

May 22, 2013

MEMORANDUM

TO: David Anderson, Engineering Manager
DEQ - Twin Falls Regional Office

Bill Allred, Regional Administrator
DEQ - Twin Falls Regional Office

FROM: Larry Waters, Scientist 3 
DEQ - Technical Services

SUBJECT: Staff Analysis for Draft Municipal Reuse Permit M-079-03 (formerly LA-000079-02) for the City of Filer

1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of the *Recycled Water Rules*, IDAPA 58.01.17.400.05, for issuing reuse permits. This memorandum addresses draft permit M-079-03 for the municipal wastewater treatment and reuse system owned and operated by the City of Filer. The City of Filer's treatment and reuse system is currently permitted under the terms of permit LA-000079-02.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) issued Permit LA-000079-02 to the City of Filer on January 23, 2004. The permit is for continued operation of the reuse system serving the City of Filer. These facilities are located at 4030 North 2200 East, Filer, Idaho in Twin Falls County. The purpose of the draft permit is to renew permit LA-000079-02, which expired on January 23, 2009. Due to planned improvements, which included a new membrane bioreactor (MBR) and an ultraviolet (UV) disinfection system at the wastewater treatment plant, the city requested an extension of the permit on January 21, 2009. DEQ approved a permit extension on April 3, 2009 and requested that the city continue to operate under the conditions of the current permit until a new permit was issued. A pre-application conference was held between DEQ, the City of Filer, and J-U-B Engineers on September 9, 2011 to discuss re-permitting requirements and associated facility up-grades and expansions. The construction of the new facility upgrades were completed in December of 2011. Since then, the facility has been able to produce Class B effluent based on facility records. However, the City has requested that the draft permit reflect both Class B and Class C recycled water.

A permit renewal application from the City of Filer was received by DEQ on June 13, 2012, and largely serves as the basis for the terms and conditions contained in the draft permit. As required by the *Recycled Water Rules*, the draft permit will be presented for a public comment period. After the comment period has closed, DEQ will provide written responses to all relevant comments and prepare a final permit for the City of Filer reuse facility.

3. PROCESS AND SITE DESCRIPTIONS

The wastewater treatment facility and the reuse land application site are located approximately two (2) miles north of the City of Filer and are owned and operated by the City. A project site map is included in Appendix A for reference. The City of Filer discharged approximately 20 million gallons annually (MGA) of recycled water to their reuse site during the 2011 reporting year. The wastewater stream into the treatment facility consisted mainly of municipal wastewater from residential users and commercial sources. No known industries contribute wastewater to the City's wastewater system.

The Environmental Protection Agency (EPA) issued a National Pollutant Discharge Elimination System (NPDES) permit that allows the City to discharge recycled water to Cedar Draw Creek from November 1st through March 31st of each year. The City's current NPDES permit expired on October 31, 2012 and the City is currently in the process of renewing this permit. Recycled water that is not discharged to Cedar Draw Creek is stored in four (4) storage lagoons.

3.1 Process Description

With the City of Filer's recently made facility improvements to produce class B effluent, the treatment facility and reuse site consists of the following major components:

- Headworks, mechanical fine screening, influent pump station, and parshall flume;
- Activated sludge system with MBR;
- Sludge dewatering and solids handling system;
- UV disinfection system;
- Old chlorine disinfection system used as back-up;
- Four winter storage lagoons;
- Overflow pond and pump back station;
- Effluent transfer pump station and mainline; and
- A 40 acre land application site consisting of one (1) hydraulic management unit.

The parshall flume and winter storage lagoon cell #1 is currently not used but may be used if the new treatment facility fails to operate and needs to be shut down for a short period of time. The lagoon cell #1 will be used to store water that does not meet Class B requirements. The stored water will be re-processed when the treatment facility is capable of producing Class B effluent.

The City recently acquired a 30 acre farm located north of the storage lagoons that will be added to the reuse site. This new acreage will be referred to as the West Field in the draft permit. In addition, the City may change the method of irrigation on the southern portion of the existing land application acres to sprinkler irrigation. As a result, the currently permitted acreage will be separated into northeast and southeast fields and new hydraulic management unit designations are included in the draft permit for each field. To avoid confusion between the existing permitted acreage and the new management unit designations, all management units were renumbered starting with MU-079-02. Therefore, the new management unit designations on the draft permit are MU-079-02, MU-079-03, and MU-079-04 referring to the northeast, southeast, and west fields, respectively. The total number of acres to be included in the draft permit with all three fields is 70 acres.

3.2 Site Soils

The wastewater reuse site soils are approximately distributed as shown in Table 1 below:

Soil Map Number	% Total Acres	Soil Name	Soil Description
67	3.3	Minidoka silt loam, 0 to 2 % slopes	Silt loam to 23 inches, cemented material 23-40 inches, and un-weathered bedrock below.
69	3.1	Minveno silt loam, 0 to 2 % slopes	Silt loam to 18 inches and cemented material below.
70	33.7	Minveno silt loam, 2 to 8 % slopes	Silt loam to 15 inches and cemented material below.
86	60	Portneuf silt loam, 0 to 2 % slopes	Silt loam to 60 inches.

Note: information taken from the USDA web soil survey located at <http://websoilsurvey.nrcs.usda.gov>. A soils map is included in Appendix B for reference.

Results of the current composite soil samples are summarized in Table 2 below.

Parameter	Unit	North Half of Site			South Half of Site		
		0 – 12 inches	12 – 24 inches	24 – 36 inches	0 – 12 inches	12 – 24 inches	24 – 36 inches
pH	s.u.	8.4	8.5	8.4	8.3	8.3	8.3
EC (salts)	mmhos/cm	1.0	1.6	1.3	0.9	1.4	1.4
Organic Matter	%	1.82	1.02	0.99	2.02	1.46	1.2
Ammonium - N	mg/Kg	3.8	2.3	1.6	4.2	2.8	1.9
Nitrate – N	mg/Kg	6	9	6	5	5	5
Phosphorus	mg/Kg	18	5	4	24	7	5
Potassium	mg/Kg	100	65	75	140	75	70
Organic – N	lbs/acre	70	40	40	80	60	50
Sodium	meq/100 g	0.9	1.2	1.1	0.8	1	1.1
CEC	meq/100 g	18	17	17.9	18.1	17.1	17.1
Excess Lime	%	12.6	14.4	13.9	7.7	13.5	13.9
Calcium	meq/100 g	11.7	9.6	9.9	12	11	10.9
Magnesium	meq/100 g	5.1	6	6.6	4.8	4.8	4.9
Sulfate - Sulfur	mg/Kg	27	47	33	18	41	39

The permit requires that only pH, EC, Ammonium – N, Nitrate – N, and plant available Phosphorus shall be monitored for each soil monitoring unit. As can be seen from Table 2, each of the constituent values decrease with depth, with the exception of EC and Nitrate – N. This indicates that salts and nitrates are

moving downward through the root zone. This downward movement of salts and nitrates could result in increased nitrate-nitrogen and TDS levels in the ground water. Although TDS levels have fluctuated historically above and below the ground water MCL, currently the ground water TDS levels are below the MCL and nitrate-nitrogen levels are well below the MCL. However, it is interesting to note from the 2011 annual report that the actual nitrogen loading at the land application site is about 25% of the reported crop up-take, yet the soil samples for nitrate-nitrogen remain fairly constant from the surface soils down to a depth of three feet. This may indicate that if the nitrogen loading was increased to 150% of crop up-take that nitrates would increase in the soil profile resulting in an upward trend in nitrate-nitrogen in the ground water. As a result, staff recommends closely monitoring the nitrogen loading rates with respect to soil and ground water nitrate nitrogen levels and report any resulting ground water quality issues related to increased nitrogen loading rates in the facility annual reports.

3.3 Surface Water

The closest surface water to the reuse site is Cedar Draw Creek, a Snake River tributary, which is about 0.75 miles to the west. In addition, an irrigation canal tributary runs diagonally between the northeast and southeast fields and along the northern edge of the west field. Also, the West Side Canal is located just over one quarter (0.25) mile east of the site. As a result, the reuse site should have virtually no effect on the surrounding surface waters except for the irrigation canal running diagonally between the northeast and southeast fields and along the northern edge of the west field. Buffer zones between the fields and the canal will be required to reduce potential impacts to the surface water quality.

3.4 Ground Water

The ground water level in the Filer area fluctuates seasonally. This fluctuation is partially due to seepage tunnels, which drain saturated farmland, installed during the early 20th century. All the domestic drinking water wells on record, near the facility, have been completed at depths between 10 and 35 feet below ground level. Six dedicated monitoring wells are currently permitted and are completed in the same depth range as the area domestic wells. The ground water flow direction is in the north - northeast direction. Based on the historical ground water monitoring information provided in the annual reports for the last three (3) years (no data was provided for 2010 or for spring of 2011), the existing reuse site does not currently appear to be causing degradation of the ground water as shown in Table 3 below.

Table 3: City of Filer, Ground Water Monitoring Well Data								
Monitoring Well	Chloride (mg/L)	Nitrate-N (mg/L)	Total-P (mg/L)	TDS (mg/L)	Total Iron (mg/L)	Total Manganese (mg/L)	Sulfate (mg/L)	Static Water Level (ft-bgs)
MCL	250	10		500	0.3	0.05	250	
Well #1								
4/27/11	41.6	3.65	<0.05	452	<0.05	<0.01	113	18.6
10/29/09	63.8	5.45	<0.05	489	0.575	0.048	117	19.0
4/30/09	235	2.74	<0.05	860	0.2	<0.05	98.4	18.4
Well #2								
4/27/11	60.6	1.62	<0.05	372	0.06	<0.01	87.7	16.3
10/29/09	93.8	0.39	<0.05	342	0.649	0.070	121	16.3
4/30/09	170	3.76	<0.05	737	0.14	<0.05	125	16.5
Well #3								
4/27/11	45.3	3.66	<0.05	455	<0.05	<0.01	111	19.6
10/29/09	32.9	1.56	<0.05	328	0.028	<0.01	65.2	20.0
4/30/09	207	3.84	<0.05	793	0.3	<0.05	133	20.3
Well #4								
4/27/11	55.6	0.63	<0.05	361	<0.05	0.08	85.9	8.0
10/29/09	44.1	<0.3	0.08	293	0.094	<0.01	91.2	7.5
4/30/09	341	1.94	<0.05	1030	0.13	<0.05	120	8.3
Well #5								
4/27/11	40.8	3.70	<0.05	443	<0.05	<0.01	116	17.8
10/29/09	19.5	0.34	<0.05	314	0.013	<0.01	49.2	19.0
4/30/09	186	3.89	<0.05	761	<0.1	<0.05	128	18.6
Well #6								
4/27/11	44.2	3.80	<0.05	449	0.20	0.05	119	15.0
10/29/09	23.8	<0.3	<0.05	312	0.145	0.011	56.7	15.7
4/30/09	162	3.87	<0.05	711	<0.1	<0.05	123	15.2

TDS – Total dissolved solids
 bgs – Below ground surface

As shown in Table 3 above, chloride and TDS levels experienced spikes in April of 2009. However, currently all constituent levels are low and below current ground water maximum contaminant levels (MCL's). Staff recommends that the City discuss any unusual constituent level spikes or MCL exceedances in the facility annual reports in order to determine what may have caused such spikes or MCL exceedances.

The City has proposed using two City owned domestic wells west of the west field as up-gradient monitoring wells for the west field. In order for these wells to be accepted as monitoring wells, the City will need to verify that these wells meet IDAPA 37.03.09, "Well Construction Standards Rules", regarding screened depth and screen length, well seal, well completed in the uppermost aquifer, etc., as described in the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater, chapter seven. To accomplish this, staff recommends adding a compliance activity to the draft permit requiring the City submit to DEQ for review and approval a monitoring well assessment for the entire site, including the west field. The results of this assessment may require new wells to be installed at various locations around the

site. This assessment will need to be approved prior to construction of the new wells.

4. PERMITTING DISCUSSION

The following sections outline the staff recommended changes to be made to the terms of the current permit. The recommended changes are based on information received with the permit renewal application, the City of Filer's past performance with respect to permit requirements, reviews of the City of Filer's annual reports, and/or updates required by changes to the *Recycled Water Rules*, or any other applicable regulatory standards. Terms and conditions that are unchanged from the current permit, and remain applicable to the facility, are not addressed in this document. Corrected typographical errors and other minor changes to the facility information or table of contents are also not addressed in this document.

4.1 Compliance Schedule for Compliance Activities

The following Table 4 summarizes the activities conducted by the permittee with regard to the compliance schedule for compliance activities in the current permit. Proposed compliance activities for the draft permit are included following Table 4.

Table 4: City of Filer, Compliance Activity Summary			
Compliance Activity	Description	Due Date	Current Status
CA-079-01	Updated Plan of Operations	January 23, 2006, six month extension approved by DEQ	Submitted July 21, 2006. DEQ requested additional information. An addendum was submitted to DEQ on January 16, 2007. The current plan of operation was approved by DEQ on June 11, 2012.
CA-079-02	Nuisance Odor Management Plan	January 23, 2006, six month extension approved by DEQ	Approved as part of the O&M Manual on June 11, 2012.
CA-079-03	Lagoon Seepage Testing	January 23, 2006, six month extension approved by DEQ	Tests completed in June 2006, DEQ approved the seepage test results on June 30, 2006.
CA-079-04	Existing Monitoring Well Adequacy	January 23, 2004	Submitted a plan to DEQ to remove sediment accumulation in the well screens on June 20, 2004. Well cleaning activities were completed on January 10, 2005. Review of well cleaning submitted on January 25, 2005. After inspection of the wells on June 13, 2005, DEQ decided no further requirements were needed.
CA-079-05	Groundwater Flow Direction	July 23, 2005	Facility submitted a letter which accurately determined groundwater flow on January 15, 2004. Compliance activity deleted from the permit as a result of the January 15, 2004 letter.
CA-079-06	Waste Solids Management Plan	Prior to land application of waste solids	Facility requested approval for landfill disposal of dried solids, from lagoon cell #1 only, in July 2008 (the facilities request was submitted by using the NPDES 2S Form which was accepted by DEQ).
CA-079-07	Site Map	January 23, 2007	New map submitted January 29, 2007.
CA-079-08	Effluent Flow Meter	January 23, 2005	Request submitted in February 2006 to use run rates. Verbally approved by DEQ. Installed an electromagnetic flow meter in August 2011.

As can be seen in Table 4, all compliance activities specified in the current permit have been completed except for the waste solids management plan. To ensure that the Plan of Operation (PO) stays current and includes the items listed in IDAPA 58.01.17.300.05 and IDAPA

58.01.16.425.01, 'Wastewater Rules' staff recommends adding a compliance activity to the draft permit requiring an update of the PO or Operation and Maintenance Manual.

Staff recommends adding a compliance activity to the draft permit to require the development of a quality assurance project plan (QAPP) that covers all monitoring and reporting required in the permit. A copy of the QAPP along with written notice that the facility has implemented the QAPP shall be provided to DEQ. The QAPP shall be designed to assist in planning for the collection, analysis, and reporting of all monitoring in support of the permit and in explaining data anomalies when they occur. At a minimum, the QAPP must include the following:

1. Details on the number of measurements, number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection, and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements.
2. Maps indicating the location of each monitoring, and sampling point.
3. Qualification and training of personnel.
4. Names, addresses, and telephone numbers of the laboratories used by or proposed to be used by the facility.
5. Example formats and tables that will be used by the facility to summarize and present all data in the annual report.

The format and content of the QAPP should adhere to the recommendations and references in the Quality Assurance and Data Processing sections of the DEQ Guidance.

The facility shall amend the QAPP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAPP. The facility shall notify DEQ of material changes to the QAPP and copies shall be kept on site and made available to DEQ upon request.

During the 2012 site inspection, the operators mentioned that the City has plans to take over the permit required laboratory analysis. If the City decides to perform this work, the QAPP will need to be updated at that time to cover the laboratory work. In addition, all city personnel performing laboratory analysis must acquire the necessary laboratory licensing from the Idaho Bureau of Occupational Licensing (IBOL) prior to the City's acceptance of all monitoring analysis. Split samples will need to be taken on a portion of the permit monitoring samples and sent to a third party laboratory to confirm the City's laboratory analysis results and testing procedures.

Since a waste solids management plan was not prepared for the reuse site, staff recommends adding a compliance activity to the draft permit requiring the preparation and submittal of the plan to DEQ for review and approval. The plan shall describe how waste solids generated at the facility will be handled and disposed of to meet the requirements of section 9.1.4 of the permit. When approved, this plan shall be incorporated into the permit and be included as part of the updated PO.

With the addition of the west field to the draft permit, staff recommends adding a compliance activity to the draft permit requiring the facility prepare and submit to DEQ, for review and approval, plans and specifications for the west field prior to any construction activities associated with the recycled water distribution system. The plans and specifications shall meet the requirements specified in IDAPA 58.01.16 and shall be prepared under the supervision and bear

the seal of an Idaho licensed professional engineer. Construction of the distribution system shall also be observed by or under the direction of an Idaho licensed professional engineer.

The plans and specifications shall include a detailed discussion and laboratory test results associated with baseline soil monitoring for the west field. The baseline soil monitoring shall include all soil constituents of concern listed in the permit for all monitoring units including iron and manganese. Background monitoring well constituent test results and a discussion of these results shall also be included as part of the plans and specifications document. Land application of recycled water will not be allowed on the west field until after the plans and specifications and all associated construction activities for this field have been approved by DEQ.

Associated with the west field, staff recommends adding a compliance activity to the draft permit to require the facility to submit to DEQ for review and approval a monitoring well network assessment for the entire site including the west field. The monitoring well network assessment shall address whether existing domestic wells can be used as up-gradient or down-gradient monitoring wells or whether new wells need to be installed, based on well locations and ground water flow directions. The monitoring well network assessment shall address well depth, well seal, verify that the well is completed in the uppermost aquifer, and meet the requirements for well construction specified in IDAPA 37.03.09.

Table 5 below shows the reported seepage rate tests for the facility storage lagoons conducted in June 2006. The reported seepage rates are below the maximum allowable seepage rates specified in IDAPA 58.01.16.493.03.b “Wastewater Rules”.

Table 5: City of Filer, 2006 Lagoon Seepage Test Results				
Lagoon	Permit Serial Number	Reported Seepage Rate (inches/day)	Surface Area (acres)	Seepage Volume (gallons/year)
Lagoon no. 1	LG-007901	Empty (not tested)	0.57	N/A
Lagoon no. 2	LG-007902	0.004	1.57	62,243
Lagoon no. 3	LG-007903	0.046	1.09	496,953
Lagoon no. 4	LG-007904	0.044	1.27	553,844

IDAPA 58.01.16.493.02.c “Wastewater Rules” requires that all existing lagoons be seepage tested by or under the supervision of an Idaho licensed professional engineer or Idaho licensed professional geologist every ten (10) years after initial testing. Therefore, staff recommends adding a compliance activity to the draft permit requiring seepage testing of all lagoons prior to June 30, 2016.

4.2 Permit Limits and Conditions

A review of the facilities annual reports show that the city has conducted their activities at the reuse site within the permit limits and conditions throughout the permit cycle and through the 2011 reporting year.

The following limits and conditions were changed in the draft permit:

- The application site area on the current permit is recorded as 40 acres. An additional 30 acres were added to the site and is called the west field on the draft permit in section 3.1. In addition, the existing field was divided into two management units, along the canal, in order to allow the facility to use sprinkler irrigation of the southern field. As a result, the management unit designations were changed as discussed in section 3.1 above.
- The current permit states that the growing season hydraulic loading rate shall be no greater than the irrigation water requirement (IWR). The wording in section 3.2 of the draft permit has been changed so that the growing season hydraulic loading rate is substantially at the IWR. This was changed to be consistent with other permits and to allow some hydraulic loading flexibility.
- The current permit shows a maximum nitrogen loading rate of 125% typical crop uptake. The nitrogen loading limit in section 3.3 of the draft permit is 150% typical crop uptake to be consistent with other permits.
- The current permit shows buffer zone distances based on three disinfection levels. Current DEQ rules require that the permit states the class of recycled water based on the level of treatment. As mentioned in section 2 above, the treatment facility is capable of treating wastewater to Class B standards. However, since the City does not yet have historical performance data to demonstrate this, the draft permit will reflect both Class B and Class C recycled water. Therefore, the buffer zone distances in the draft permit are based on Class B and Class C recycled water. All the buffer zone distances in the draft permit were taken from Table 6-4 and section 6.5.1 of the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater, September 2007, except for the buffer zone distances to irrigation ditches and canals for furrow irrigation. A standard buffer zone distance of 50 feet between sprinkler irrigation systems at land application sites and irrigation canals (taken from section 6.5.1) was used for both Class B & C. This is to prevent direct spray from the sprinkler systems from entering the canals while allowing for changes in the spray pattern during periods of pressure fluctuation. The buffer zone distance to irrigation ditches and canals for furrow irrigation with Class C will remain the same as in the current DEQ approved Class C permit for streams (20 feet). In addition, the same buffer zone distance to irrigation ditches and canals for furrow irrigation will be used for Class B.

4.3 Monitoring Requirements

The current permit specifies the total coliform sampling based on disinfection levels. The current permit sampling for a disinfection level representative of Class B recycled water is twice weekly and Class C recycled water is weekly. Based on the current rules (IDAPA 58.01.17.602) the sampling frequency for Class B recycled water is daily and Class C is once weekly. The draft permit was changed to reflect the current rule sampling frequencies.

The current permit requires ground water monitoring of total phosphorus. Phosphorus is not a primary or secondary drinking water constituent of concern and typically may be a concern in surface waters. Since the nearest surface water is about 0.75 miles west of the site, ground water flow is away from the surface water (north to north-east), and historical data shows that ground water total phosphorus is negligible throughout the site (Table 2), staff recommends removing total

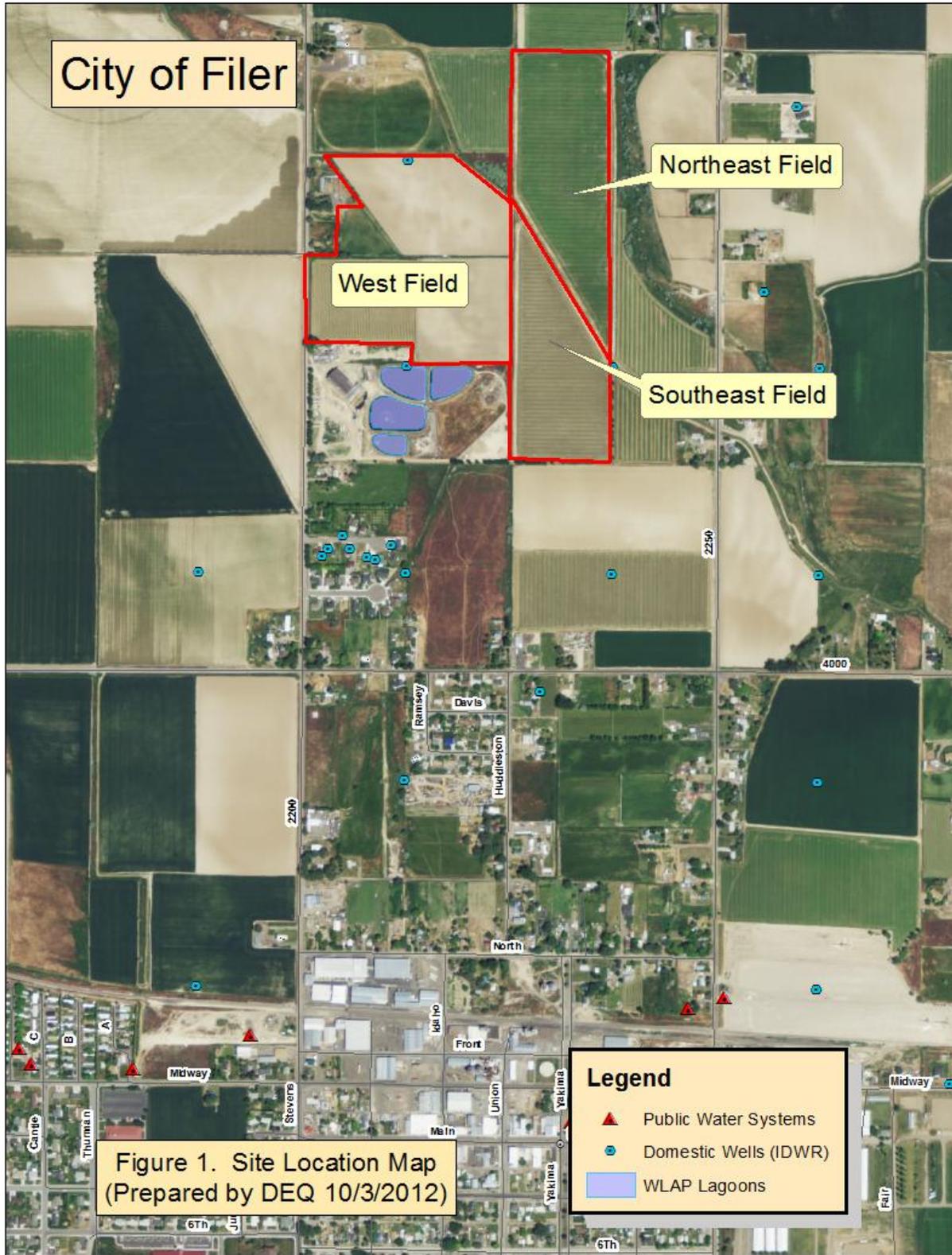
phosphorus ground water monitoring from the permit.

Typical domestic wastewater contains only trace amounts of iron and manganese. Since the City does not currently accept wastewater from industrial facilities, and historical data shows negligible amounts of iron and manganese in the ground water (Table 2), staff recommends removing total iron and manganese from the ground water monitoring requirements in the draft permit.

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft permit M-079-03 for a public review and comment period. The draft permit contains effluent quality requirements for the upgraded wastewater treatment system for both Class B and Class C recycled water, hydraulic and constituent loading limits for the reuse site, and terms and conditions required for operation of the reuse system. Compliance activities have been incorporated into Section 3 of the draft permit to address outstanding compliance issues. Finally, monitoring and reporting requirements have been included in Sections 5 and 6 to demonstrate compliance with the permit conditions, and demonstrate protection of human health and the environment with respect to operation of the facility.

APPENDIX A



APPENDIX B

Soil Map—Jerome County and Part of Twin Falls County, Idaho

