MEMORANDUM

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DATE: July 27, 2026

SUBJECT: **M-208-04 City of Tetonia, Staff Analysis supporting reuse permit issuance.**

Executive Summary

The City of Tetonia currently operates a municipal Class I collection and Class I lagoon treatment system with one aerated cell and a facultative/storage cell. During the current permit cycle (M-208-03), the City applied an average of 7.7 million gallons annually (MGA) to 42.0 permitted acres of agricultural land via slow-rate irrigation. Reuse of recycled water is only permitted during the growing season, and the facility has adequate capacity for winter storage. There have been no significant changes to facility infrastructure since the previous permit renewal. Recent annual reports indicate overall compliance with permit hydraulic and constituent loading requirements, except for periodic noncompliance of Class C disinfection requirements.

Proposed changes to draft permit M-208-04 from the previous permit include the following:

- Addition of a compliance activity that requires an assessment of the treatment and disinfection systems for capability to comply with Class C standards.
- Addition of a compliance activity to measure sludge depths in the lagoons and, if necessary, a plan to remove and dispose of the sludge and waste solids.
- Changes to groundwater monitoring parameters. See section 6.3 for a description of and rationale for the changes.
- Changes to recycled water monitoring parameters. See section 6.1 for a description of and rationale for the changes.
- Changes to supplemental irrigation water (SIW) monitoring parameters. See section 6.4 for a description of and rationale for the changes.
- Changes to plant tissue monitoring parameters. See section 6.5 for a description of and rationale for the changes.

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1 Introduction

This memorandum satisfies the requirements of the "Recycled Water Rules" (IDAPA 58.01.17.400) for issuing reuse permits. The principal facts and significant questions considered in preparing the draft permit and a summary of the basis for the draft permit conditions are provided.

Summary of permitting timeline:

- Reuse permit M-208-03 was issued on July 11, 2014 and expired on July 11, 2024.
- DEQ issued permit modification 1 to update monitoring well designations on June 7, 2019
- DEQ issued permit modification 2 on March 22, 2021 to update the permit responsible official and authorized representative to reflect City personnel at the time.
- DEQ issued permit modification 3 on May 9, 2023 to update the permit responsible official and authorized representative to reflect City personnel at the time.
- A pre-application conference was held between DEQ, the City of Tetonia, and consultants on October 5, 2022.
- A letter of needs summarizing the pre-application conference discussion and permit application requirements was issued on October 10, 2023.
- The reuse permit renewal application was submitted to DEQ on March 8, 2024.
- DEQ issued a permit application completeness determination letter on March 15, 2024.
- DEQ issued a preliminary decision to prepare a draft permit on April 16, 2024.
- DEQ issued an administrative extension of reuse permit M-208-03 on July 9, 2024 until the new permit is issued in accordance with the Recycled Water Rules, IDAPA 58.01.17.

2 Site Location and Ownership

The City of Tetonia wastewater treatment and reuse facility is located approximately ½ mile west of the City of Tetonia. The reuse site, MU-208-02, is located adjacent to the treatment facility to the west. The treatment facility, reuse site, and the land are owned and operated by the City. Nearby land use is agricultural and residential. Site maps are provided in Appendix A.

3 Process Description

Domestic wastewater is collected from the City of Tetonia. Contributors are primarily homes with a few commercial businesses including retail, bars, and restaurants. Wastewater from the collection system gravity flows to the treatment plant. At the treatment plant, a lift station pumps wastewater through an influent flow meter directly to the lagoon system.

The lagoon treatment system consists of two cells with a total volume of 14.8 MG. Cell 1 is aerated and has an operating volume of 5.1 MG. Cell 2 is a facultative storage cell with a maximum volume of 9.7 MG. Wastewater typically flows sequentially through Cell 1 and Cell 2, though either cell can be bypassed as needed for maintenance. After Cell 2, wastewater flows

through the land application pump station, which includes the effluent flow meter, an entry point for SIW from the ditch, and the chlorine injection point. Effluent from Cell 2 is disinfected to Class C recycled water standards using sodium hypochlorite. After the pump station, effluent flows through a dragon filter, then through a chlorine contact chamber to achieve the necessary contact time for disinfection (S&A 2010b).

Recycled water is pumped to the sole management unit (MU), MU-208-02, comprising 42.0 acres. A center pivot (E_i = 0.85) installed on the reuse site allows for even distribution of recycled water to the MU, with additional acreage in the corners covered by an end gun on the pivot. The facility typically grows alfalfa on the MU and uses SIW to meet the irrigation water requirement (IWR). The facility does not typically apply fertilizer to the MU.

A flow diagram and hydraulic profile of the City of Tetonia wastewater facility can be found in Appendix B, Figure B-1.

4 Site Characteristics

4.1 Site Management History

The City of Tetonia sewer system was first constructed in the mid-1980s and consisted of concrete collection pipes, one facultative lagoon, and land application of recycled water via flood irrigation (S&A 2006). During this time, the wastewater system did not have a disinfection system and wastewater was applied to the land directly northwest of the lagoon (DEQ 2006). Before 2006, the facility did not operate under a land application permit and instead disposed wastewater under multiple one-time permits. Under a Consent Order issued by DEQ, the City put forth a facility plan in 2005 that outlined several improvements, including the construction of a new lagoon, disinfection system, and a sprinkler irrigation system (S&A 2006). DEQ issued the City its first reuse permit, LA-000208-01, in 2006 during the interim of enacting the wastewater improvement plans. Permit LA-000208-01 limited wastewater application to 13 MGA and imposed limits on nitrogen, phosphorus, and BOD loading to the MU (DEQ 2006).

Plans and specifications for the wastewater system improvement plans were approved by DEQ in 2008, and as-built drawings of the completed project were submitted to DEQ in 2010 (S&A 2010b). Permit LA-000208-02 was issued in June 2009 and removed phosphorus and BOD loading limits, changed hydraulic loading limits to be at the IWR, changed nitrogen loading limits to be 125% of typical nitrogen uptake, and imposed Class C disinfection requirements (DEQ 2009).

The current permit, M-208-03, was issued July 7, 2014, and some major changes from the previous permit included an increased nitrogen loading limit of 150% of typical nitrogen uptake and the addition of GW total and fecal coliform monitoring (DEQ 2014b).

4.2 Climatic Characteristics

Climate data is taken from the NWS weather station located in Driggs, ID (USC00102676; IEM 2026). The average annual precipitation is 16.27 inches per year, of which 6.42 inches occur during the non-growing season (November 1 through March 31). The average annual maximum temperature is 53.1 °F and the annual average minimum temperature is 25.3 °F.

Table 1: Monthly Averages of Weather Data of Driggs, ID (NWS ASOS Station DIJ) (IEM 2026)

Month	Average High Temperature (°F)	Average Low Temperature (°F)	Rainfall (in)	Average Wind Speed (mph)
Jan	30.43	6.89	0.86	5.64
Feb	32.89	10.19	0.69	7.12
Mar	40.33	18.28	1.06	7.33
Apr	49.11	26.49	2.63	7.71
May	60.79	34.44	1.78	7.41
Jun	71.89	41.87	2.91	7.35
Jul	83.09	48.51	0.64	6.63
Aug	80.27	47.16	1.28	6.46
Sep	71.29	39.71	1.32	6.31
Oct	54.70	29.43	3.74	6.31
Nov	41.20	19.29	0.78	6.50
Dec	30.30	10.24	1.05	6.50
Total	-	-	18.72	-
Highest	83.09	48.51	3.74	7.71
Lowest	30.30	6.89	0.64	5.64

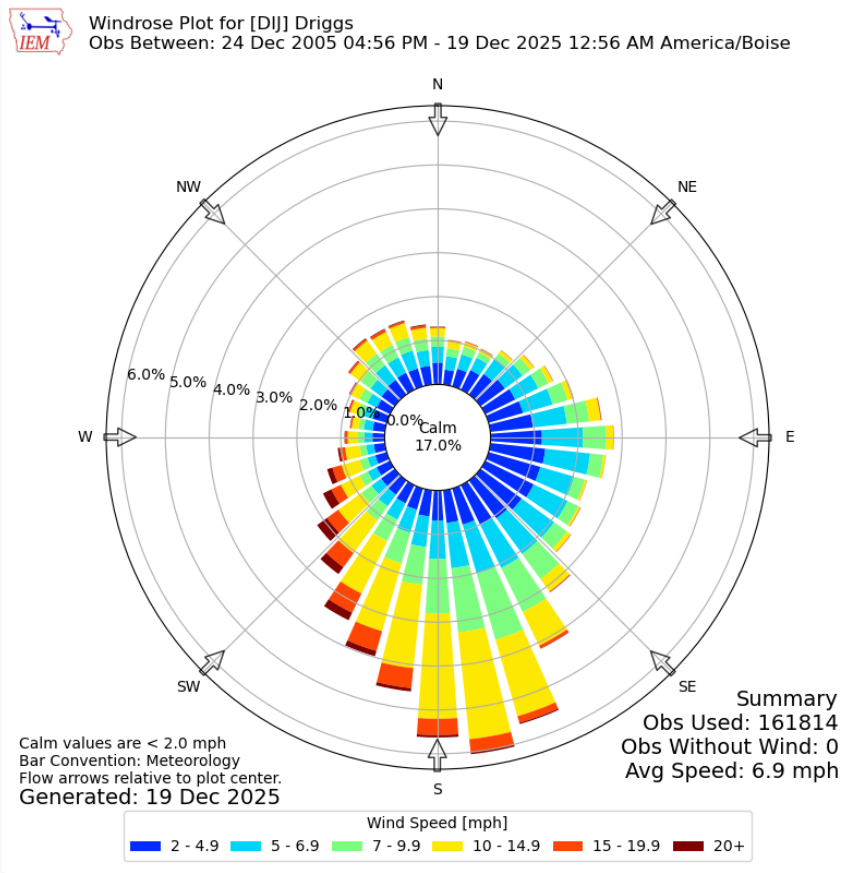

Figure 1: Windrose for Driggs, ID (NWS ASOS Station DIJ) (IEM 2026).

Crop evapotranspiration for this location was taken from the ET_{IDWR} website located at: *https://et-idwr.idaho.gov/* using the Tetonia Experimental National Weather Station located at latitude 43° 51' North, longitude 111° 17' West at an elevation of 6170 feet.

Crop evapotranspiration, the process where soil water is lost to the atmosphere from surface evaporation and plant transpiration, greatly influences the amount of irrigation water required during the growing season. Therefore, DEQ recommends that land application fields be irrigated substantially at the irrigation water requirement (IWR) with SIW and recycled water (DEQ 2024). The IWR is defined by Equation 1 below. Where P_{def} is the precipitation deficit and E_i is the irrigation efficiency of the irrigation system.

$$\boldsymbol{Eq\ 1}: IWR = \frac{P_{def}}{E_i}$$

Precipitation deficit is defined as the amount of water the plant requires less than the amount in the root zone and less than the effective precipitation (PPT_e; Allen and Robison 2007).

The facility primarily grows alfalfa on the reuse site (Tetonia 2024). Precipitation deficit and IWR values for alfalfa (less-frequent cuttings) are presented in Table 2.

Table 2. Precipitation deficit (P_{def}) and irrigation water requirement (IWR) values for primary crops at the reuse facility, during the growing season.

Month	Alfalfa – Less-Frequent Cuttings	
	P_{def}[a] (inches)	IWR[b] (inches)
April	0.11	0.13
May	1.54	1.81
June	5.93	6.98
July	5.57	6.56
August	5.67	6.67
September	2.88	3.39
October	0.53	0.63
GS Total	22.23	26.15

a. These data were obtained from the ET-IDWR website, using the Tetonia Experimental NWS station (IDWR 2026).
b. IWR was calculated using Equation 1, assuming an E_i of 0.85 for a pivot (Allen and Robison 2007).

4.3 Soils

4.3.1 Soil Characteristics

Soil types on the site are described in detail in section 7 of the permit application. According to the NRCS Soil Survey, the site's soil is predominantly Alpine-St. Anthony Complex, which is a gravelly loam characterized by well-draining and low available water capacity (AWC). The westernmost soil on the MU is classified as Redfish-Foxcreek complex, which is considered poorly drained due to its profile being partially mucky peat (NRCS 2026). Well drained soil is typically beneficial for aerobic bacterial activity, which promotes crop growth, and for preventing ponding during periods of heavy rainfall or irrigation (DEQ 2024).

Table 3: Soil Composition of City of Tetonia MU-208-02 (NRCS 2026).

NRCS Soil Composition Table						
Teton County, Idaho						
Map Unit Name	Percent of AOI	Slopes	Texture	Parent Material	Drainage Class	Available Water Capacity (AWC)
Alpine-St. Anthony Complex	93.60%	0-2%	Gravelly Loam	Mixed Alluvium	Well Drained	Low (about 3.5 inches)
Redfish-Foxcreek complex	6.32%	0-2%	Mucky Peat, Gravelly Loam	Mixed Alluvium	Poorly Drained	Low (about 3.2 inches)

4.3.2 Soil Monitoring Data

The following soil constituent monitoring data was obtained from the 2016 through 2025 annual reports (Tetonia 2017a, 2018, 2018, 2020a, 2021, 2022, 2023, 2024, 2025, 2026). Soil

constituent concentrations can be assessed using the Soil Constituent Interpretation Guide in the table below.

Table 4: Soil Constituent Interpretation Guide (OSUES 2011).

Crop Production Guidelines				
Constituent	Low	Medium	High	Excessive
Nitrate-N (mg/kg)	<10	10 to 21	21-30	>30
Ammonium-N (mg/kg)	<2	2 to 10	>10	-
Avail. Phosphorus (mg/kg)	<10	10 to 25	25 to 50	>50
Potassium (ppm)	<150	150 to 250	250 to 800	>800
EC (mmhos/cm)	<1.0	1 to 2	2 to 4	>4
Saline and Sodic Soil Interpretation				
Salt-affected Soil Classification	EC	SAR	ESP	pH
Normal Soil	<4.0	<13	<15	<8.3
Saline Soil	>4.0	<13	<15	<8.3
Saline-Sodic Soil	>4.0	>13	>15	<8.3
Sodic Soil	<4.0	>13	>15	>8.3

Data Source: Oregon State University Extension Service (OSUES 2011)
SAR = sodium absoprtion ratio, EC = electrical conductivity, ESP = exchangeable sodium percent

Concentrations of nitrate-N, ammonium-N, phosphorus, and electrical conductivity (EC) have generally remained within acceptable levels based on the Crop Production Guidelines. The monitoring data for EC concentrations show that the site's soil is typically nonsaline or slightly saline. Soil pH levels are generally neither acidic nor alkaline, typically ranging from 6.6 to 8.1 standard units.

Table 5: Average soil monitoring data from 2016 to 2025

Layer	E.C. (mmhos/cm)	NH4-N (ppm)	NO3-N (ppm)	pH (s.u.)	Avail. P (ppm)
Layer 1 (0-12")	0.784	6.52	10.34	7.82	12.22
Layer 2 (12-24")	1.166	3.7	8.45	7.19	8.14
Layer 3 (24-36")	1.07	3.32	8.97	6.86	7.99
Average (0-36")	1.01	4.51	9.25	7.29	9.45

4.3.2.1 Nitrogen

Soil nitrate-N concentrations from 2016 to 2025 have generally been between 2 and 25 ppm, with the average between the 3 layers being 9.25 ppm. Ammonium-N concentrations from 2016 to 2025 have generally been between 2 and 12 ppm. Nitrate-N and ammonium-N concentrations appear to be within typical ranges for crop production and there are no apparent trends from 2016 to 2025.

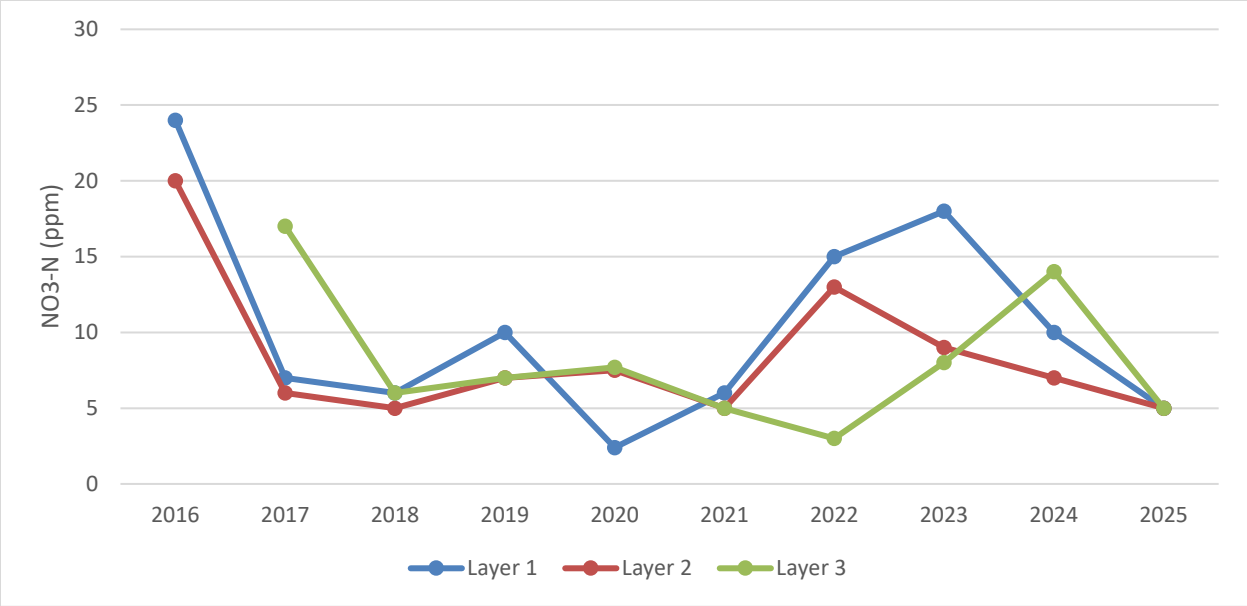

Figure 2a: Soil nitrate-N concentrations from 2016 to 2025

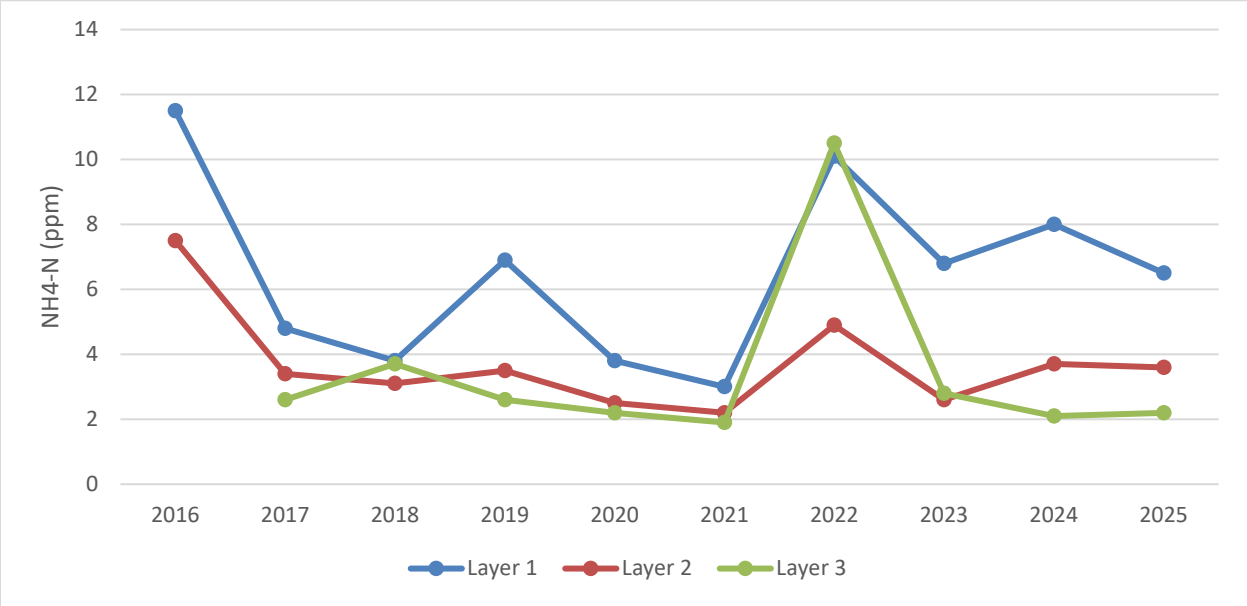

Figure 2b: Soil ammonium-N concentrations from 2016 to 2025

4.3.2.2 Phosphorus

Soil phosphorus levels were typically 10 ppm or less prior to 2022, but phosphorus levels in the first layer have ranged from 14 to 23 ppm since 2022. Phosphorus concentrations in layer 3 do not appear to have significantly increased since 2016. Heavy periods of rain or irrigation can uptake phosphorus from the upper soil layers and runoff into surface water (DEQ 2007). However, the site does not appear to be at a high risk of runoff to surface water, given the typically mild rainfall and distances to surface water bodies (UIE 2008). Phosphorus concentrations more than 40 ppm in the upper 12 inches of soil can raise concerns of surface

water runoff, but available phosphorus concentrations on the site are well below 40 ppm, as shown in Figure 3 below (UIE 2008).

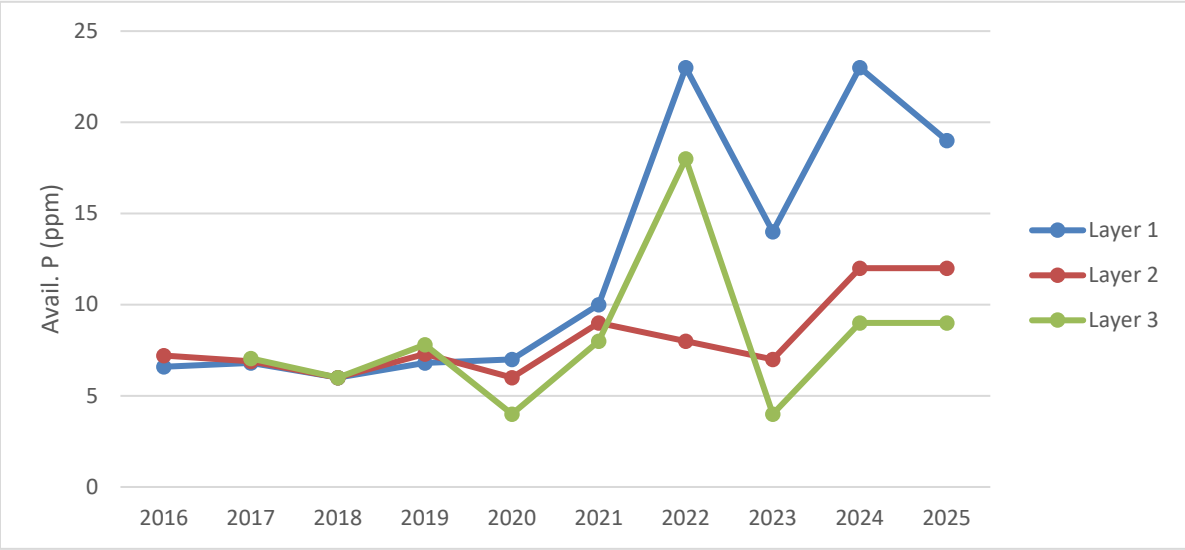

Figure 3: Soil phosphorus concentrations from 2016 to 2026

4.4 Surface Water

The Teton River is located 3 ½ miles west of the facility and provides multiple beneficial uses including Cold Water Aquatic Life, Salmonid Spawning, Primary Contact Recreation, Domestic Water Source, and industrial and agricultural uses. Spring Creek is located approximately ¼ mile south of the facility and is designated for Cold Water Aquatic Life, Secondary Contact Recreation, and Wildlife Habitat beneficial use. Presumed beneficial uses are industrial and agricultural use.

There appear to be three irrigation ditches located adjacent to MU-208-02: one along the western boundary, one on the northeast corner, which is no longer used, and one along the east edge of the MU and the west side of the storage lagoon, LG-208-02.

Table 6: Summary of surface water bodies near reuse facility

Surface Water Body	Beneficial Uses[a]	Nearest Distance to MU[b]	Nearby MWs[b]
Irrigation Canals(unnamed)	Irrigation	58 feet W	<50 feet W (GW-208-03 and GW-208-04)
Spring Creek	Tributary to the Teton River	1000 feet S	1200 feet S (GW-208-03)
Teton River	COLD, SS, PCR, DWS	2.3 miles SW	2.3 miles SW (GW-208-03)

a. COLD: Cold Water Species, SS: Salmonid Spawning, PCR: Primary Contact Recreation, DWS: Domestic Water Source (IDAPA 58.01.02.100.02).
b. Distances to surface water bodies verified using the Source Water Assessment Map (DEQ 2023).

4.5 Groundwater/Hydrogeology

4.5.1 Hydrogeology

The site historically had shallow seasonal groundwater levels, with the 1982 seasonal high being 3.5 feet below ground surface (bgs), but conditions since 2004 have indicated that seasonal water depths may have lowered (S&A 2006). The uppermost aquifer generally flows west to southwest and is located approximately 25 to 40 feet bgs, as indicated by monitoring data from 2016 to 2025 (Tetonia 2017a, 2018, 2019, 2020a, 2021, 2022, 2023, 2024, 2025, 2026). This aquifer is 50 to 100 feet thick and is most likely interconnected with the deeper Snake River Plain (SRP) aquifer. The SRP aquifer is located approximately 400 feet below the reuse site and flows southwest.

The nearest public water supply is the City of Tetonia, PWS ID7410012, with Well #1 and Well #2 being approximately 2800 ft and 3300 ft from the MU respectively (DEQ 2023). Both wells are upgradient of the groundwater flow direction and are unlikely to be impacted by reuse operations. There are multiple private wells for residential use located around the facility. Three private wells are located approximately 1900 feet southwest of the facility, and two are located about 1900 feet southeast of the MU (IDWR 2026). Since the private wells are further than ¼ mile from the MU, a well location acceptability analysis would not be necessary for these wells.

The facility has three groundwater monitoring wells, one upgradient of the MU (GW-208-01) and two downgradient of the MU (GW-208-03 and GW-208-04). The wells were reassigned numbers in the 2019 permit modification, however DEQ recommends the new permit use the original well designations, shown in Table 7 below, since the facility continues to use the original well numbers for annual reporting (DEQ 2019).

Table 7: Monitoring well gradients, casing elevation, and average water table depth from 2016 to 2025.

Well	Location	Gradient	Well Casing Elevation (ft)	Water Table Depth (ft bgs)
GW-208-01	East	Upgradient	6030.63	37.09
GW-208-03	Southwest	Downgradient	6017.63	26.69
GW-208-04	Northwest	Downgradient	6014.60	26.77

4.5.2 Groundwater Quality

Annual report data from 2016 to 2025 show that the monitoring wells have not exceeded the nitrate and total dissolved solids (TDS) Ground Water Quality Rule (GWQR) constituent standards (Tetonia 2017a, 2018, 2019, 2020a, 2021, 2022, 2023, 2024, 2025, 2026). Phosphorus does not have a GWQR standard, however phosphorus levels appear to have been higher during this permit cycle than the previous cycle (DEQ 2014a).

Table 8: Average groundwater nitrate, total phosphorus, and total dissolved solids concentrations

Well	NO3-N (mg/L)	Total P (mg/L)	TDS (mg/L)
GW-208-01	1.07	0.126	175
GW-208-03	0.71	0.098	160
GW-208-04	0.99	0.094	177

4.5.2.1 Phosphorus

Phosphorus does not have a constituent standard listed in the GWQR, however elevated phosphorus levels in downgradient wells can indicate possible breakthrough of recycled water through course vadose material (DEQ 2007). Phosphorus levels in the three monitoring wells appear to have increased between 2016 and 2025, with levels being notable above 0.15 mg/L in 2024. Mann-Kendall tests were used to analyze the groundwater data, and the tests did not indicate with >95% certainty that there were time-based upward trends from 2016 to 2025. DEQ recommends that groundwater phosphorus continue to be monitored to observe future trends.

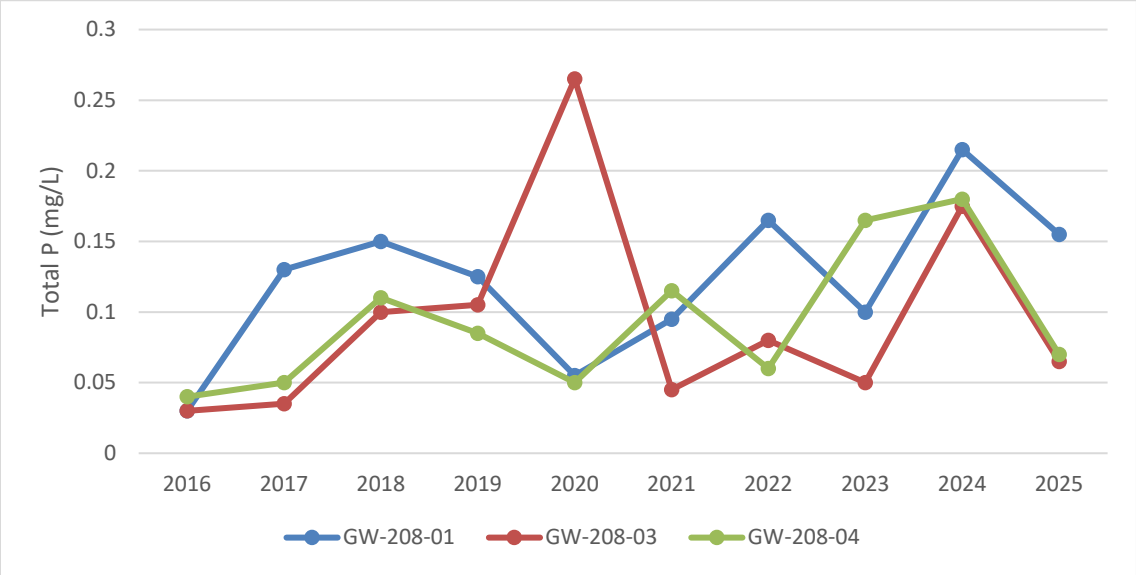

Figure 4: Average annual groundwater phosphorus concentrations from 2016 to 2025.

Table 9: Summary of Mann-Kendall analyses of groundwater phosphorus monitoring data.

GW-030-01		GW-030-03		GW-030-04	
n	10	n	10	n	10
alpha	0.05	alpha	0.05	alpha	0.05
p-value	0.15	p-value	0.283	p-value	0.0593
trend	no	trend	no	trend	no

4.5.2.2 Coliform

Groundwater coliform monitoring was only reported in the 2021, 2023, 2024, and 2025 annual reports. Based on the available total and fecal coliform groundwater data from 2021 to 2025, the facility's groundwater occasionally exceeds total coliform standards but has not exceeded fecal coliform standards. The total coliform exceedances were not violations of the permit nor the GWQR because the same samples were within the fecal coliform primary constituent standard; therefore, the facility has generally complied with groundwater quality standards since 2021.

Table 10: Summary of total and fecal coliform groundwater data from 2021 to 2025

Analyte	Parameter	GW-208-01	GW-208-03	GW-208-04
Total Coliform	Total Samples	8	8	8
	Exceedances	0	2	3
	% Exceedances	0%	25%	37.5%
Fecal Coliform	Total Samples	8	8	8
	Exceedances	0	0	0

4.6 Recycled Water Characterization and Loading Rates

4.6.1 Recycled Water Characterization

Recycled water monitoring data from the 2016 through 2025 annual reports are summarized as annual average constituent concentrations in Table 11 (Tetonia 2017a, 2018, 2019, 2020a, 2021, 2022, 2023, 2024, 2025, 2026).

Total Kjeldahl Nitrogen (TKN) and total phosphorus appear to be on upward trends since 2016. Groundwater and soil nitrogen concentrations have remained relatively constant during this time, which indicates that crops are effectively removing the nitrogen applied to the system. However, as shown in sections 4.3.2.2 and 4.5.2.1, phosphorus concentrations may be trending upwards in groundwater and soil. See section 4.6.3 for further discussion of constituent loading and uptake rates.

Table 11. Average recycled water quality, mg/L.

Year	NNN	TKN	Total N	Total P	TDS	VDS	NVDS
2016	0.20	5.25	5.45	1.98	391	110	281
2017	0.79	7.73	8.52	3.12	420	91	329
2018	0.03	6.63	6.66	5.29	469	98	371
2019	NR	NR	NR	NR	NR	NR	NR
2020	10.32	4.50	14.82	4.53	841	150	690
2021	4.18	5.48	9.66	5.69	612	98	514
2022	1.05	12.60	13.65	8.52	516	148	368
2023	NR	NR	NR	NR	NR	NR	NR
2024	1.29	15.90	17.19	5.52	474	140	334
2025	0.40	24.78	25.18	7.10	331	117	214
Average	2.28	10.36	12.28	5.22	507	119	388
Median	0.92	7.18	11.65	5.40	471	113	351
Std Dev	3.28	6.60	5.64	1.94	149	22	140

4.6.1.1 Total Coliform

The reuse system is classified for Class C disinfection requirements, which limits total coliform concentrations to 230 cfu/100mL for single samples and 23 cfu/100mL for running 5-sample medians. The City collects weekly samples for total coliform analysis during periods of use, and the samples are typically analyzed using Standard Methods 9223B for total coliform. Standard Methods 9223B is only approved by the EPA for analyzing drinking water and surface water and is not approved for analyzing wastewater. DEQ recommends the facility coordinate with its contracted laboratory and update the facility's quality assurance project plan with an acceptable method.

Out of 59 samples collected for analysis from 2016 to 2025, 32 samples were non-detects, 14 samples were detects below the 230 cfu/100mL limit, and 13 samples exceeded the 230 cfu/100mL limit. Given the frequency of total coliform exceedances, DEQ recommends the facility complete a disinfection management plan, which will require an evaluation of the existing disinfection system for deficiencies and a plan that must be implemented to correct the deficiencies.

Table 12: Summary of recycled water total coliform monitoring

Year	# of Samples	# of Exceedances	Lowest TC (cfu/100 mL)	Highest TC (cfu/100 mL)	Highest Running Median (5 samples)
2016	3	2	<1	2419.2	248.1
2017	4	3	95.9	2419.2	1732.9
2018	7	0	<1	206.4	195.6
2020	14	0	<1	<1	<1
2021	6	0	<1	<1	<1
2022	6	0	7.1	39.1	28.4
2023	4	4	2419.2	2419.2	2419.2

2024	3	2	4.1	2419.2	2419.2
2025	12	3	<1	2419.6	19.9

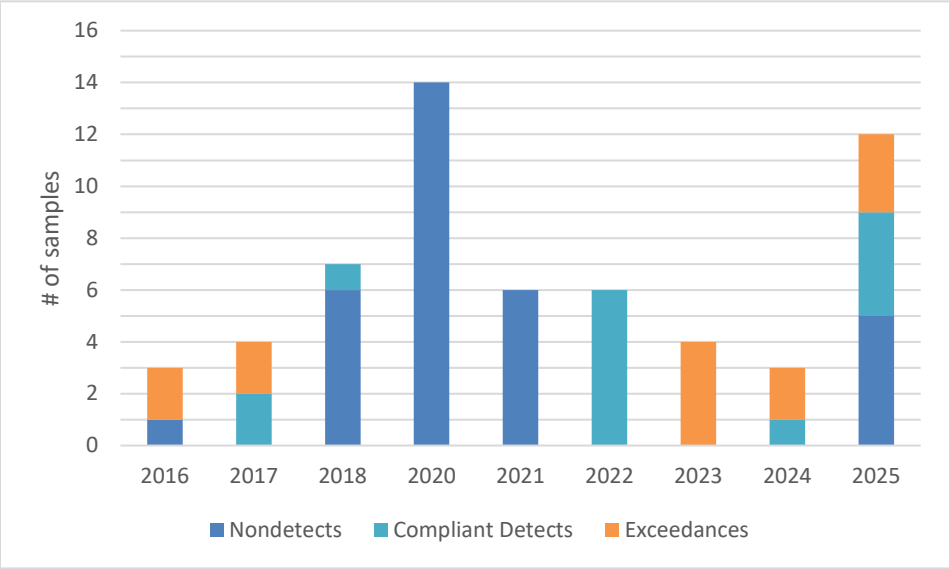

Figure 5: Recycled water total coliform sample results by year.

4.6.2 Hydraulic Loading Rates

DEQ typically establishes the growing season hydraulic loading limits for the application of recycled water on MUs at the irrigation water requirement (IWR). The formula used to estimate IWR can be found on Eq. 1 in section 4.2. The hydraulic loading limit for slow rate land application sites is established at the IWR for the following two reasons:

- Irrigating considerably below the IWR could lead to poor plant growth, causing inadequate nutrient uptake in the plants, potentially leading to infiltration of more recycled water nutrients past the root zone, which could then infiltrate deeper into the soil and potentially pollute the groundwater and surface water; and,
- Conversely, applying water to MUs at rates considerably greater than the IWR could lead to the water that is in excess of the quantity necessary for crop growth to infiltrate past the root zone, carrying with it excess nutrients deeper into the soil, which could potentially pollute the groundwater and surface water.

Historical hydraulic loading has generally been lower than the annual IWR for the crop. The IWR for alfalfa-less-frequent cuttings, assuming an irrigation efficiency of 85% is 26.15 inches (Section 4.2; Table 2), with average hydraulic loading on the site being 13.3 inches per year. The facility has shown in more recent years, 2021, 2022, and 2024, that it is capable of hydraulically loading at the IWR. The historical hydraulic loading rates for the MU are shown in Table 13 below (Tetonia 2017a, 2018, 2019, 2020a, 2021, 2022, 2023, 2024, 2025, 2026).

Table 13. Recycled water to reuse site, million gallons per year

Year	Recycled Water Volume (MGA)	Supplemental Irrigation Water Volume (MGA)	Total Hydraulic Loading (in/yr)
2016	6.365	0.000	5.58
2017	7.229	0.000	6.34
2018	7.050	0.000	6.18
2019	0.784	0.600	1.21
2020	9.935	10.578	17.99
2021	8.922	22.287	27.37
2022	11.694	14.044	22.57
2023	7.230	0.000	6.34
2024	2.738	15.500	15.99
2025	15.223	11.659	23.57
Average	7.717	7.467	13.31
Median	7.230	5.589	11.17
Std Dev	3.926	7.905	8.79

4.6.3 Constituent Loading Rates

The constituent loading rate data shown below are from the 2016 to 2025 Annual Reports (Tetonia 2017a, 2018, 2019, 2020a, 2021, 2022, 2023, 2024, 2025, 2026). Constituent loading rates generally appear to conform with permit loading limits and do not appear to be impacting the environment at this time. DEQ does not recommend any changes to constituent loading limits.

Table 14. Average annual constituent loading to MU-208-02, pounds per acre per year.

Year	Nitrogen	Phosphorus	Salts (NVDS)
2016	7.27	2.08	358.85
2017	11.24	3.96	498.22
2018	9.39	7.93	520.19
2019	1.34	1.18	79.43
2020	31.59	13.89	1735.16
2021	26.30	36.57	2785.24
2022	33.83	25.48	1256.11
2023	19.60	12.23	528.33
2024	12.36	9.42	634.33
2025	77.42	26.52	846.20
Average	23.03	13.93	924.21
Median	15.98	10.82	581.33
Standard Deviation	21.93	11.86	806.64

4.6.3.1 Nitrogen

Nitrogen application rates have ranged from approximately 12 to 77 lb/ac-yr since 2020. Nitrogen loading rates exceeded the nitrogen loading limit in 2020 and 2021, but loading rates were well within the limits from 2022 to 2025. Crop yields were substantially higher from 2021 through 2025, with an average dry yield of 1.23 tons/acre-yr.

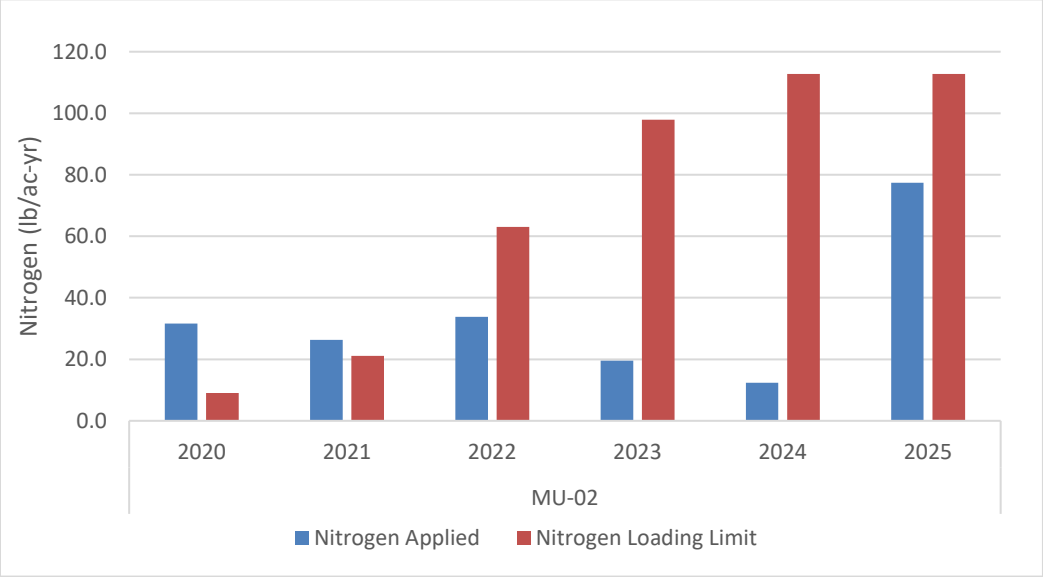

Figure 6: Annual nitrogen loading rates compared to nitrogen loading limits. Nitrogen applied was estimated for 2022 due to missing recycled water monitoring data.

As stated in the DEQ Reuse Guidance, "alfalfa presents a unique problem when making required nitrogen calculations since it is able to fix atmospheric nitrogen in addition to its ability to take up plant available nitrogen (nitrate, ammonia) from the soil" (DEQ 2007). Alfalfa is a crop regularly grown by the permittee, and it is recommended that loading limits on fields with alfalfa account for N-fixation. The following equation (Eq. 3) should be used when calculating the N loading limit for MUs where alfalfa is grown:

$$\boldsymbol{Eq.\,3}: N_{required} = \frac{(1 - N_{fixation}) \times N_{crop}}{e_f}$$

Where $N_{fixation}$ is the proportion of N_{crop} which is fixed from the atmosphere and e_f is the uptake efficiency factor (DEQ 2007). This equation would provide a more realistic estimate of N-uptake since a portion of N content in legumes is derived from the atmosphere. DEQ recommends the draft permit require that alfalfa nitrogen uptake be calculated assuming that 15% of crop nitrogen content is fixed from the atmosphere.

4.6.3.2 Phosphorus

Phosphorus application rates have ranged from 12 to 36 lb/ac-yr, while phosphorus uptake rates have remained below 10 lb/ac-yr since 2020. Phosphorus application rates since 2020 are generally within acceptable ranges for a municipal recycled water system of this size, but

phosphorus uptake rates have consistently fallen behind application rates. As stated in sections 4.3.2.2 and 4.5.2.1, phosphorus application does not appear to be adversely impacting groundwater and soil quality. However, consistently inadequate phosphorus uptake by crops may lead to negative long-term environmental impacts.

To ensure healthy crops and adequate constituent uptake, DEQ recommends that the facility create a cropping plan that outlines strategies for improving crop health and yields, which may include utilization of crop rotations, fertilizers, and irrigation schedules. The facility should also ensure that crop yield and plant tissue monitoring procedures listed in the QAPP are up to date and can accurately track the constituent uptake of crops.

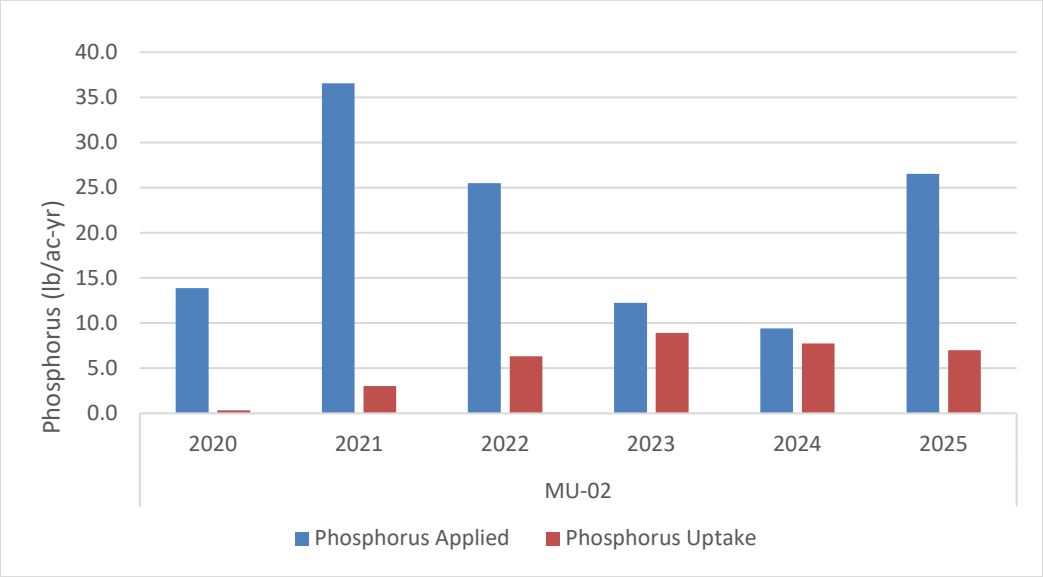

Figure 7: Annual phosphorus loading rates compared to phosphorus uptake rates. Phosphorus applied was estimated for 2022 due to missing recycled water monitoring data.

5 Site Management

5.1 Buffer Zones

Buffer zones for protection of surface water, groundwater, drinking water supplies, and the public are required by IDAPA 58.01.17.604. The DEQ Reuse Guidance Manual provides recommended buffer distances for various reuse scenarios. For this permit, the following scenario was used in determining buffer distances: Municipal Class C recycled water, rural area, sprinkler application.

As shown in Table 15 below, all existing buffer zones satisfy the DEQ Guidance buffer requirements. The Guidance buffer zones requirements will be specified in the new permit.

Table 15. Buffer zones, feet.

	Existing Permit Buffer Requirements[a]	Guidance Buffer Zone Requirements[b]	Actual Reuse Area
Nearest Inhabited Residence	300	300	1750 (West)
Nearest Public Water System	1,000	1,000	2760 (City of Tetonia Well #2, East of MU)
Nearest Private Water Supply	500	500	1900 (Southwest)
Areas Accessible to the Public	50	50	50 (Beard Ln, South)
Nearest Surface Water	100	100	1000 (Spring Creek, South)
Nearest Irrigation Ditches/Canals	50	50	58 (West)
Fencing	Three-wire pasture fence	Three-wire pasture fence	Three-wire pasture fence
Posting	Every 500 feet and each corner of the outer perimeter of the buffer zone of the site	Every 500 feet and each corner of the outer perimeter of the buffer zone of the site	Every 500 feet and each corner of the outer perimeter of the buffer zone of the site

a. Current Buffer Zone Requirements in Reuse Permit M-208-03.
b. The DEQ Reuse Guidance Manual provides recommended buffer distances for various reuse scenarios. For this permit, the following scenario was used for determining buffer distances: Municipal Class C, rural area, sprinkler application.
c. Distances to drinking water supplies verified using the Source Water Assessment Map (DEQ 2023).

5.2 Runoff

The permit application and the NRCS Soil Survey state that general topography of the reuse site is flat, with 0-2% slopes, reducing the risk of runoff from the site (NRCS 2026). The application also states that runoff has not been observed during irrigation activities (Sunrise 2024). The draft permit includes a compliance activity to submit a Plan of Operations to DEQ within one year of permit issuance. The Plan of Operations will be required to include a runoff management plan for review and approval.

5.3 Seepage Rate Testing

Table 16 contains a summary of seepage rate testing for the lagoons associated with this reuse permit (Keller 2020). Lagoon Cells 1 and 2 are due next for seepage rate testing in 2030.

Table 16. Seepage rate testing.

Lagoon	Test Date Completion	Test Result	Allowable Rate, (inches/day)	Date Next Seepage Rate Test is Due
Cell 1	5/30/2020	Passed	0.125	2030
Cell 2	6/16/2020	Passed	0.125	2030

Test procedures for completing seepage tests are recommended to be submitted at least 45 days prior to the due date shown in the table above. Information on seepage testing

procedures is located at: *http://www.deq.idaho.gov/water-quality/wastewater/lagoon-seepage-testing.aspx*

5.4 Waste Solids, Biosolids, Sludge, and Solid Waste

The facility submitted a Sludge Management Plan to DEQ in October 2017, and the plan outlined monitoring procedures for sludge depth and estimated the sludge accumulation at the time (Tetonia 2017b). The Plan estimated the average sludge depth of Cell 1 to be 1 foot, and that sludge depths greater than 18 inches may deteriorate lagoon performance. In 2020, the facility measured sludge depths in Cell 1 ranging from 12 to 36 inches, but there is no record of the facility removing the sludge from Cell 1 (Tetonia 2020b).

The buildup of sludge in Cell 1 could be reducing wastewater residence time, and consequently treatment efficiency, and could be a contributing factor to the total coliform exceedances discussed in section 4.6.1.1. DEQ recommends the permit includes a compliance activity to measure the sludge accumulation of each lagoon and, if sludge depths are greater than 18 inches on average, put forth a plan to remove the sludge and waste solids from lagoons with excessive sludge buildup.

5.5 Nuisance Odors

A nuisance odor management plan will be required as part of the updated Plan of Operations, required one year after permit renewal. Nuisance odors are not typical at the facility, but the plan should address potential odors and response in the event of an odor complaint.

5.6 Cropping Plan

A cropping plan will be required as part of the updated Plan of Operations required one year after permit renewal. The cropping plan should discuss appropriate crops for the site including crop rotations.

5.7 Grazing

Grazing is not currently practiced on site. If the facility wishes to practice grazing in the future, a grazing management plan must first be approved by DEQ.

5.8 Salts

Salts are not applied at a rate that would cause adverse salinity in soils or degradation of groundwater or surface water. Submittal of an NVDS loading management plan is not required by the draft permit.

6 Monitoring

The proposed monitoring requirements for the draft permit are described in detail in the following subsections. All monitoring will be conducted in accordance with the facility's Quality Assurance Project Plan (QAPP). See section 7 for requirements regarding the QAPP.

6.1 Recycled Water Monitoring

As discussed in section 4.6.1.1, the facility has not consistently met Class C disinfection requirements. DEQ recommends the addition of weekly free chlorine residual monitoring during periods of recycled water use. The monitoring of free chlorine residual can help determine if inadequate disinfection is responsible for total coliform exceedances, which can help the facility diagnose issues with the disinfection process (DEQ 2024). DEQ also recommends the addition of monthly pH recycled water monitoring, as it is a typical monitoring parameter for municipal recycled water systems and it may be beneficial for identifying changes to recycled water characteristics (DEQ 2024).

As discussed in section 4.6.1, total dissolved solids and volatile dissolved solids concentrations have not historically been a concern with the facility's recycled water effluent. The monitoring of TDS and VDS are not typical for Class C facultative lagoon systems; therefore, DEQ recommends the new permit not require recycled water TDS and VDS monitoring.

DEQ also recommends that the new permit requires total nitrogen monitoring instead of TKN and NNN monitoring. Since NNN recycled water concentrations are not a significant concern, total nitrogen monitoring will allow the City to choose the analytical methods for total nitrogen that best suits their needs.

Table 17: Recycled water constituent monitoring requirements from permit M-208-03

Monitoring Point Serial Number and Location	**Sample Description**	**Sample Type and Frequency**	**Constituents (units in mg/L unless otherwise specified)**
WW-208-01 Recycled water at center pivot sample point	Recycled Water to MU-208-02	Grab sample/ Weekly frequency (during weeks of use)	-Total Coliform (cfu/100mL)
WW-208-01 Recycled water at center pivot sample point	Recycled Water to MU-208-02	Grab sample/ Monthly frequency (during months of use)	-Total Kjeldahl Nitrogen, as N -Nitrate+Nitrite-nitrogen, as N -Total Phosphorus, as P -Total Dissolved Solids -Volatile Dissolved Solids
Management Unit or Flow Measurement Serial Number and Location	**Sample Description**	**Sample Type and Frequency**	**Measured Parameter, each MU**
Flow Meter at effluent pump station	Recycled Water from LG-208-02	Daily Meter Reading Monthly compliation of Data	-Volume (MG/month) -Application depth (inches/month)

6.2 Soil Monitoring

Table 18 below shows the current soil monitoring requirements. DEQ does not recommend any changes to soil monitoring requirements.

Table 18: Soil constituent monitoring requirements from permit M-208-03

Monitoring Point Serial Number	Sample Description	Sample Type and Frequency	Constituents (units in mg/L unless otherwise specified)
SU-208-02	Composite Samples	Annual, Each spring prior to any fertilization	-Electrical Conductivitiy (umhos/cm in saturated paste extract) -Nitrate-nitrogen -Ammonium-nitrogen -Plant available phosphorus -pH (standard units)

6.3 Groundwater Monitoring

While the facility often monitors total and fecal coliform for groundwater, permit M-208-03 does not require analysis for those constituents. DEQ recommends that permit M-208-04 require semi-annual fecal coliform monitoring in groundwater.

To ensure stabilization of groundwater before collecting laboratory samples, DEQ recommends the addition of pH, specific conductance/electrical conductivity, and temperature as field parameters to semi-annual groundwater monitoring.

Table 19: Groundwater constituent monitoring requirements from permit M-208-03

Monitoring Point Serial Number	Sample Description	Sample Type and Frequency	Constituents (units in mg/L unless otherwise specified)
GW-208-01 through GW-208-04	Monitoring wells	Filtered grab sample; Semi-annual sampling frequency: prior to irrigation season and post irrigation season	-Water table elevation (feet); -Water table depth (feet); -Nitrate-nitrogen, as N; -Total phosphorus, as P; -Total Dissolved Solids

6.4 Supplemental Irrigation Water Monitoring

Table 20 below shows the current SIW flow and constituent monitoring requirements. To match the changes to recycled water monitoring listed in section 6.1, DEQ recommends the removal of total dissolved solids and volatile dissolved solids monitoring for supplemental irrigation water. To match the changes to RW monitoring, DEQ also recommends that the new permit requires total nitrogen monitoring instead of TKN and NNN monitoring in SIW.

Table 20: Supplemental Irrigation constituent monitoring requirements from permit M-208-03

Monitoring Point Serial Number and Location	Sample Description	Sample Type and Frequency	Constituents (units in mg/L unless otherwise specified)
SW-208-01 Irrigation well no. 1	Supplemental irrigation water	Grab sample/ Annual frequency in July	-Nitrate+Nitrite-nitrogen, as N -Total Phosphorus, as P -Total Dissolved Solids -Volatile Dissolved Solids
SW-208-02 Irrigation Ditch	Supplemental irrigation water	Grab sample/ Annual frequency during years of use	Nitrate+Nitrite-nitrogen, as N -Total Phosphorus, as P -Total Dissolved Solids -Volatile Dissolved Solids
Management Unit or Flow Measurement Serial Number and Location	**Sample Description**	**Sample Type and Frequency**	**Measured Parameter, each MU**
Flow Meter on Irrigation well	Supplemental irrigation water from well	Daily Meter Reading Monthly compliation of Data	-Volume (MG/month) -Application depth (inches/month)

6.5 Crop Yield and Tissue Monitoring

Table 21 below shows the current crop yield and plant tissue monitoring requirements. DEQ recommends that the new permit requires plant tissue monitoring of total nitrogen content instead of nitrate-nitrogen and Total Kjeldahl nitrogen content.

Due to generally low nutrient loading rates, the use of standard table values may be appropriate to satisfy plant tissue monitoring requirements in lieu of laboratory analysis of plant tissue samples. If the permittee wishes to utilize standard table values in lieu of laboratory analysis of crop tissue samples, then the desired standard table including plant tissue moisture content, total nitrogen content, total phosphorus content, and ash content must be included in an updated cropping plan. The permittee may use these standard table values if DEQ concurs that they accurately represent crops grown on the MU.

Table 21: Crop yield and plant tissue monitoring requirements from permit M-208-03.

Associated Hydraulic Management Units	Sample Description	Sample Type and Frequency	Parameters
MU-208-02	Harvested Portion, each crop, each MU; Crop Yield Monitoring	Field monitoring; Each harvest	-Crop Type -Harvest date -Sample Collection date -Harvested acreage (acres) -As-harvested ("wet") yield in customary harvested units (tons, bushels, cwt, etc.) -As-harvested (field) moisture content (%) -Dry yield (lb)
MU-208-02	Harvested Portion, each crop, each MU; Plant Tissue Monitoring	Lab analysis; Each harvest	-Moisture content (%) -Total Kjeldahl nitrogen (%) -Nitrate-nitrogen, as N (%) -Phosphorus as P (ppm) -Ash (%)

6.6 Calculation Methodologies

DEQ does not recommend that the draft permit requires meteorological monitoring for land application, as the data from the nearby Tetonia NWS station is sufficient and accessible to City of Tetonia and DEQ.

7 Quality Assurance Project Plan

The QAPP outlines the procedures used by the permittee to ensure the data collected and analyzed meets the requirements of the permit.

To support its mission, DEQ is dedicated to using and providing objective, correct, reliable, and understandable information. Decisions made by DEQ are subject to public review and may at times, be subject to rigorous scrutiny. Therefore, DEQ's goal is to ensure that all decisions are based on data of known and acceptable quality.

The QAPP is a permit requirement and must be submitted to DEQ as a stand-alone document for review and acceptance. The QAPP is used to assist the permittee in planning for the collection, analysis, and reporting of all monitoring data in support of the reuse permit and explaining data anomalies when they occur.

DEQ does not approve QAPPs, but reviews them to determine if the minimum EPA guideline requirements are met and that the reuse permit requirements are satisfied. DEQ does not approve QAPPs because the responsibility for validating of the facility's sampling data lies with the permittee's quality assurance officer and not with DEQ.

The format of the QAPP should adhere to the recommendations and references in the Assurance and Data Processing sections of the guidance manual (DEQ 2024) and EPA QAPP guidance documents https://www.epa.gov/system/files/documents/2025-10/qapp-guidance_dtd_10012025_1.pdf.

The facility's most recent QAPP is dated 2010. DEQ recommends the new permit include a compliance activity that requires an updated QAPP that reflects operational and monitoring changes.

8 Site Operation and Maintenance

The wastewater treatment plant and reuse facility are owned and operated by the City of Tetonia. The Mayor of the City of Tetonia serves as the responsible official for the permit and has authority over the facility. The Public Works Director is typically the authorized representative for the permit and is responsible for the monitoring, sampling, and maintenance of the facility. The City also employs a wastewater operator, who is responsible for the operations of the facility, and a city clerk, who is responsible for the record keeping of the facility and is also designated as an authorized representative.

9 Compliance Activities

The list of compliance activities include in the current permit and those that will be required by the new permit is provided below.

9.1 Status of Compliance Activities in Current Permit

1. CA-208-01. The Plan of Operation and QAPP were assigned to be updated as needed to reflect current facility operations and permit requirements. The most recent QAPP was dated April 2010 (Tetonia 2010). The facility has developed multiple management plans, but DEQ is not aware of a consolidated Plan of Operations document.
2. CA-208-02. The Sludge Management Plan was developed in October 2017 and submitted to DEQ (Tetonia 2017b).
3. CA-208-03. Monitoring well GW-208-02 was abandoned in November 2014, and DEQ received notice of the well abandonment in January 2015.
4. CA-208-04. A backflow prevention device was installed in October 2017. A report of the installation, specification for the backflow device, and a hydraulic profile was submitted to DEQ.
5. CA-208-05. Lagoons 1 and 2 were seepage tested from May 13, 2020 to May 28, 2020, and the seepage test report was reviewed by DEQ on September 24, 2020 (Keller 2020). Both lagoons will be due for seepage testing again at the end of September 2030.
6. CA-208-06. The pre-application conference was held on October 5, 2022 between DEQ, the City of Tetonia, and Aqua Engineering. DEQ sent a Letter of Needs to the City on October 10, 2023.
7. CA-208-07. The permit renewal application and preliminary technical report were sent to DEQ in March 2024 (Sunrise 2024). DEQ reviewed the application and issued a preliminary decision to issue a permit on April 16, 2024.

9.2 Compliance Activities Required in New Permit

The following Compliance Activities are specified in the draft permit (examples include):

1. Submit an updated Plan of Operation that incorporates the requirements of the new permit within twelve (12) months after permit issuance and additionally as necessary to reflect site operations.
2. Submit a Quality Assurance Project Plan, including verification that the plan has been implemented by the facility, within twelve (12) months of permit issuance and additionally as necessary to reflect site operations.
3. Submit sludge depth measurements for lagoons 1 and 2 within twelve (12) months of permit issuance. If the average sludge depths for either lagoon are 18 inches or more, submit a plan to remove sludge and waste solids from the lagoon(s) within six (6) months of the sludge measurement.
4. Submit a disinfection management plan within twenty-four (24) months of permit issuance. The plan must identify potential deficiencies with the treatment and disinfection systems and outline a plan to improve recycled water disinfection.

5. Submit lagoon seepage rate test proposed schedule and procedures at least 42 days prior to the planned seepage tests. Complete the seepage tests before the end of September of 2030. Submit the seepage test report within 90 days after completion of the seepage test.
6. Schedule a Pre-Application Conference one year prior to permit expiration.
7. Submit a permit renewal application 180 days prior to expiration of the existing permit.

10 Recommendations

Staff recommends the draft reuse permit be issued for a period of 10 years, incorporating conditions discussed in this staff analysis and the attached draft permit. The permit specifies hydraulic and constituent loading limits and establishes monitoring and reporting requirements to evaluate system performance, environmental impacts, and permit compliance.

11 References

Allen, Richard G. and Clarence W. Robison, 2007. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho., IDWR Digital Library. et-idwr.idaho.gov/ETIdaho_Report_April_2007_with_supplement.pdf. (Allen and Robison 2007).

Brown, Brad, Chahine, Mireille, de Haro Marti, Mari, Falen, Christi, Sheffield, Ron, University of Idaho Extension (UIE). August 2008. Mitigating High-Phosphorus Soils. (UIE 2008).

City of Tetonia. 2010. Quality Assurance/Quality Control Plan Wastewater Reuse Permit LA-000208-02. (Tetonia 2010).

City of Tetonia. 2017. 2016 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2017a).

City of Tetonia. October 2017. Sludge Management Plan for City of Tetonia Wastewater Treatment Facility. (Tetonia 2017b)

City of Tetonia. 2018. 2017 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2018).

City of Tetonia. 2019. 2018 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2019).

City of Tetonia. 2020. 2019 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2020).

City of Tetonia. 2021. 2020 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2021).

City of Tetonia. 2022. 2021 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2022).

City of Tetonia. 2023. 2022 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2023).

City of Tetonia. 2024. 2023 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2024).

City of Tetonia. 2025. 2024 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2025).

City of Tetonia. 2026. 2025 Annual Report for Reuse and Land Application of Wastewater. (Tetonia 2026).

Federal Emergency Management Agency (FEMA). 2025. National Flood Hazard Layer. Accessed January 27, 2026. (FEMA 2025). *https://idwr.idaho.gov/floods/map/*

Keller Associates. August 2020. City of Tetonia Seepage Test Report, Lagoons No. 1 and 2. (Keller 2020).

Idaho Department of Environmental Quality (DEQ). City of Tetonia, Reuse Permit LA-000208-01. (DEQ 2006).

Idaho Department of Environmental Quality (DEQ). September 2007. Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater (DEQ 2007).

Idaho Department of Environmental Quality (DEQ). City of Tetonia, Reuse Permit LA-000208-02. (DEQ 2009).

Idaho Department of Environmental Quality (DEQ). City of Tetonia, M-208-03, Staff Analysis Supporting Reuse Permit Renewal. (DEQ 2014a).

Idaho Department of Environmental Quality (DEQ). City of Tetonia, Reuse Permit M-208-03. (DEQ 2014b).

Idaho Department of Environmental Quality (DEQ). City of Tetonia, Modification 1 to Reuse Permit M-208-03. (DEQ 2019).

Idaho Department of Environmental Quality (DEQ). 2023. "Source Water Assessment and Protection Map". (DEQ 2023). *https://mapcase.deq.idaho.gov/swa/default.html*

Idaho Department of Environmental Quality (DEQ). 2024. DEQ Reuse Permit Writer's Manual. (DEQ 2024).

Idaho Department of Water Resources (IDWR). 2026. "Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho." Kimberly Research and Extension Center. Accessed August 20, 2025. (IDWR 2026).

Iowa State University, Iowa Environmental Mesonet (IEM). 2025. Station Data & Metadata, Idaho ASOS Station: DIJ. Accessed May 26, 2026. (IEM 2025). *https://mesonet.agron.iastate.edu/sites/windrose.phtml?station=ITD18&network=ID_RWIS*

Natural Resources Conservation Service (NRCS). 2026. "Custom Soil Resource Report for Teton County Area, Idaho". Accessed April 7, 2026. (NRCS 2026). *https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm*

Oregon State University Extension Service (OSUES). July 2011. "Soil Interpretation Guide". (OSUES 2011).

Safe Drinking Water Information System (SDWIS). 2025. SDWIS Version 3.01: Drinking Water Watch. Accessed: November 13, 2025. (SDWIS 2025). *http://dww.deq.idaho.gov/IDPDWW/*.

Schiess & Associates. 2006. City of Tetonia Wastewater Facility Planning Study. (S&A 2006).

Schiess & Associates. 2010. City of Tetonia, Wastewater System Improvements Operations and Maintenance Manual, Volumes I-IV. (S&A 2010a).

Schiess & Associates. 2010. City of Tetonia, Wastewater System Improvements Record Drawings, Phases I, II, & III. (S&A 2010b).

Sunrise Engineering. 2024. City of Tetonia Wastewater Reuse Permit Renewal Preliminary Technical Report. (Sunrise 2024).

Appendix A. Site Maps

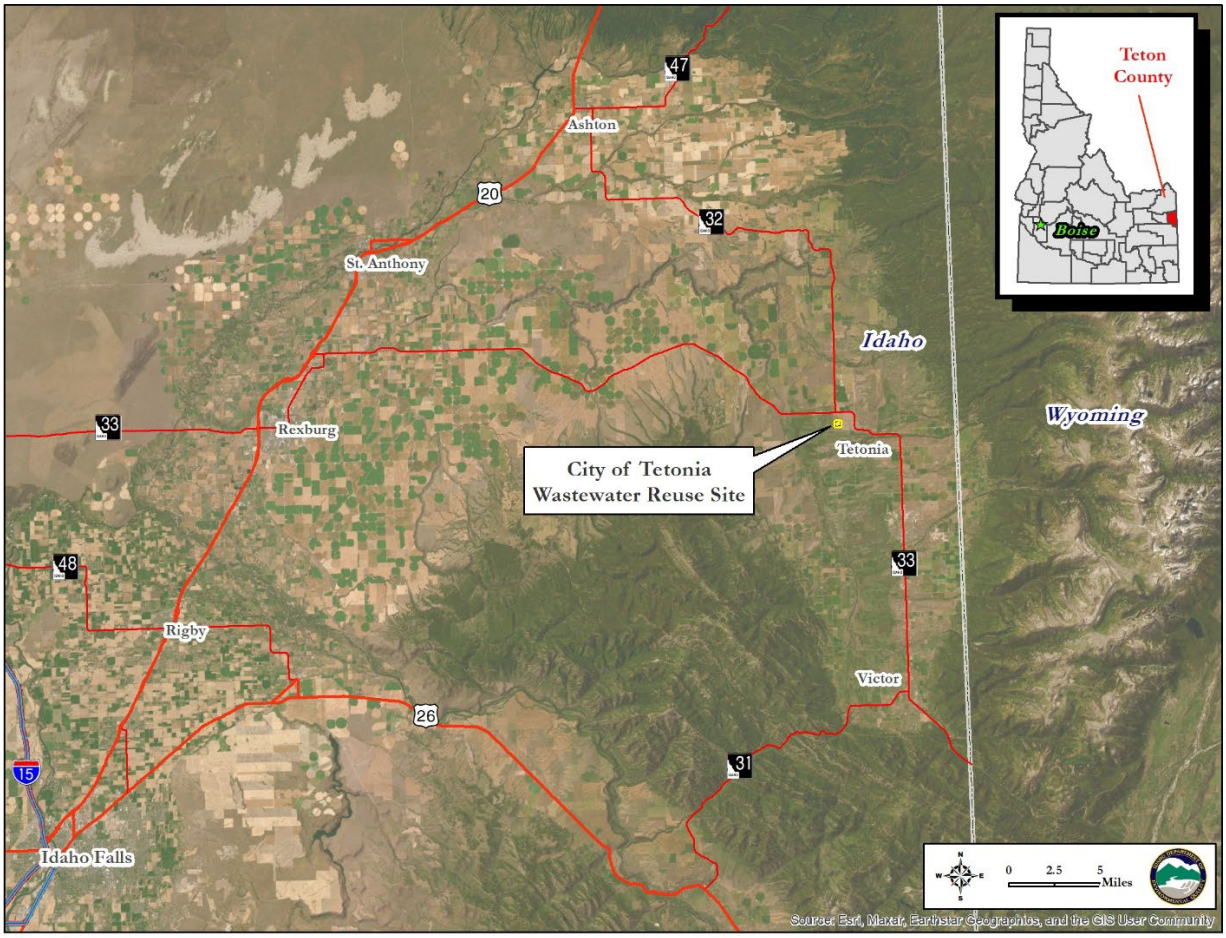

Figure A-1: Regional Map of City of Tetonia WWTP.

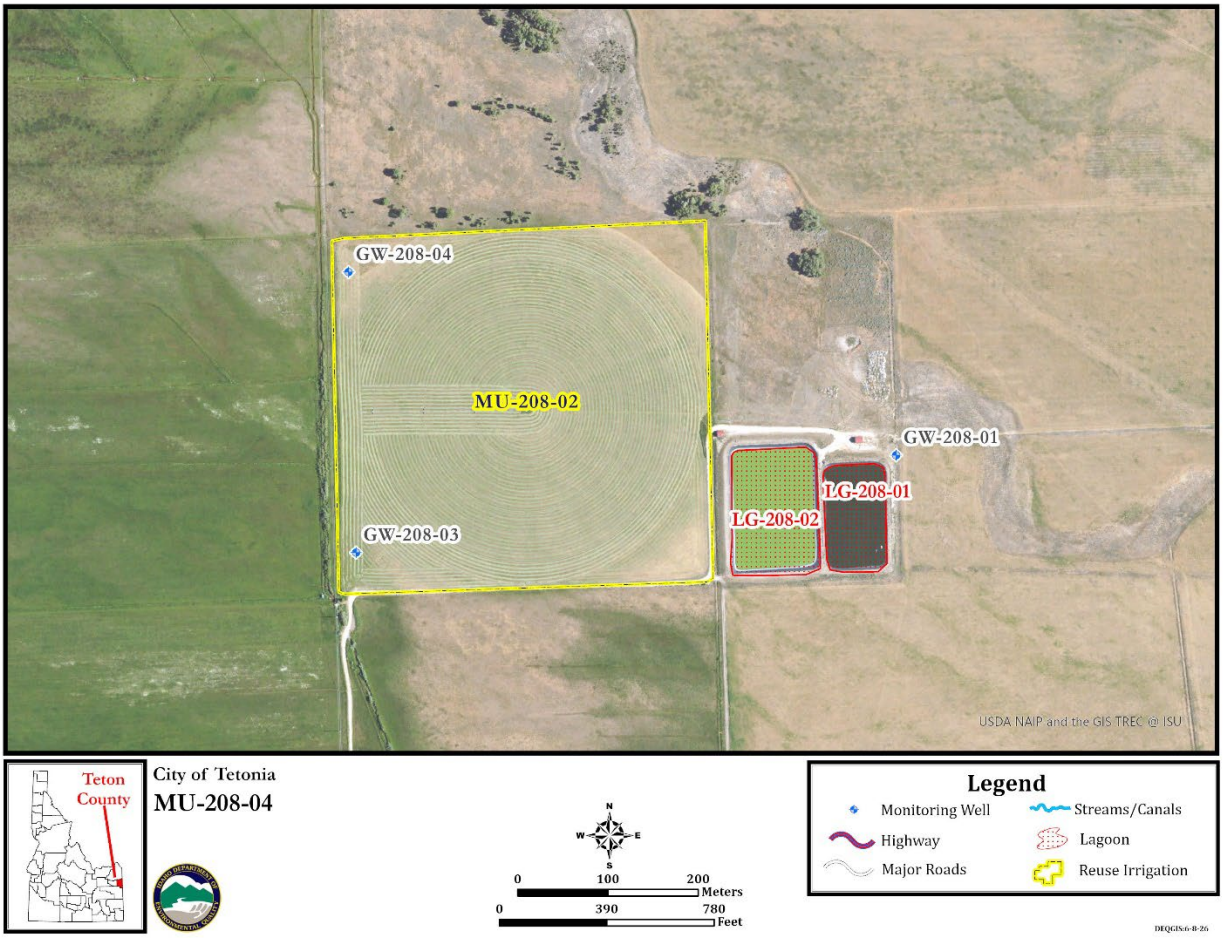

Figure A-2: Site map of City of Tetonia WWTP

Appendix B. Diagrams

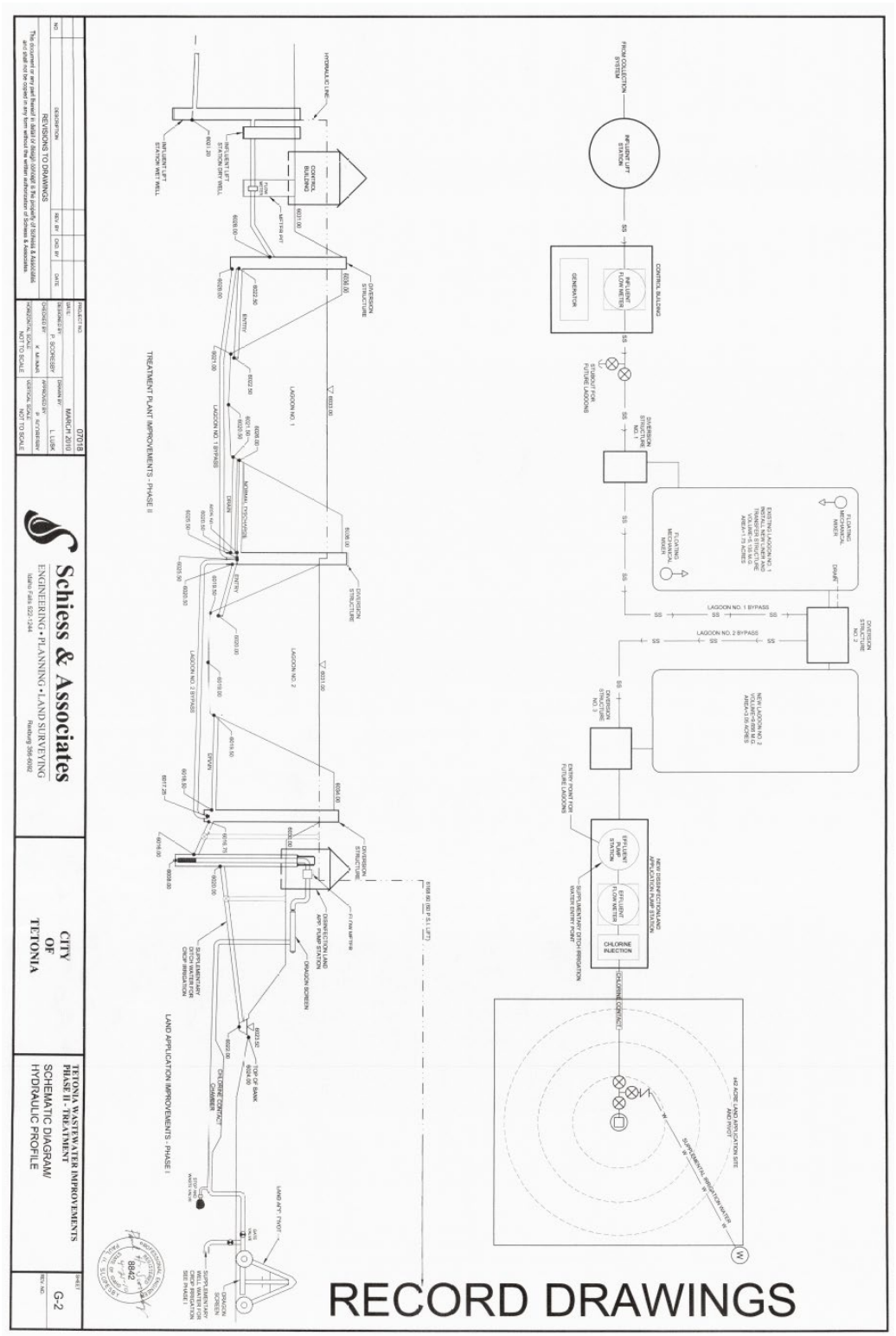

Figure B-1: Flow diagram and hydraulic profile of City of Tetonia (S&A 2010b)