December 20, 2013

M E M O R A N D U M

TO: R. Todd Crutcher, P.E., Engineering Manager
DEQ, Boise Regional Office

FROM: Larry L. Waters, P.E., Scientist 3
DEQ, State Office of Technical Services

SUBJECT: Staff Analysis for Draft Municipal Reuse Permit M-037-04 for the City of Mountain Home

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 reuse permit M-037-04 for the municipal wastewater treatment and reuse system owned and operated by the City of Mountain Home. The City of Mountain Home's treatment and reuse system is currently permitted under the terms of permit LA-000037-03.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) issued permit LA-000037-03 to the City of Mountain Home on August 14, 2007. The draft reuse permit is for continued operation of the reuse system serving the City of Mountain Home. These facilities are located at 160 S. 3rd East, Mountain Home, Idaho in Elmore County. The purpose of the draft reuse permit is to renew permit LA-000037-03, which expired on August 14, 2012.

A permit renewal application from the City of Mountain Home was received by DEQ on February 14, 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 Mountain Home reuse facility.

3. PROCESS AND SITE DESCRIPTIONS

The wastewater treatment facility and the reuse land application site are located approximately two (2) miles south of the City of Mountain Home and are owned by the City. The City operates and maintains four facultative lagoons, four winter storage lagoons, and a chlorine disinfection system at the treatment facility, however, the City owned reuse site is leased and farmed by Sunview Dairy, LLC. Based on the lease agreement, the dairy is only allowed to grow alfalfa on the reuse site unless otherwise given permission by the City to grow other crops. The lease agreement expires on October 31, 2015, but the lease can be extended if it is mutually agreed upon by both parties. The City of Mountain Home discharges approximately 297 million gallons annually of recycled water to their reuse site. Influent

water to the treatment facility consists mainly of municipal wastewater from residential users, however, some wastewater is from commercial and industrial users that do not contribute any known unusual waste streams or high strength loads to the treatment facility. The recycled water land applied at the reuse site typically contains 5 mg/L nitrogen, 2.4 mg/L total phosphorus, and 325 mg/L non-volatile dissolved solids (NVDS).

3.1 Process Description

The City of Mountain Home has made some improvements to the treatment facility and the reuse site over the past several years. With these improvements, the treatment facility and reuse site will consist of the following major components, listed in sequence of flow:

- Headworks with a septage dumping station, screening and flow measurement;
- Four facultative lagoons;
- Four winter storage lagoons;
- Chlorine injection system;
- Effluent transfer pump station and mainline; and
- A 577 acre land application system consisting of eight hydraulic management units (three (3) center pivot fields and a half pivot consisting of 459 acres and four (4) handset fields consisting of 118 acres). The land application site includes the northern two thirds of field 4 (included in pivot 1) and field 5 (pivot 4) which have been added to the land application site in this permit renewal. A map showing the locations of fields 4 and 5 is included in appendix D.

The center pivots have been added to the reuse site since the last permit renewal. As a result, it was necessary to reassign management units (MU's) for the resulting fields. Eight of the previous MU's will be retired (MU-003701 through MU003708) and seven new MU's will be assigned (MU-037-10 through MU-037-16). One previously used MU will remain as MU-037-09, resulting in eight MU's (MU-037-09 through MU-037-16). These management units and the associated fields are detailed in section 4.1 of the draft permit.

Construction of the eight lagoons are as follows: lagoons 1 - 4 (facultative lagoons) are completely lined with clay, lagoons 7 & 8 have clay bottoms and membrane lined sides, and lagoons 5/6 & 9 are completely lined with a membrane.

3.2 Site Hydraulic Loading

Over the course of the current permit, the land application facility has experienced hydraulic overloading as compared to the irrigation water requirement (IWR). Table 1 below highlights the reported dates where land application exceeded the IWR (management units experienced hydraulic overloading). Table 1 values are corrected values from those reported in the annual reports and do not include a correction factor for precipitation. The correction factor used in the annual reports is not justified as it may not represent any portion of effective precipitation and should not be included in the IWR calculation in future annual reports. The permit states that the growing season hydraulic loading rate shall be substantially equal to the IWR throughout the growing season. The word substantially is used to allow for small fluctuations in the hydraulic loading rate to provide a healthy crop during abnormally dry or wet years. However, adjacent fields should be managed to prevent one field from receiving seven times the IWR while another field receives only 69% of the IWR as occurred in August 2011. Anytime the hydraulic loading rate for any field is excessively over the IWR, the facility is to report this to DEQ as a

non-compliance event as stated in section I of the current permit. The facility should manage the hydraulic loading of each field as close to the IWR as possible to provide good plant health and to maximize crop yield and crop uptake of nutrients throughout the growing season.

Table 1: City of Mountain Home, Existing Hydraulic Loading Data (% Irrigation Water Requirement)

Date	MU-003707 Pivot 3	MU-003708 (North) Hand Lines	MU-003708 (South) Pivot 1	MU-003701 (North) Hand Lines	MU-003701 (South) and MU-003705 Pivot 1	Parts of MU-003702, 03 & 06 Pivot 2
6/2009	74	-	-	34	34	36
3/2010	-	-	-	228	228	241
4/2010	40	-	-	189	189	122
7/2011	72	143	143	53	53	75
8/2011	91	703	703	69	69	94
9/2011	194	914	914	47	47	70
4/2012	-	127	61	302	67	44
5/2012	654	82	36	223	38	44
6/2012	95	13	53	221	74	57
7/2012	89	21	165	197	55	72
8/2012	98	68	940	174	98	80
9/2012	19	143	97	87	97	100
10/2012	206	-	15	-	15	37

3.3 Site Soils

The reuse site consists of 577 acres divided as described above. The site soils are distributed as shown in Table 2 below:

Table 2: City of Mountain Home, Reuse Site Soils

% Total Acres	Soil Name	Soil Description
60	Colthorp-Kunaton complex, 0 to 8 % slopes	Stony silt loam to 3 inches, silty clay loam 3-18 inches, cemented material 18-23 inches, and un-weathered bedrock below.
33	Power silt loam, 1 to 4 % slopes	Silt loam to 6 inches, clay loam 6-19 inches, and loam 19-60 inches.
7	Elijah-Purdam silt loam, 0 to 8 % slopes	Silt loam to 7 inches, silty clay loam 7-21 inches, loam 21-30 inches, cemented material 30-41 inches, and fine sandy loam 41-60 inches.

Note: information taken from the USDA web soil survey located at http://websoilsurvey.nrcs.usda.gov; soil map included in Appendix A.

Results of composite soil samples from three previous years are shown in Table 3 below. The 2012 results are not shown as the City used the proposed management units in the 2012 annual report instead of those shown in the permit and in Table 3 below. Therefore, a proper comparison could not be made.

Staff requests that the City use the soil monitoring units shown in the current permit for future analysis.

Table 3: City of Mountain Home, Composite Soil Sample Data

Soil Monitoring Unit	Parameter (ppm or as indicated)	Sampled Date April 2009			Sample Date April 2010			Sample Date April 2011		
		Depth (inches)								
		0 – 12	12 – 24	24 – 36	0 – 12	12 – 24	24 – 36	0 – 12	12 – 24	24 – 36
SU-003701	CEC (µmhos)	667	1180	1220	14	13	14	11	10	9
	Nitrate-N	13.2	6.3	7.9	7.0	4.4	5.6	12.8	8.6	6.1
	Ammonium-N	3.18	3.09	2.72	2.96	2.16	2.71	3.62	0.75	2.13
	Phosphorus	23.1	8.4	9.0	29.6	13.9	8.7	24.2	7.7	6.7
SU-003702	CEC (µmhos)	554	784	1160	9	10	14	10	9	11
	Nitrate-N	5.4	10.1	6.8	7.6	7.7	5.6	11.6	3.0	1.8
	Ammonium-N	3.16	3.10	3.52	2.85	2.56	3.21	2.81	1.19	0.91
	Phosphorus	33.2	11.8	6.6	25	12.6	12.6	43.1	11.2	8.7
SU-003703	CEC (µmhos)	591	1050	629	13	13	9	10	9	9
	Nitrate-N	4.20	9.30	7.30	7.90	4.90	2.80	5.2	1.6	1.0
	Ammonium-N	3.87	3.15	3.44	2.82	2.68	3.58	1.70	1.04	1.05
	Phosphorus	40.1	19.7	4.8	26.1	9.1	8.4	52.2	16.9	13.1
SU-003705	CEC (µmhos)	329	428	558	10	11	14	10	11	9
	Nitrate-N	5.30	3.10	2.10	2.40	1.70	2.40	11.3	5.2	3.1
	Ammonium-N	2.56	2.32	3.68	4.01	2.72	3.19	1.99	1.32	0.87
	Phosphorus	21.8	8.7	26.1	35	11.2	10.3	29.9	15.4	12.2
SU-003706	CEC (µmhos)	453	782	822	14	3.36	13	11	10	9
	Nitrate-N	2.6	5.9	4.4	13.6	20.1	26.5	5.5	10.0	12.8
	Ammonium-N	2.26	2.92	3.51	3.04	3.36	3.84	1.72	2.22	0.84
	Phosphorus	27	8.1	7.2	39.1	22.3	21.4	37.4	12.4	9.4
SU-003707	CEC (µmhos)	299	584	500	11	13	10	10	11	9
	Nitrate-N	5.4	7.8	8.4	7.3	13.6	15.6	12.7	13.5	10.8
	Ammonium-N	2.70	3.32	3.70	2.78	2.66	2.98	2.04	1.09	1.45
	Phosphorus	28.1	13.9	12.7	19.2	11	9.6	45.6	10.8	9.5
SU-003708	CEC (µmhos)	1240	1390	2290	10	11	9	10	9	11
	Nitrate-N	103.0	102.0	171.0	30.8	70.7	25.4	22.2	116.0	93.7
	Ammonium-N	3.36	3.40	4.30	5.88	14.20	15.90	1.36	13.10	1.03
	Phosphorus	24.6	9.2	9.1	23.8	15.7	16.2	40.4	15.5	9.0
SU-003709	CEC (µmhos)	2920	5020	3700	9	10	9	8	10	9
	Nitrate-N	2.7	4.0	3.1	1.3	5.4	8.5	1.2	1.5	5.1
	Ammonium-N	3.42	3.12	3.28	4.93	2.30	4.69	1.06	0.80	0.65
	Phosphorus	9.2	8.1	7.7	18.9	10.9	10.1	28.5	8.9	7.4

The permit requires that Cation Exchange Capacity (CEC), Nitrate - N, Ammonium - N, Plant Available Phosphorus, pH, and texture be monitored for each soil monitoring unit. Texture and pH were left out of

Table 3 as these values are relatively constant and are typical for the Mountain Home area. As can be seen from Table 3, in general, each of the constituent values decrease with depth except CEC, Nitrate - N, and sometimes Ammonium - N, over time. Therefore, it appears that nitrogen (Nitrate - N and sometimes Ammonium - N) are moving downward through the root zone. This downward movement of nitrogen could result in increased nitrogen levels in the ground water. In comparing the hydraulic overloading discussed in section 3.2 above and the nitrogen increases with depth in this section, it appears that the increased nitrogen levels with depth in the soils is directly related to the hydraulic loading and possibly could be controlled by better management of the hydraulic loading rates. As a result, staff recommends closely monitoring the nitrogen loading rates and the associated hydraulic loading rates with respect to soil and ground water nitrogen levels and report any suspected ground water quality issues in the facility annual reports.

3.4 Surface Water

The closest surface water to the reuse site is the West Side Canal located just over one quarter mile east of the site (up-gradient). Some maps show Rattlesnake Creek along the west side of the land application site but this creek has not had water in it, near the land application site, for over 20 years and no longer exists north of the land application site as the lagoons intersect this portion of the creek. The Snake River is approximately 9.5 miles south of the land application site. As a result, controlling reuse from entering the surrounding surface waters should be easily controlled through site management.

3.5 Ground Water

Compliance activity CA-037-03 of the current permit requires that a ground water monitoring plan be submitted to DEQ for review and approval. In preparing this plan the City's consultant used the shallow ground water limits (extent of the shallow ground water aquifer) shown in Young (1977). This map estimates that the shallow ground water aquifer extends approximately four miles in all directions around the land application site. This map of the shallow ground water aquifer is included in appendix B. The ground water monitoring plan was approved by DEQ in February 2011. The recommendations stated in the ground water monitoring plan were as follows:

- Construct six new ground water monitoring wells;
- Monitor the new wells according to the existing permit including the two existing wells GW-003702 & 03;
- Monitor two of the four domestic wells which appear to have a capture zone intersecting the site;
- Manage the site according to the permit.

In addition, Baldwin, et al. (2009), which is a cooperative study between the Idaho Department of Environmental Quality and the Idaho Department of Agriculture, describes the ground water in the area at the land application site; this study is also referred to as Technical Report 36 (TR-36). As described in TR-36, there are two distinct aquifers, a shallow perched ground water aquifer and a deep regional ground water aquifer below the reuse site. In addition, perched zones occur between the shallow and regional aquifers in localized areas. Five dedicated monitoring wells were initially constructed in the shallow aquifer but no recent monitoring data exists for three of the five wells. It is presumed that these three wells went dry and were subsequently abandoned according to the Idaho Department of Water Resources (IDWR) requirements. Based on TR-36, the ground water flow direction in the shallow aquifer is from east to west and the flow direction in the regional aquifer is toward the southwest. TR-36 also provides a map that estimates the extent of the shallow ground water aquifer in the vicinity of the land application

site which is shown to underlie the northern half of the site. This map of the proposed shallow ground water aquifer along with a sketch of the land application site (added by DEQ staff) is included in appendix C.

In order to follow the approved recommendations stated in the ground water monitoring plan, three monitoring wells were constructed during May and June 2011. These wells were identified in the plan as wells GW-003706 (south of lagoon cell 8), GW-003707 (northeast corner of field 1) and GW-003711 (southwest corner of field 2). A small amount of ground water was encountered in GW-003706 between 250-270 feet below ground surface (bgs), ground water was not encountered in GW-003711 to a depth of 275 feet bgs, and ground water was encountered in GW-003707 in the alluvium material above the basalt and the static water elevation at well completion was reported at 117 feet bgs. After completing the three new wells, the City concluded that a reliable ground water monitoring well network could not be developed. The City met with DEQ to discuss their options, and it was agreed that a ground water contaminant model would be used to determine potential impacts of the land application activities at the down-gradient boundary of the site and on down-gradient users. The modeling results were submitted to DEQ on April 30, 2012. DEQ ran several irrigation scenarios in the ground water contaminant model to verify the results of the submitted report and test the sensitivity of various parameters. DEQ concluded that although the concentration of nitrate nitrogen in ground water was modeled to increase at the site boundary, the increase was within acceptable limits and was predicted to stay below the ground water quality standard of 10 mg/L. In addition, the model predicted that total dissolved solids (TDS) would exceed the secondary ground water quality standard of 500 mg/L (from between 521 and 765) depending on the scenario. However, the scenarios did not include hydraulic overloading of the site which would most likely increase the predicted values of nitrate nitrogen and TDS concentrations in the ground water. The fact that nitrate nitrogen is increasing with depth in the soil as discussed in section 3.3 is evidence of this.

In Figure 7-5 of the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater (DEQ Guidance) it states that if conservative modeling demonstrates significant impact to ground water as discussed above (TDS and possibly nitrate nitrogen due to hydraulic overloading), then aquifer and vadose zone travel times need to be evaluated to determine if ground water monitoring, soil water or soil core monitoring is most appropriate. Due to the fact that not enough information is available (i.e., studies such as Young, 1977, TR-36 and other studies don't agree on the extent of shallow ground water aquifer or ground water flow direction) staff recommends adding a compliance activity to the draft permit that requires that a ground water study and soil study be conducted by the City. As a result, the following language has been added to the draft permit as a compliance activity:

- **Ground Water Study:** Submit a ground water study plan for the land application site. The purpose of the study is to determine the extent of shallow ground water at the land application site. Test boreholes shall be located at appropriate spacings to adequately determine where shallow ground water is located below the site. It is recommended that Figure 6 of the Ground Water Quality Technical Report No. 36 (Mountain Home South Ground Water Nitrate Study) be used as a guide in proposing borehole locations. The plan shall include a determination of depth to ground water or bedrock whichever is reached first.

  Submit an implementation schedule for the activities proposed in this plan.

  The ground water study plan shall be submitted to DEQ for review and approval prior to implementation. After approval, this plan shall be implemented in accordance with the approved implementation schedule. Following implementation, submit a report of the study results, which shall include the following:

1) A ground water map shall be generated delineating depth to ground water and an outline of where ground water was found and the extent of shallow ground water, with any cross sections as appropriate. GPS coordinates shall be recorded and reported for all borehole locations.

2) Propose a shallow aquifer monitoring well network if the extent of the shallow ground water determined above makes this feasible and reasonable.

After approval the ground water study shall be a part of the PO.

- **Soil Study:** Submit a soil study plan for the whole land application site. The plan shall outline a study which is designed to meet the following objectives:

1) Characterize the soil profile throughout the land application site including soil depth, soil texture, soil type (including type of limiting layer (i.e., hard pan, bedrock, rocks, etc.)) and any other information needed to calculate soil permeability and available water holding capacity (AWC).

2) Provide data relevant for modeling root zone water balance and ground water contaminant transport, should further modeling be required by DEQ.

3) Provide data to guide site management and loading criteria, operational decisions, and the content of the QAPP and PO.

4) Baseline soil sampling shall be conducted for field 4 and field 5 in the manner indicated, and for the constituents required, in section 5.3.2 of this permit.

5) Test borings shall be proposed at spatial densities sufficient to adequately characterize the site soils. Samples shall be taken to a depth of five feet or to bedrock whichever is reached first, utilizing equipment that will allow soil sample collection at various depths. Recommended sample spacing is on a grid of 500 feet for soil unit 33 and 250 feet for all others. Direct push drilling is recommended as an acceptable boring method but other methods can be used.

6) GPS coordinates shall be recorded for each sample location.

7) Submit an implementation schedule for the activities proposed in this plan.

The soil study plan shall be submitted to DEQ for review and approval prior to implementation. After approval, this plan shall be implemented in accordance with the approved implementation schedule. Following implementation, submit a report of the study results, which shall include the following:

1) Soil maps shall be generated delineating soil type and depths, and any cross sections as appropriate. Soil permeability and AWC at different depths shall also be provided for the soil maps. GPS coordinates shall be recorded and reported for soil sample locations.

2) Provide baseline soil sampling composites of each of the first three feet or to refusal, three representative composite samples each for field 4 and field 5, which shall include soil monitoring constituents listed in section 5.3.2 of this permit and include a detailed discussion of laboratory test results associated with the baseline soil monitoring.

3) Use the information collected in this study to provide a site acceptability evaluation for reuse and land application with respect to hydraulic and nutrient

loading and plant acceptability using Chapter 2 of the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater as an outline. Propose a site or area specific Plan of Operations that will be protective of ground water.

Land application on the northern two thirds of field 4 (west half of pivot 1) and field 5 (pivot 4) shall not be allowed until the soil study has been approved by DEQ. After approval the site or area specific Plan of Operations shall be included as part of the PO.

On June 27, 2012 DEQ visited the site and measured the static water levels of two of the new wells and the existing wells. The results of this visit are shown in Table 4.

Table 4: City of Mountain Home, Monitoring Well Depths and Static Water Elevations

Well Number	Well Completion Date	Well Depth, BGL (feet) (*as measured on June 27, 2012)	Original Static Water Elevation, BGL (feet)	Static Water Elevation, BGL, on June 27, 2012 (feet)
GW-003702	Exact date unknown (1960's)	13.41*	Not known	6.11
GW-003703	Exact date unknown (1960's)	12.14*	Not known	6.96
GW-003706	June 1, 2011	278.71*	Small amount of water between 250 and 270	243.91
GW-003707	May 13, 2011	145.71*	117	68.16
GW-003711	May 20, 2011	275	Dry to 275	Abandoned

As can be seen from Table 4, the static water elevation in wells GW-003706 and GW-003707 have risen since they were installed. Based on the well logs, both wells (GW-003706 and 07) were cased through sandy clayey gravel to a depth of 38 feet. Water was first encountered in well GW-003706 at 230 feet and in GW-003707 from 5 to 127 feet. Staff recommends adding monitoring wells GW-003706 and 07 to the permit as monitoring points.

Table 5 below summarizes the ground water monitoring well results from the two remaining active monitoring wells GW-003702 and GW-003703 over the last three years.

Table 5: City of Mountain Home, Ground Water Monitoring Well Results							
Permit Serial Number	Parameter	Sample Date					
		4/8/09	10/14/09	4/14/10	10/6/10	4/6/11	10/19/11
GW-003702	Water Depth (ft)	6.70	8.45	5.30	8.26	4.70	8.13
	Nitrate-N (mg/L)	0.5	0.7	0.4	0.2	0.5	<0.2
	TDS (mg/L)	582	562	766	688	880	1160
	Chloride (mg/L)	87	67	141	101	205	325
GW-003703	Water Depth (ft)	7.65	8.35	7.50	8.48	5.55	8.2
	Nitrate-N (mg/L)	6.2	7.4	7.5	6.4	7.9	8.1
	TDS (mg/L)	514	660	690	758	762	812
	Chloride (mg/L)	48	59	71	77	93	81

The following Figure 1 summarizes the ground water monitoring well results from MW-2 (GW-003702) and MW-3 (GW-003703) from 1991 to April of 2012.

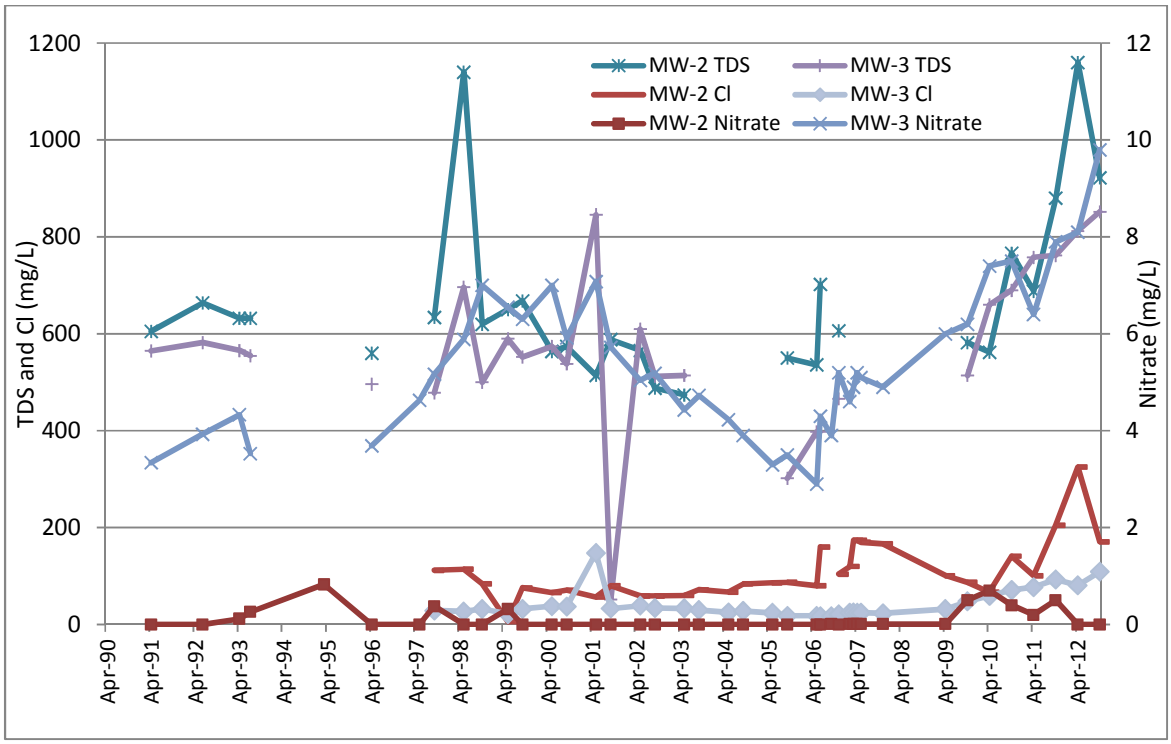


Figure 1: Historic ground water monitoring well results for MW-2 & MW-3.

Based on the shallow aquifer flow directions specified in TR-36, east to west, monitoring wells GW-003702 and GW-003703 serve as side-gradient wells to the site. Based on the size of the lagoon system (206 acres, which can hold a full volume of approximately 442 million gallons), it is likely that, with the underlying basalt layer, ground water mounding exists around the lagoon area. As a result, GW-003702 may be influenced more from the lagoons and GW-003703 may be influenced more from the shallow ground water flow direction (Baldwin, et al., 2009 and Nicholas, 2010) which could explain why the constituent parameters vary so much between monitoring wells in Table 5 and Figure 1. In addition, a nitrate priority area is located east of GW-003703 and includes the eastern portion of field 1 which may explain the variation in nitrate nitrogen values between these two monitoring wells. TR-36 also suggests that the low nitrate nitrogen levels in GW-003702 may be due to phytoremediation by a grove of Russian olive trees near this well.

Compliance activity CA-037-03 of the current permit LA-000037-03 required that a well location acceptability analysis (WLAA) be provided to DEQ for review and approval. The completed WLAA concluded that because all domestic wells near field 3 are in the deep regional aquifer that these wells should not be adversely affected by the land application site. However, the WLAA recommended that two of the four domestic wells near field 3 be monitored to be conservative and safe. Since the land application site has been expanded to include field 4 (west half of Pivot 1) and field 5 (Pivot 4), staff recommends monitoring one domestic well west of field 3 and one domestic well west of field 4. These wells have been identified in the draft permit.

In addition, IDAPA 58.01.16.493.09.c.v states that "An approved system of wells or lysimeters shall be required around the perimeter of the pond site to facilitate ground water monitoring". As discussed above, the surface area of the lagoons covers approximately 206 acres, and mounding around the lagoons is likely. Staff recommends including a compliance activity in the draft permit that requires adding ground water monitoring wells around the lagoon area to monitor any impact the lagoons may be having on ground water.

Isotopic data presented in TR-36 indicated that three domestic wells southwest of the treatment lagoons and one domestic well east of the land application site have similar signatures to the wastewater, and therefore are being affected to some degree by the wastewater treatment operation. However, staff does not recommend adding these wells as monitoring points at this time as the monitoring network around the lagoon area should provide data related to lagoon seepage. Appendix E shows the wells recommended as monitoring points in the draft permit.

4. PERMITTING DISCUSSION

The following sections outline the additional staff recommended changes to be made to the terms of the current permit. The recommended changes are based on requests made in the permit renewal application, items completed as required in Permit No. LA-000037-03, the City of Mountain Home's past performance with respect to permit requirements, reviews of the City of Mountain Home'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 6 is a summary of the activities conducted by the facility with regard to the compliance schedule for compliance activities in section E of the current permit. Recommendations for compliance activities to be included in the draft permit follow the table.

Table 6: City of Mountain Home, Compliance Activity Summary			
Compliance Activity	Description	Due Date	Current Status
CA-037-01	Updated Plan of Operation	August 14, 2008	Unknown
CA-037-02	Seepage Test Plan & Lagoon Testing	Seepage test plan, April 14, 2008 Lagoon testing, August 14, 2009	The seepage test plan was approved by DEQ on April 21, 2012. All lagoons, except lagoon 9, were seepage tested between May and August of 2009. All lagoons, except lagoons 5 and 6, met DEQ seepage requirements. Lagoon 9 was seepage tested in February 2010 and the reconstructed lagoon 5/6 was re-tested in May 2011. Both lagoons met DEQ seepage requirements.
CA-037-03	Ground Water Monitoring Plan	August 14, 2008	Submitted to DEQ on December 2, 2010, and DEQ made comments. A letter responding to comments was submitted on February 3, 2011. Approved by DEQ February 25, 2011. Associated Modeling of Water Quality Impacts on Ground Water from Land Application of Wastewater submitted April 30, 2012.
CA-037-04	Soil Profile Sampling and Analysis Plan	Prior to non-growing season land application	Approved by DEQ in December 2011.
CA-037-05	Implementation Plan for Field 3	Prior to land application on Field 3	Approved by DEQ in October 2009.
CA-037-06	Runoff Management Plan	February 14, 2008	Submitted February 21, 2013

As can be seen in Table 6, all compliance activities specified in the current permit have been completed except for the updated plan of operation, additional requirements associated with the ground water monitoring plan, and the runoff management plan.

To ensure that the Plan of Operation (PO) stays current and includes the items listed in IDAPA 58.01.17.300.05 of the *Recycled Water Rules* and IDAPA 58.01.16.425.01 of the *Wastewater Rules*, staff recommends adding a compliance activity to the draft permit requiring an update of the PO. The PO is a living document and should be up to date on any day in any given year. The purpose of this manual is to provide any operator (whether familiar or unfamiliar with the facility) the needed information to operate the facility by using only the manual. Updating this manual should not be delayed and should be completed as soon as possible. However, to allow

the city ample time in completing the manual, the draft permit will require this activity to be completed twelve months after permit issuance.

The seepage testing for the facility lagoons has been completed. IDAPA 58.01.16.493.02.c in the *Wastewater Rules* requires that municipal lagoons be seepage tested every ten (10) years. As a reminder to the facility and DEQ, Table 7 was added to specify when the next seepage tests are due.

Table 7: City of Mountain Home – DEQ Required Seepage Test Dates

Existing Lagoons	Previous Seepage Test Date	Next Required Seepage Test Date	Liner
Lagoon 1	June 2009	By June 30, 2019	Clay
Lagoon 2	July 2009	By July 31, 2019	Clay
Lagoon 3	June 2009	By June 30, 2019	Clay
Lagoon 4	August 2009	By August 31, 2019	Clay
Lagoon 5/6	May 2011	By May 31, 2021	Synthetic
Lagoon 7	July 2009	By July 31, 2019	Clay bottom – Synthetic sides
Lagoon 8	May 2009	By May 31, 2019	Clay bottom – Synthetic sides
Lagoon 9	February 2010	By February 28, 2020	Synthetic

Section 3.5 above addresses the ground water concerns. As stated above, staff recommends adding new wells around the lagoons.

With the addition of field 4 (west half of Pivot 1) and field 5 (Pivot 4) to the land application site, staff recommends adding compliance activities to the draft permit requiring a soil study and a field implementation plan for these fields. These compliance activities will need to be approved by DEQ prior to any land application on the west half of Pivot 1 or Pivot 4.

4.2 Permit Limits and Conditions

The hydraulic management units have all been re-numbered except MU-037-09 (Field 3: west section) to accommodate three and a half center pivots and the areas surrounding them. The total acres have also been changed to reflect a total of 577 acres.

The non-growing season hydraulic loading rate (HL_{ngs}) for the pivots 1, 2, and 3 only are specified in the current permit and are allowed only during the months of November and March. Since the City has not requested a change to the HL_{ngs} and the HL_{ngs} values were used in the ground water modeling study, staff recommends using the same HL_{ngs} in the draft permit. The HL_{ngs} values are listed in Table 8 below.

Table 8: City of Mountain Home Non-growing Season Hydraulic Loading Rate		
New Management Unit	NGS Hydraulic Loading Rate (in/ac)	NGS Hydraulic Loading Rate (MG)
MU-037-10 (Pivot 1)	6.8	24.4
MU-037-11 (Pivot 2)	2.4	7.6
MU-037-12 (Pivot 3)	1.9	5.8
Total		37.8

The current permit differs from the most current rules regarding disinfection requirements for Class C effluent. The current rules now require that the median number of total coliform organisms be determined from the bacteriological results from the last five (5) days rather than the last seven (7) days as shown in the current permit. Staff recommends changing the draft permit to meet the current rules.

4.3 Monitoring Requirements

The management units have been re-numbered to accommodate additional acreage and the change to three and a half center pivots on currently permitted and newly acquired land. The re-numbering of the management units are shown in section 4.1 of the draft permit.

Annual sampling of supplemental water was added to section 5.1.1 of the draft permit.

Ground water monitoring wells 1, 4, and 5 were abandoned according to IDWR requirements and are no longer accessible for monitoring. Therefore, these ground water monitoring wells have been removed in the draft permit.

Staff recommends adding total coliform to the ground water monitoring requirements in the draft permit. In addition, sampling domestic wells is a proactive measure to protect the residents in case the wells are being or may become negatively influenced by wastewater treatment or reuse operations. If there is a positive total coliform result, the sample should be retested for fecal coliform or *E.coli*.

Phosphorus is typically a concern in surface waters and is usually not a concern in ground water unless an interconnection between ground water and surface water exists. Since the nearest surface water down-gradient of the site (Snake River) is approximately 9.5 miles away, soil monitoring in Table 3 shows that phosphorus is decreasing with depth, and the phosphorus at the 24” to 36” soil depth is well below the trigger level of 30 ppm using the Olsen method, staff recommends removing Ortho-Phosphorus from the ground water monitoring requirement in the draft permit.

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft Reuse Permit Number M-037-04 for a public review and comment period. Section 4 of the draft permit contains effluent quality requirements for the wastewater treatment system, hydraulic and constituent loading limits, 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.

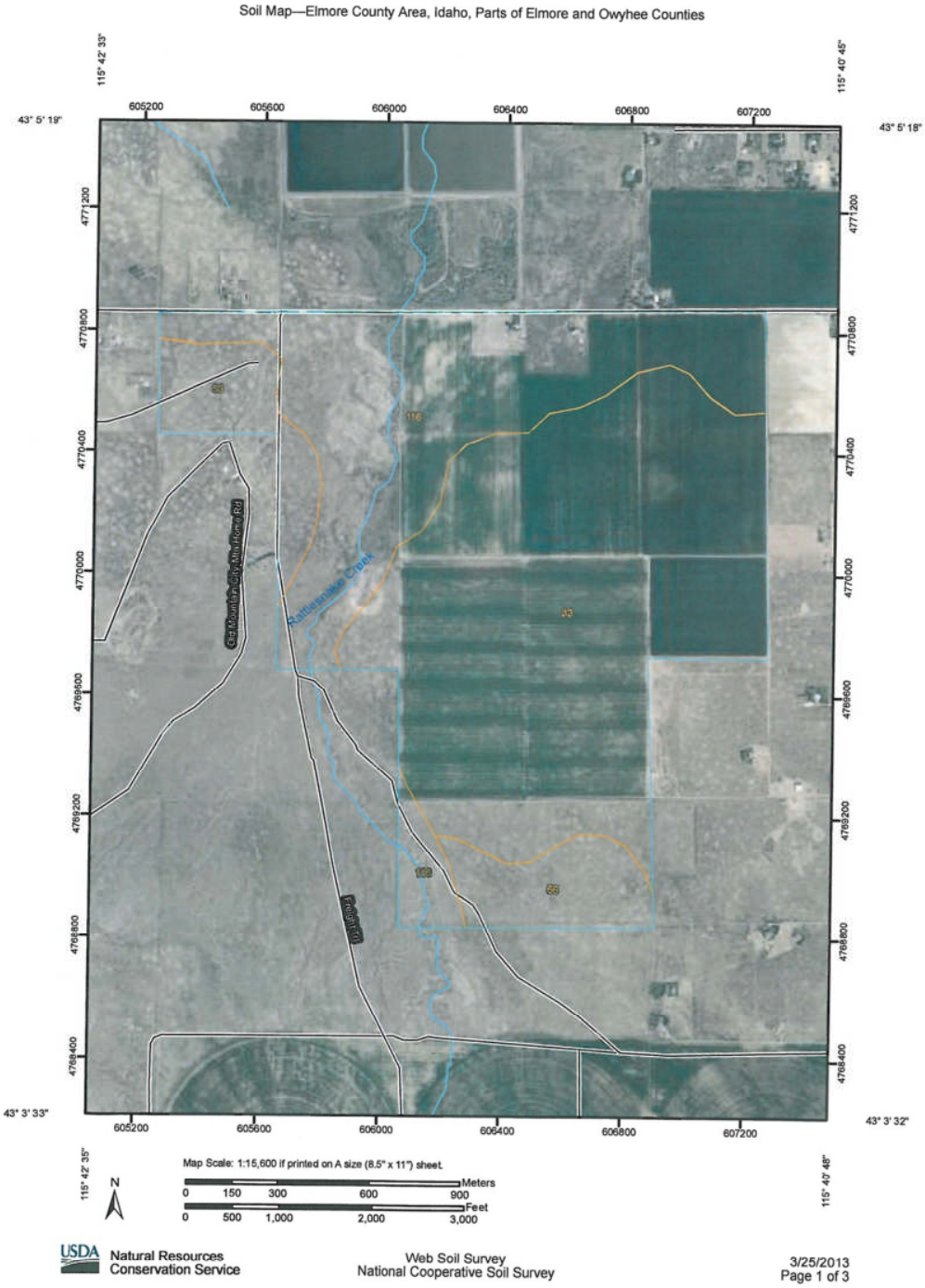
REFERENCES

Baldwin, J., T. Nicholas, and G. Bahr, 2009, Mountain Home south ground water nitrate study, Elmore County, Idaho: Idaho Department of Environmental Quality, State Office and Idaho Department of Agriculture, Ground Water Quality Technical Report No. 36, 79 p.

Nicholas, T., 2010, Pharmaceuticals and personal care products in ground water from municipal lagoon treatment: Boise State University Masters Thesis.

Young, H.W., 1977, Reconnaissance of ground water resources in the Mountain Home plateau area, Southwest Idaho: U.S. Geological Survey Water Resources Investigations Open-File Report 77-78, 40 p.

APPENDIX A


Soil Map—Elmore County Area, Idaho, Parts of Elmore and Owyhee Counties
115° 42' 33"
115° 40' 45"
43° 5' 19"
43° 5' 18"
605200
605600
606000
606400
606800
607200
4771200
4770800
4770400
4770000
4769600
4769200
4768800
4768400
Rattlesnake Creek
Rough Rd
43° 3' 33"
43° 3' 32"
115° 42' 35"
115° 40' 48"
Map Scale: 1:15,600 if printed on A size (8.5" x 11") sheet.
N
Meters
0 150 300 600 900
Feet
0 500 1,000 2,000 3,000
USDA Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
3/25/2013
Page 1 of 3

APPENDIX B

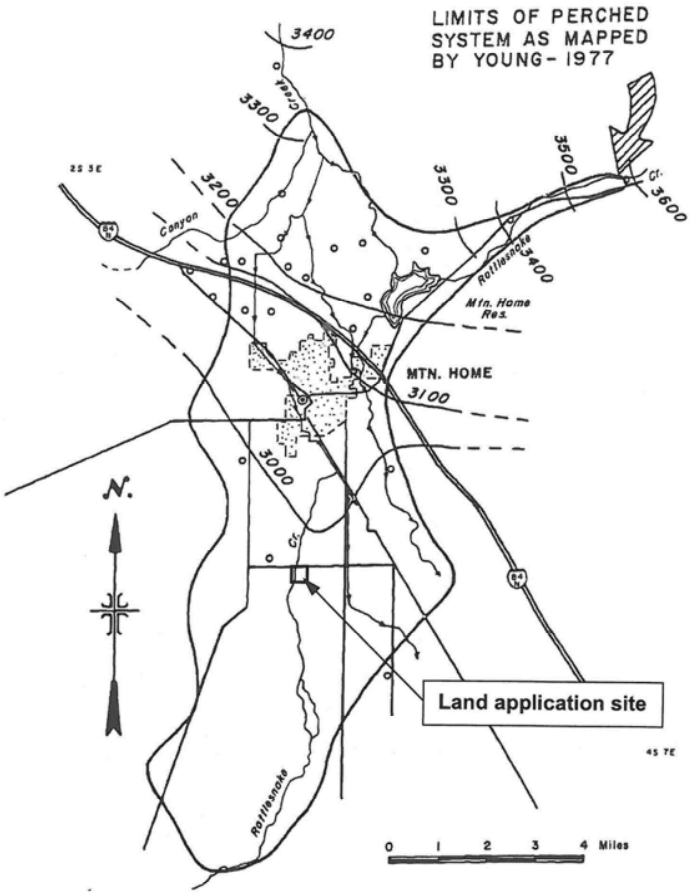


Figure 3. Water levels in the perched aquifer in fall 1976, after Young (1977)

APPENDIX C

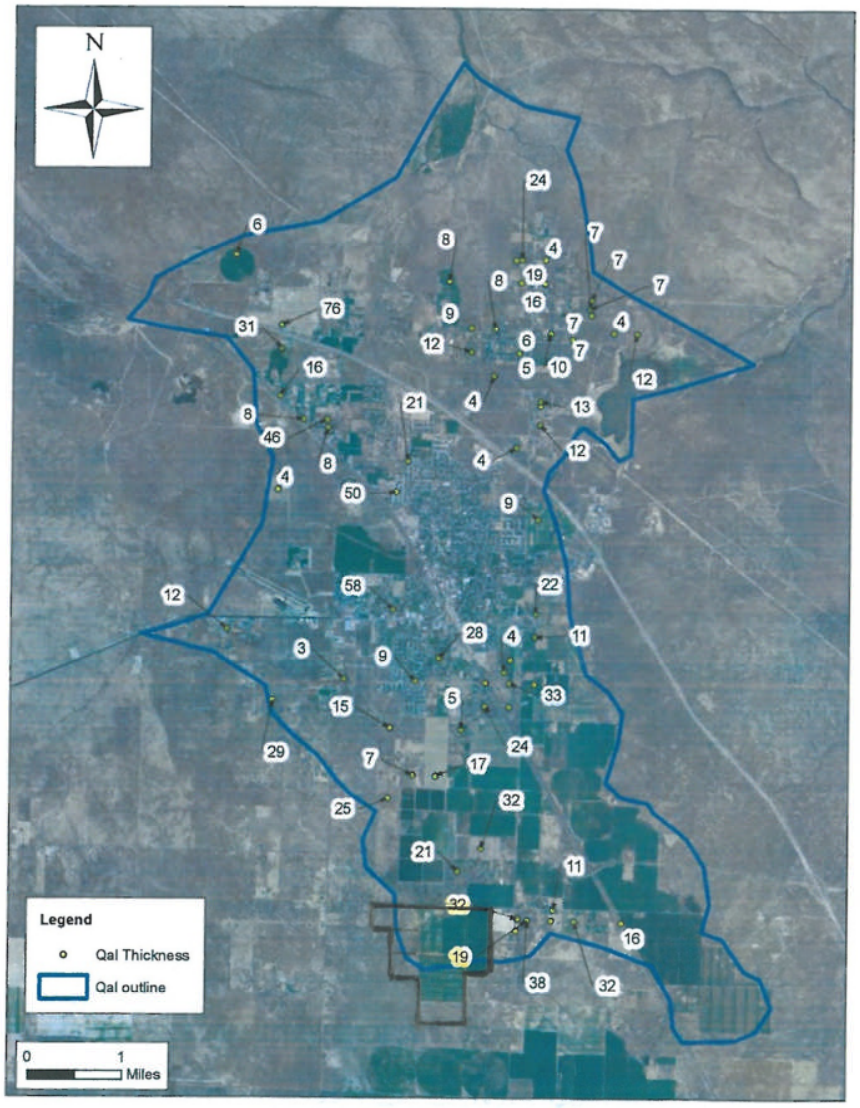
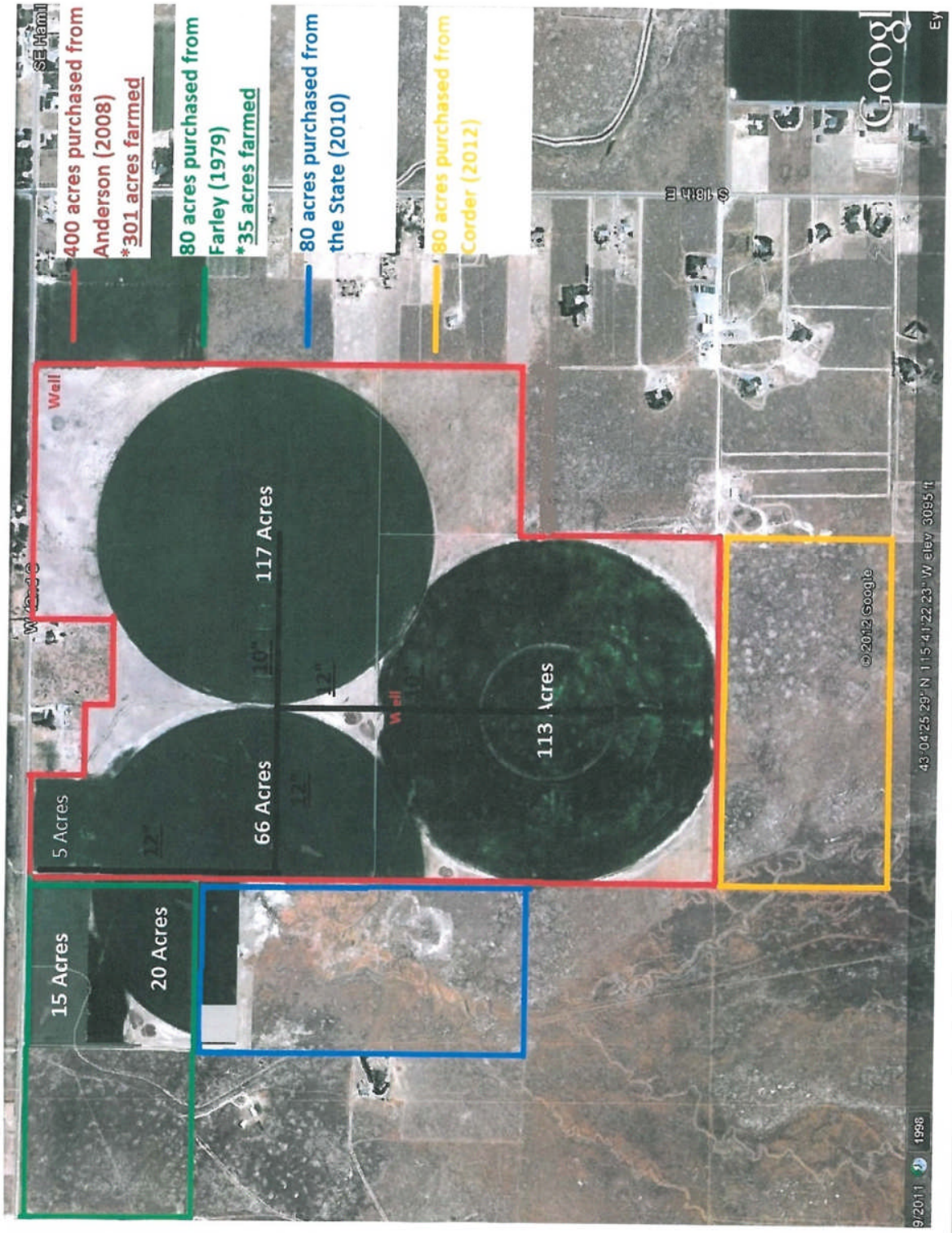


Figure 6. Map showing outline of Qal in the Mountain Home area and alluvium thickness, in feet, from selected wells. Qal outline adapted from Shervais, et al, 2002.

APPENDIX D

(Green Area = Field 3, Blue Area = Field 4, Yellow Area = Field 5)



APPENDIX E

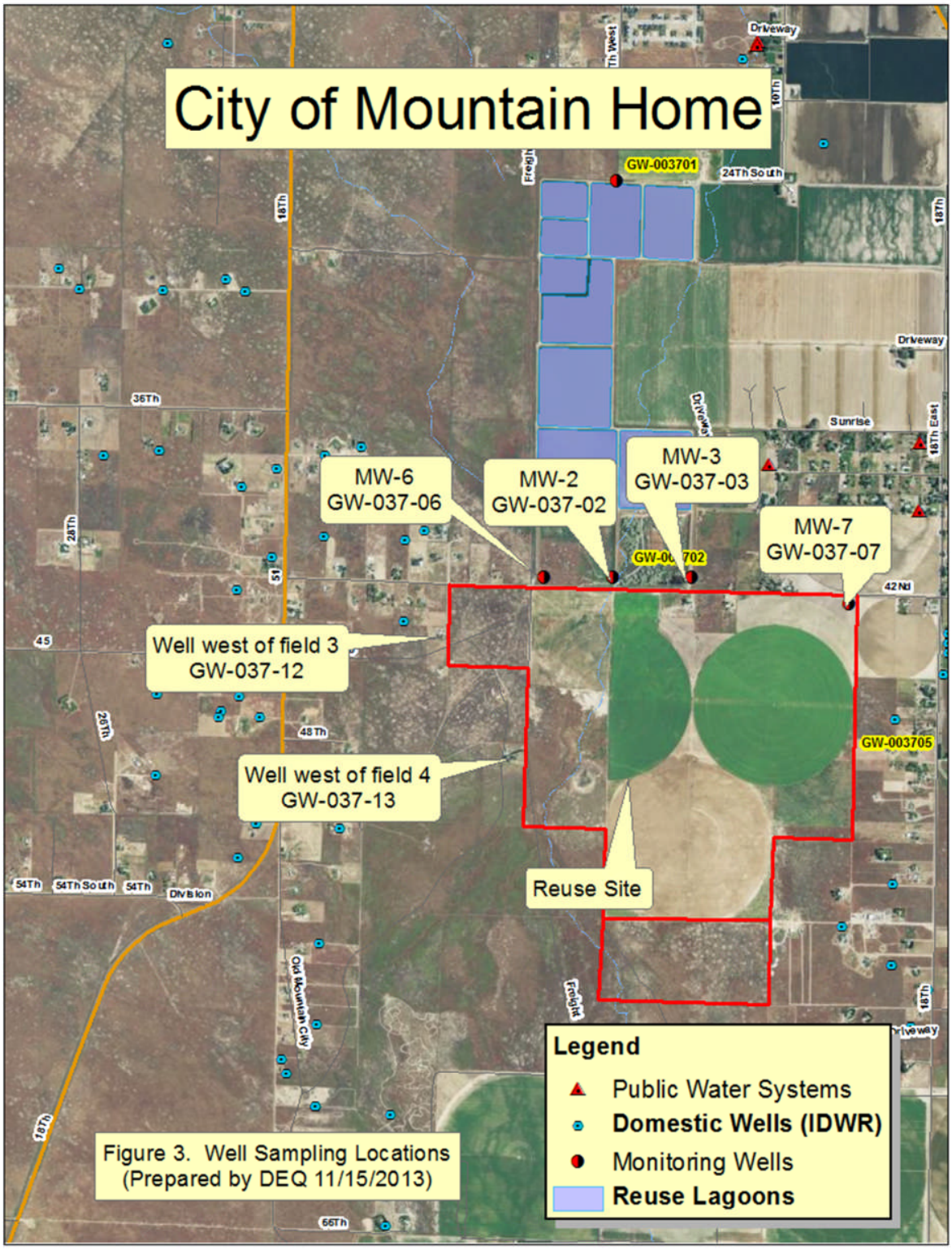


Figure 3. Well Sampling Locations
(Prepared by DEQ 11/15/2013)