kg dry	96	85 - 115	
22F0758-BS1	Lead (Pb) EPA 6010B	Lead	485	496.6	mg/kg dry	98	85 - 115	
22F0758-BS1	Molybdenum (Mo) EPA 6010B	Molybdenum	483	496.6	mg/kg dry	97	85 - 115	
22F0758-BS1	Nickel (Ni) EPA 6010B	Nickel	486	496.6	mg/kg dry	98	85 - 115	
22F0758-BS1	Potassium (K) EPA 6010B	Potassium	521	496.6	mg/kg dry	105	85 - 115	
22F0758-BS1	Selenium (Se) EPA 6010B	Selenium	474	496.6	mg/kg dry	95	85 - 115	
22F0758-BS1	Zinc (Zn) EPA 6010B	Zinc	497	496.6	mg/kg dry	100	85 - 115	
22F0316-BS1	PCB Analysis by SW846 8082	PCB-1016	0.0158	0.01333	mg/kg wet	119	55.4 - 120	
22F0316-BS1	PCB Analysis by SW846 8082	PCB-1260	0.0152	0.01333	mg/kg wet	114	60.6 - 129	

LCS Duplicate Data

QC Lab#	Test Group	Test Name	LCS % Rec.	LCS Dup % Rec.	Recovery Limits	RPD	RPD Limit	Flags
22F0316-BSD1	PCB Analysis by SW846 8082	PCB-1016	119	111	55.4 - 120	7	20	
22F0316-BSD1	PCB Analysis by SW846 8082	PCB-1260	114	117	60.6 - 129	2	20	

Matrix Spike Data

QC Lab #	Test Group	Test Name	Source Sample	Sample Result	Units	Spike Result	Spike Level	% Rec.	Acceptance Limits	Flags
22F0842-MS1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	EF02107-01	980	mg/kg dry	2430	1601	90	80 - 120	
22F0758-MS1	Arsenic (As) EPA 6010B	Arsenic	EF02107-01	BPQL	mg/kg dry	473	489.5	97	85 - 115	
22F0758-MS1	Cadmium (Cd) EPA 6010B	Cadmium	EF02107-01	0.395	mg/kg dry	480	489.5	98	85 - 115	
22F0758-MS1	Chromium (Cr) EPA 6010B	Chromium	EF02107-01	17.2	mg/kg dry	480	489.5	94	85 - 115	
22F0758-MS1	Copper (Cu) EPA 6010B	Copper	EF02107-01	11.8	mg/kg dry	490	489.5	98	85 - 115	
22F0758-MS1	Lead (Pb) EPA 6010B	Lead	EF02107-01	7.26	mg/kg dry	479	489.5	96	85 - 115	
22F0714-MS1	Mercury (Hg) EPA 7471A	Mercury	EF02107-02	0.00863	mg/kg dry	0.471	0.4855	95	75 - 125	
22F0758-MS1	Molybdenum (Mo) EPA 6010B	Molybdenum	EF02107-01	BPQL	mg/kg dry	476	489.5	97	85 - 115	
22F0758-MS1	Nickel (Ni) EPA 6010B	Nickel	EF02107-01	8.79	mg/kg dry	481	489.5	96	85 - 115	
22F0758-MS1	Potassium (K) EPA 6010B	Potassium	EF02107-01	1890	mg/kg dry	2340	489.5	90	85 - 115	
22F0758-MS1	Selenium (Se) EPA 6010B	Selenium	EF02107-01	BPQL	mg/kg dry	464	489.5	95	85 - 115	
22F0758-MS1	Zinc (Zn) EPA 6010B	Zinc	EF02107-01	49.1	mg/kg dry	538	489.5	100	85 - 115	

Quality Control Data

Matrix Spike Duplicate Data

QC Lab #	Test Group	Test Name	Sample Result	Spike Result	Spike Level	Units	% Rec.	Rec. Limits	% RPD	RPD Limit	Flags
22F0842-MSD1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	980	2160	1514	ng/kg dr	78	80-120	12	20	#52
22F0758-MSD1	Arsenic (As) EPA 6010B	Arsenic	BPQL	471	483.5	ng/kg dr	98	85-115	0.3	20	
22F0758-MSD1	Cadmium (Cd) EPA 6010B	Cadmium	0.395	477	483.5	ng/kg dr	99	85-115	0.6	20	
22F0758-MSD1	Chromium (Cr) EPA 6010B	Chromium	17.2	475	483.5	ng/kg dr	95	85-115	0.9	20	
22F0758-MSD1	Copper (Cu) EPA 6010B	Copper	11.8	483	483.5	ng/kg dr	98	85-115	1	20	
22F0758-MSD1	Lead (Pb) EPA 6010B	Lead	7.26	471	483.5	ng/kg dr	96	85-115	2	20	
22F0714-MSD1	Mercury (Hg) EPA 7471A	Mercury	0.00863	0.465	0.4768	ng/kg dr	96	75-125	1	20	
22F0758-MSD1	Molybdenum (Mo) EPA 6010B	Molybdenum	BPQL	473	483.5	ng/kg dr	98	85-115	0.5	20	
22F0758-MSD1	Nickel (Ni) EPA 6010B	Nickel	8.79	479	483.5	ng/kg dr	97	85-115	0.3	20	
22F0758-MSD1	Potassium (K) EPA 6010B	Potassium	1890	2210	483.5	ng/kg dr	67	85-115	5	20	#52
22F0758-MSD1	Selenium (Se) EPA 6010B	Selenium	BPQL	463	483.5	ng/kg dr	96	85-115	0.3	20	
22F0758-MSD1	Zinc (Zn) EPA 6010B	Zinc	49.1	527	483.5	ng/kg dr	99	85-115	2	20	

Quality Control Data

Surrogate Recovery Data

QC Lab#	Test Group	Test Name	% Recovery	Recovery Limits	Flags
22F0316-BLK1	PCB Analysis by SW846 8082	DCB	102	24 - 160	
22F0316-BLK1	PCB Analysis by SW846 8082	TCMX	72	38 - 118	
22F0316-BS1	PCB Analysis by SW846 8082	DCB	101	24 - 160	
22F0316-BS1	PCB Analysis by SW846 8082	TCMX	73	38 - 118	
22F0316-BSD1	PCB Analysis by SW846 8082	DCB	103	24 - 160	
22F0316-BSD1	PCB Analysis by SW846 8082	TCMX	69	38 - 118	
EF02107-01	PCB Analysis by SW846 8082	DCB	96	24 - 160	
EF02107-01	PCB Analysis by SW846 8082	TCMX	67	38 - 118	
EF02107-02	PCB Analysis by SW846 8082	DCB	98	24 - 160	
EF02107-02	PCB Analysis by SW846 8082	TCMX	75	38 - 118	

* Complete Entire COC to be in Compliance*

X **RUSH** Due Date **ASAP**

Chain of Custody

Accurate Environmental Labs

Client Name- *Coffee Creek WRRF*

Project Name-

Accurate Work Order #	Date Sample Taken	Time Sample Taken	Matrix or Source (Refer below)	Grab (G) or Comp (C)	Client I.D. / Sample Location and / or (DEQ / EPA Location Code)	Field Results (pH, Temp, Chlorine, ...) (note analysis & units)			Analysis Requested → # of Container ↓	Fecal Coliform	PCB	503 Metals; P.A.N; CEC; *SBI if pH is < 5.5 SU.				
EFD2107						( )	( )	( )	Sample Preserv. & Container →		Boz Cool N/P	Boz Cool N/P				
-01	5/31/2022	10:35am	0	G	KPO3				1		X	X				
-02	5/31/2022	2:04pm	0	G	MAC1				1		X	X				

On-Site Info *TOC RAW* *E.Coli*

Alkalinity = _____ *mg/L* *Turbidity* = _____ *ntu*

E.Coli Source- **GWUDI-FS** = *Groundwater under direct influence of Flowing Stream* **GWUDI-RL** = *Groundwater under direct influence of Reservoir/lake*

Matrix Codes **DW** = *Drinkingwater ;* **WW** = *Wastewater ;* **SL** = *Sludge ;* **O** = *Other*

Comments

Field Instrument Calibration -

Meter Type	Standards	Final Read.	Date . Time	Initials

RUSH

- - All Glass containers provided by Accurate Labs have Teflon lined lids - -

- - All samples are scheduled to be disposed of in 4 weeks of receipt at Accurate. - -

- - Hazardous samples will be returned to client or will be disposed of for a fee - -

Certification by Company Official: I hereby certify that the above sampling occurred during a period such that the sample(s) is/are representative of a typical operating day discharge for the above facility. Signature: [signature] Date/Time 6-1-2022 2:30pm

Sampled By: Robert Ross Company: Coffee Creek WRRFP/City of Edmond Sample Method: Manual/Grab

Relinquished By: [signature] Ruben Ayala Date/Time 6-2-22 3:18pm Received By: [signature] Date/Time 6/2/22 1518

☐ Relinquished to Lab By: Date/Time 6/2/22 1615 Received at Lab By: Madison Heller Rec'd °C 4.5 Date/Time 6.2.22 1615

☐ Relq'd to Log-In Fridge By:

Reporting Requirements (standard 10-15 working days)		Compliance Reporting?	Yes or No (DMR, PWS,)	Oklahoma PWS ID #		RUSH Request (if available)	_____ (Working Days)

Mail Report To: Ruben.Ayala@edmondok.com

Address: *City of Edmond, Coffee Creek WRRF, 1600 N. Midwest Blvd. Edmond OK 73034*

Phone #: (405)216-7790 Fax #: ( )

Email:

Mail Invoice To: "Same"

Address:

Bid # - _____

PO # - _____

Phone #: ( ) Fax #: ( )

www.accuratelabs.com (800) 516-5227

505 South Lowry Street Stillwater, OK 74074 Phone: (405) 372-5300 Fax: (405) 372-5396

6558 E. 40th Street Tulsa, OK 74145 Phone: (918) 663-5400 Fax: (918) 663-6300

12036 N. Pennsylvania Oklahoma City, OK 73120 Phone: (405) 751-3132 Fax: (405) 751-3108

Accurate Environmental Laboratories

July 22, 2022

Client: Edmond, Coffee Creek Plant

PO Box 2970 1600 North Midwest Blvd.

Edmond, OK 73083

Requested By: -

National Environmental Laboratory Accreditation Program
ODEQ TNI Certified

Sample Project Name:	2022 Sludge Land Application
Date Samples Received:	July 11, 2022 Time: 11:47 sample temp upon arrival at lab = 27.30°C
Matrix:	Sludge
Lab Log Numbers:	**EG11023-01 EG11023-02**
Work Order:	EG11023
Report #	EG11023-0722220819
EPA Lab ID#'s:	**Stillwater OK00092 Tulsa OK00983 OKC OK00129 ICR OK 001**
Oklahoma Certification:	Stillwater NELAP WasteWater, ODEQ 8316/ Drinking Water, DEQ D9602 NELAP Tulsa WasteWater, ODEQ 9905 / Drinking Water, DEQ D9901 Oklahoma City NELAP WasteWater ODEQ 7202 / Drinking Water, DEQ D9937
Kansas Certification:	Stillwater NELAP CERT # E-10219
Method Reference:	40 CFR 136, 141, and 261 Methods for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1983. Test Methods for Evaluating Solid Wastes, SW-846, Final Update III. Standard Methods 1998 (20th Edition), Standard Methods 2005 (21st Edition) and Standard Methods 2011 (22nd Edition) for the Examination of Water and Wastewater.
Analysis Reference:	If qualifiers present in "Prep Info" or "Analysis Info", then analysis performed as follows: @= Tulsa Lab and * = OKC Lab. If no qualifiers present, then analysis performed at Stillwater Lab. Accurate Environmental Laboratories certify that the test results performed at the Stillwater lab meet all requirements of NELAP. Any exceptions to this can be found in the report footer or Quality Control Section of the report. This report is to only be replicated in its entirety. Accurate Environmental sampling protocol was followed for any sampling performed by Accurate Field Services.

Sample: ***East Lagoon Composite*** **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 7/11/22 9:20 **Lab Log#** EG11023-01

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
pH in Lab EPA 9045D	pH	7.44 pH Units	#03	0.0100	07/12/22 11:34 BM	07/12/22 10:27 BM
Phosphorus (P), Total - EPA 365.1	Phosphorus	10700 mg/kg dry		25.0	07/13/22 09:31 KMK	07/15/22 11:18 KMK
Temperature SM2550 B	Temperature	22.1 °C			07/12/22 11:34 BM	07/12/22 10:27 BM
Total Volatile Solids EPA 160.4	Total Volatile Solids	32.6 %		0.10	07/12/22 12:51 MHM	07/15/22 13:12 MHM
Ammonia, Total SM4500NH3 C	Ammonia as N	10400 mg/kg dry		0.75	07/18/22 13:30 RND	07/19/22 17:23 RND
Nitrate EPA 300.0	Nitrate as N	BPQL mg/kg dry		5.00	07/18/22 08:24 RMM	07/18/22 13:28 RMM
Nitrite EPA 300.0	Nitrite as N	531 mg/kg dry		1.00	07/18/22 08:24 RMM	07/19/22 19:57 RMM
Solids, Percent SM2540 B	Percent Solids	5.77 %		0.100	07/12/22 12:49 MHM	07/14/22 13:33 MHM
Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	32800 mg/kg dry		2.00	07/18/22 11:10 RND	07/19/22 12:25 CPL
Potassium (K) EPA 6010B	Potassium	3950 mg/kg dry		125	07/12/22 15:00 RAF	07/13/22 14:04 SMV

Sample: ***West Lagoon Composite*** **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 7/11/22 9:46 **Lab Log#** EG11023-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
pH in Lab EPA 9045D	pH	7.53 pH Units	#03	0.0100	07/12/22 11:34 BM	07/12/22 10:27 BM
Phosphorus (P), Total - EPA 365.1	Phosphorus	17400 mg/kg dry		23.7	07/13/22 09:31 KMK	07/15/22 11:22 KMK
Temperature SM2550 B	Temperature	21.6 °C			07/12/22 11:34 BM	07/12/22 10:27 BM
Total Volatile Solids EPA 160.4	Total Volatile Solids	49.6 %		0.10	07/12/22 12:51 MHM	07/15/22 13:12 MHM
Ammonia, Total SM4500NH3 C	Ammonia as N	20000 mg/kg dry		0.75	07/18/22 13:30 RND	07/19/22 17:23 RND
Nitrate EPA 300.0	Nitrate as N	BPQL mg/kg dry		5.00	07/18/22 08:24 RMM	07/18/22 13:52 RMM
Nitrite EPA 300.0	Nitrite as N	1260 mg/kg dry		1.00	07/18/22 08:24 RMM	07/19/22 20:20 RMM
Solids, Percent SM2540 B	Percent Solids	3.97 %		0.100	07/12/22 12:49 MHM	07/14/22 13:33 MHM
Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	50000 mg/kg dry		2.00	07/18/22 11:10 RND	07/19/22 12:25 CPL
Potassium (K) EPA 6010B	Potassium	5640 mg/kg dry		125	07/12/22 15:00 RAF	07/13/22 14:08 SMV

Notes and Definitions

#52	Analyte recoveries are outside of acceptance limits for the matrix spike sample. This failure does not invalidate data reported.
#44	RPD is outside of acceptance limits. This failure does not invalidate data reported.
#03	This sample was received outside of EPA recommended holding time.
MCL	Analyte concentration may exceed Maximum Contaminant Limit (MCL) for EPA Primary or Secondary Drinking Water Regulations.
###	Analyte concentration may exceed regulatory limit.
PQL	Practical Quantitation Limit - the method reporting limit (MRL) adjusted for any dilutions or other changes made to the sample to deal with interferences/matrix effects
BPQL	Below Practical Quantitation Limit (if applicable).

The "Prep Date" of the QC analysis coincides with the characters of the appropriate QC Lab ID. (Example: 19 A 02 15 - BLK – 2019, Jan 2, Batch #15 - Blank)

Lab Manager

Quality Control Data

Blank Data

QC Lab #	Test Group	Test	Result	PQL	Flags
22G1327-BLK1	Phosphorus (P), Total - EPA 365.1	Phosphorus	BPQL mg/kg wet	2.50	
22G1865-BLK1	Ammonia, Total SM4500NH3 C	Ammonia as N	BPQL mg/kg wet	0.75	
22G1837-BLK1	Nitrate EPA 300.0	Nitrate as N	BPQL mg/kg wet	0.500	
22G1837-BLK1	Nitrite EPA 300.0	Nitrite as N	BPQL mg/kg wet	0.10	
22G1832-BLK1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	BPQL mg/kg wet	2.00	
22G1259-BLK1	Potassium (K) EPA 6010B	Potassium	BPQL mg/kg dry	125	

Duplicate Sample Data

QC Lab #	Test Group	Test Name	Source	Dup Result	Samp Result	% RPD	RPD Limit	Flags
22G1209-DUP1	pH in Lab EPA 9045D	pH	EG11023-01	7.43	7.44	0.1	20	#03
22G1327-DUP1	Phosphorus (P), Total - EPA 365.1	Phosphorus	EG11023-01	9660	10700	10	20	
22G1209-DUP1	Temperature SM2550 B	Temperature	EG11023-01	21.9	22.1	0.9	20	
22G1237-DUP1	Total Volatile Solids EPA 160.4	Total Volatile Solids	EG11023-01	37.8	32.6	15	10	#44

Laboratory Control Sample Data

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
22G1209-BS1	pH in Lab EPA 9045D	pH	7.02	7.000	pH Units	100	99 - 101	#03
22G1327-BS1	Phosphorus (P), Total - EPA 365.1	Phosphorus	48.7	50.00	mg/kg wet	97	90 - 110	
22G1832-BS1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	20.8	20.00	mg/kg wet	104	90 - 110	
22G1832-BS2	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	40.0	40.00	mg/kg wet	100	90 - 110	
22G1837-BS1	Nitrate EPA 300.0	Nitrate as N	9.69	10.00	mg/kg wet	97	90 - 110	
22G1837-BS1	Nitrite EPA 300.0	Nitrite as N	6.17	6.090	mg/kg wet	101	90 - 110	
22G1865-BS1	Ammonia, Total SM4500NH3 C	Ammonia as N	4.83	5.000	mg/kg wet	97	90 - 110	
22G1865-BS2	Ammonia, Total SM4500NH3 C	Ammonia as N	9.52	10.00	mg/kg wet	95	90 - 110	
22G1259-BS1	Potassium (K) EPA 6010B	Potassium	511	486.5	mg/kg dry	105	85 - 115	

Matrix Spike Data

QC Lab #	Test Group	Test Name	Source Sample	Sample Result	Units	Spike Result	Spike Level	% Rec.	Acceptance Limits	Flags
22G1327-MS1	Phosphorus (P), Total - EPA 365.1	Phosphorus	EG11023-01	10700	mg/kg dry	18400	8669	89	90 - 110	#52
22G1865-MS1	Ammonia, Total SM4500NH3 C	Ammonia as N	EG11023-01	10400	mg/kg dry	40800	29800	102	80 - 120	
22G1832-MS1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	EG11023-01	32800	mg/kg dry	62000	33400	87	80 - 120	
22G1259-MS1	Potassium (K) EPA 6010B	Potassium	EG11023-01	3950	mg/kg dry	4660	481.5	148	85 - 115	#52

Quality Control Data

Matrix Spike Duplicate Data

QC Lab #	Test Group	Test Name	Sample Result	Spike Result	Spike Level	Units	% Rec.	Rec. Limits	% RPD	RPD Limit	Flags
22G1865-MSD1	Ammonia, Total SM4500NH3 C	Ammonia as N	10400	42300	31750	ng/kg dr	101	80-120	4	20	
22G1832-MSD1	Kjeldahl Nitrogen SM4500Norg C	Total Kjeldahl Nitrogen	32800	64600	33040	ng/kg dr	96	80-120	4	20	
22G1259-MSD1	Potassium (K) EPA 6010B	Potassium	3950	4820	485.7	ng/kg dr	180	85-115	3	20	#52

* Complete Entire COC to be in Compliance*

☐ RUSH Due Date _____

Accurate Environmental Labs

Chain of Custody

Client Name- *Coffee Creek WRRF*

Project Name- *2022 Sludge Land Application*

Accurate Work Order #	Date Sample Taken	Time Sample Taken	Matrix or Source (Refer. below)	Grab (G) or Comp (C)	Client I.D. / Sample Location and / or (DEQ / EPA Location Code)	Field Results (pH, Temp, Chlorine, ...) (note analysis & units) ( )	( )	( )	Sample Preserv. & Container →	Analysis Requested → # of Container ↓	PAN nutrients. %Dry, %Volatile						
										1000 mLs Plastic							
EG11023																	
-01	7/11/2022	9:20	SL	G	East Lagoon Composite				1	X							
-02	7/11/2022	9:46	SL	G	West Lagoon Composite				1	X							

On-Site Info *TOC RAW* *Alkalinity* = _____ *mg/L* E.Coli *Turbidity* = _____ *ntu*

E.Coli Source- GWUDI-FS= *Groundwater under direct influence of Flowing Stream* GWUDI-RL= *Groundwater under direct influence of Reservoir/Lake*

Matrix Codes DW = *Drinkingwater ;* WW = *Wastewater ;* SL = *Sludge ;* O = *Other*

Comments

Field Instrument Calibration - Meter Type	Standards	Final Read.	Date . Time	Initials

- - All Glass containers provided by Accurate Labs have Teflon lined lids - -

- - All samples are scheduled to be disposed of in 4 weeks of receipt at Accurate. - -

- - Hazardous samples will be returned to client or will be disposed of for a fee - -

Certification by Company Official: I hereby certify that the above sampling occurred during a period such that the sample(s) is/are representative of a typical operating day discharge for the above facility. Signature: _____ Date/Time 7/11/22 @ 10:51

Sampled By: R.Miller / V.Phung / A.Jaja Company: Coffee Creek WRRF City of Edmond Sample Method: Manual/Grab

Relinquished By:	Date/Time	Received By:	Date/Time
Rachel Miller	7/11/22 @11:47		
☐ Relinquished to Lab By: / ☐ Relq'd to Log-In Fridge By:	Date/Time	Received at Lab By:	Rec'd °C 27.3✓ Date/Time 7/11/22 11:47

Reporting Requirements (standard 10-15 working days)	Compliance Reporting?	Yes or No (DMR, PWS,)	Oklahoma PWS ID #		RUSH Request (if available)	_____ (Working Days)

Mail Report To: robert.whitney@edmondok.gov

Address: *City of Edmond, Coffee Creek WRRF, 1600 N. Midwest Blvd. Edmond OK 73034*

Phone #: (405)216-7790 Fax #: ( )

Email:

Mail Invoice To: "Same" Bid # -

Address: PO # -

Phone #: ( ) Fax #: ( )

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE

Site: KP03 Facility: 04

Crop Year 2022

Procedure: A procedure used to calculate the agronomic rate for application of sewage sludge at which the nitrogen supplied by the sludge and available to the plant does not exceed the requirement for nitrogen of the crop or vegetation. To calculate the agronomic rate, the available ammonium nitrogen (NH_4!N_{avail}), nitrate nitrogen (NO_3!N_{avail}), organic nitrogen (Org!N_{avail}), must all be determined to calculate the total available nitrogen (TN_{avail}) in the sludge. The nitrogen needed (N_{needed}) by the crop is calculated basis the crop selected, expected yield, soil type, previous crop residual and nitrate nitrogen retained in the soil. Then the amount of nitrogen needed by the plant (N_{needed}) is divided by the total nitrogen available (TN_{avail}) to find the annual loading rate.

Input of information is required only in blue boxes.

Step 1: From analysis of the sewage sludge to be land applied, determine the amount of each nitrogen compound, based on dry weight, in pounds per ton (Lb/ton).

Nitrogen Compound	Concentration of Nitrogen Compounds (mg/kg)		Current Amount of Nitrogen in Sludge (Lb/dry ton of sludge)	
Total Kjeldahl Nitrogen (TKN•N)	32800	x.002=	65.60	TKN•N
Ammonium Nitrogen (NH_4•N)	10400	x.002=	20.80	NH4•N
Nitrate Nitrogen (NO_3•N)	5	x.002=	0.01	NO3•N
Organic Nitrogen (ORG•N) TKN•N -	44.80			Org•N
Total Phosphorus (sludge) =	0.25	mg/kg or ppm		

Step 2: Calculate the amount of ammonium-nitrogen available in the sewage sludge to be applied. Assume that the available fraction (K_v) is dependent upon operations at the site (see Table 1). Use the following equation:

$$NH_4•N_{available} = NH_4•N \times K_v$$

Where,

NH_4•N=is the amount of ammonium nitrogen in the sewage sludge to be land applied, Lb/ton.

K_v=is a volatilization factor for determining the availability of ammonium nitrogen based on how the sewage sludge is applied (see Table 1).

NH4•Navailable = 20.80 (From Step 1) Lb/ton X 0.25 (K_v) = 5.20 Lb/ton

Table 1. Factors for K_v

If Sewage Sludge Is:	Factor K_v Is:
Liquid and Surface Applied	.25
Liquid and Incorporated into the Soil	1.0
Dewatered and Applied in any Manner	1.0

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE (Continued)

Step 3: Calculate the amount of organic nitrogen available in the sewage sludge to be applied. The factor F, used for determining the amount of Org•N present due to mineralization, is provided below in Table 2. The value of F is dependent upon how the sludge is treated (i.e., aerobic digestion, composted, etc.).

Step 3A: Current Available Organic Nitrogen, Current Org•$N_{available}$. Current available organic nitrogen from this year's sludge is

Current Org•$N_{available}$ = Org•N (from Step 1) X F

Where,

Current Org•$N_{available}$=the nitrogen which will be available this year from this year's sludge.

Org•N=the organic nitrogen in the sewage sludge to be land applied, Lb/ton

F=is the mineralization rate from Table 2

Current Org•N available = 44.80 (From Step 1) Lb/ton X 0.4 (F) = 17.92 Lb/ton

Table 2. F Values

Time After Sludge Application (Year)	Stabilized Primary and Waste Activated Sewage Sludges, Fraction of Org•N	Aerobically Digested Sewage Sludge, Fraction of Org•N	Anaerobically Digested Sewage Sludge Fraction of Org•N	Composted Sewage Sludge, Fraction of Org•N
0-1	0.4	0.3	0.2	0.1

Step 4: Total available nitrogen in the sludge is then determined by adding together the resulting totals from Steps 2 and 3 to the amount of NO_3•N in Step 1 (Assuming 100% of NO_3•N is available). The result is the following equation:

Total Nitrogen Available (TN_{avail}) = NO_3•N + NH_4•N_{avail} + Current Org•N_{avail}

TNavail = 0.01 (Step 1/NO_3•N) Lb/ton + 5.20 (Step 2/NH_4•N_{avail}) Lb/ton + 17.92 (Step 3/Current Org•N_{avail}) Lb/ton

TNavail = 23.13 Lb/ton of dry sludge. This is the total available nitrogen in the sewage sludge and is used as the denominator in the equation in step 8

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE (Continued)

Step 5: Nitrogen Credits. The available nitrogen credits from previous legume crops and existing residuals must be determined.

Step 5A: Previous Legume Crop, $N_{previous\ crop}$. If the crop for the previous year was a legume and was plowed under, there will be a previous crop nitrogen credit in the soil. Select the appropriate nitrogen credit based upon the data shown in Table 3.

Nprevious crop = _____ Lbs/Acre

Table 3. Nitrogen Credits from Legumes in Rotations

Legume Crop	Nitrogen Credit
Alfalfa (1st year after)	
>80% stand	100-140 lbs/acre
60-80% stand	60-100 lbs/acre
<60% stand	0-60 lbs/acre
Alfalfa (2nd year after)	Half of 1st year credit
Sweet Clover	100-120 lbs/acre
Red Clover	40-80 lbs/acre
Soybeans*	30-60 lbs/acre

*(Allow 1 pound of N credit per bushel of yield.
No credit for wheat double-cropped after soybean harvest.)

Step 5B: Existing Nitrate Content of Soil, Nresidual. The nitrogen credit for the existing nitrate level in the soil can be accounted for by using the soil test nitrate results in the following equations. (See soil testing procedures for soil sampling

(Use the data for the top (nominal 6 inch) soil composite sample.)

Depth of Sample = 12 inches

$NO_3 \bullet N_{soil}$ = 1 mg/kg (or ppm)

$N_{residual}$ $= NO_3 \bullet N_{soil}$ X Density of Soil*

$N_{residual}$ $= NO_3 \bullet N_{soil}$, mg/kg X (0.3 Lb / acre-inch X depth of sample, inches)

$$N_{residual} = \frac{1.00}{NO_3 \bullet N_{soil}} \times .3 \times \frac{12.00}{\text{depth of sample}}$$

$N_{residual}$ 3.60 Lbs/Acre

*300,000 Lb/acre-inch

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE (Continued)

Step 5C: Previous Sludge, Available Organic Nitrogen, Previous Org!$N_{available}$. Because the mineralization of organic nitrogen in sludge occurs over a long time, there will be a nitrogen credit for mineralization of previously applied sludge. This nitrogen credit is

A.Find the previous year's current organic nitrogen (Current Org•$N_{available}$ from Step 3 on last year's form).

B.Find the previous year's sludge loading rate for this site in tons/acre. The previous year's Sludge Loading rate is calculated at:

Step 8 (last year) ___ X gallons/acre actually applied last year
Step 9 (last year)

[ ] X [ ]
1.00 If this is the first year for this site leave 1.00 in here to allow formula to work.
If second or later years include proper number from previous year.

Previous Year's Sludge Loading Rat 0.00 tons dry sludge/acre

C.Previous Org•$N_{available}$= 0.5 X Previous year's Current Org•$N_{available}$ X Previous Year's Sludge Loading Rate

Previous Org•$N_{available}$= 0.5 X [ ] Lb/ton X 0.00 tons/acre
tons/acre Step 3 (last year) previous year's sludge loading rate

Previous Org•N_{availa} 0.00 Lb/acre

Step 5D: Total Nitrogen Credits Summary

Total Nitrogen Credits = Previous Crop Credit + Existing Nitrate Content of Soil + Previous Organic Nitrogen

Total $N_{credits}$= $N_{previous\ crop}$ + $N_{residual}$ + Previous Org. $N_{available}$

Total $N_{credits}$= 0.00 (Step 5A) + 3.60 (Step 5B) + 0.00 (Step 5C)

Total $N_{credits}$= 3.60 Lb/acre (Use this value in Step 7)

CALCULATION WORKSHEET

FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE

Step 6: **Crop Nitrogen requirement, N_{crop}.** Determine the crop nitrogen requirement. The equation is:

From Table 4, select the crop to be grown and its factor. From Table 5, select the soil factor.

Table 4.

CROP	CROP FACTOR
Wheat	1.75 lbs N/bushel
Corn	1.35 lbs N/bushel
Oats	1.15 lbs N/bushel
Grain Sorghum/Milo	1.35 lbs N/bushel
Barley	1.50 lbs N/bushel
Soybeans	5.4 lbs N/bushel
Alfalfa	56 lbs N/ton
Orchard Grass	50 lbs N/ton
Brome	33 lbs N/ton
Sunflowers	50 lbs N/1000 lbs seed
Tall Fescue	39 lbs N/ton
Sorghum	9 lbs N/ton

Table 5. Soil

Type Soil	Factor
Sandy	1.1
Other	1

Selected Crop is: Wheat

Crop Factor is: 1.75

Estimated Yield is: 33

Crop Nitrogen Requ N_{crop} = Crop Factor X Yield X Soil Factor =

1.75 (crop factor) * 33 (yield) * 1 = 57.75 lb/acre (soil factor)

Step 7: Nitrogen Needed, N_{needed}. Based upon the previous calculations from Steps 5 and 6, the net amount of nitrogen needed for the land application site can be calculated from these equations:

N_{needed} = Crop Nitrogen Requirement - Nitrogen Credits

$N_{needed} = N_{crop}$ - Total $N_{credits}$

N_{needed} = 57.75 (Step 6(N_{crop})) - 3.60 (Step 5D(Total $N_{credits}$)) = 54.15 lb/acre

Step 8: Determine the agronomic loading rate (ALR) for the sewage sludge. This is determined by dividing the nitrogen needed by the plants (N_{needed}) (from Step 7) by the total nitrogen available (TN_{avail}) (from Step 4) in the following equation:

ALR (ton/acre) = Nitrogen needed by crops or vegetation (N_{needed}), Lb/acre / Total Nitrogen Available (TN_{avail}), Lb/ton = Nneeded / TN_{avail} = 54.15 / 23.13 = 2.34 ton/acre

ALR (ton/acre)= 2.34

Approved Loading Rate, APLR = 1.2 X ALR = 1.2 X 2.34 / ALR = 2.81 tons dry sludge/acre

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE

Step 9: To change tons of dry sludge/acre:

A. For liquid application to gallons/acre:

Approved Loading Rate (APLR) = 2.81 (Step 8) (tons dry sludge / acre) X 100 (% Solids) X 2000 / 8.33

Therefore,

APLR 2.81 tons/acre X (24009) = 16862.35 gallons/acre
4 (% solids)

B.For "dry" application to cubic feet/acre or cubic yards/acre:

APLR 2.81 tons dry sludge/acre X 2000 lb/ton X (*)Ft3/LB X 100 / % Solids = #DIV/0! cubic feet/acre

or,

APLR #DIV/0! FT3/acre X 1 yd3 / 27 Ft^3 #DIV/0! cubic yards/acre

*Use 1 FT^3 / 60 Lb for sandbed dried or similar moisture content sludge.

Step 10: From the soil analysis record the following parameters:

0 - 6" depth sample6 - 24" depth (profile) sample

Available Phosphorus: 554 ppm

Nitrate: 16.6 ppm

Exchangeable Potassium: 1890 ppm

pH: 7.26

Kansas State University, Cooperative Extension Service, Agronomy Program, currently recommends that pH be maintained between 6.5 and 7.0 for most field crops. Also, available phosphorus content of the soil should not be allowed to exceed 100 ppm to achieve maximum crop production. If high phosphorus contents are encountered, the disposal of sludge should be temporarily discontinued and an agronomist contacted to determine appropriate actions to be taken.

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