

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

Permit Fact Sheet Montana Ground Water Pollution Control System (MGWPCS)

Applicant: **Ueland Land Development LLC**

Permit Number: **MTX000204**

Facility Name: Homestake Meadows Phase II WWTP

Facility Location: The WWTP is at **45.91833 Latitude, -112.449722 Longitude**. The WWTP is located on Lot 44 of the Homestake Meadows Phase II subdivision along Liberty Lane. Liberty Lane is ~1 mile east of Continental Drive along Blacktail Canyon Road. The subdivision is about 6 miles southeast of the southern reaches of the town of Butte.

Facility Address: The WWTP hasn't yet been assigned a street address, but the subdivision encloses Whisper Ridge Road, Legacy Court, Liberty Lane, and Ole Court. The subdivision is located north of Blacktail Canyon Road and ~1 mile east of Continental Drive. The subdivision is about 6 miles southeast of the southern reaches of the town of Butte.

Facility Contact: Ronald Ueland, Managing Partner
Ueland Land Development LLC
122181 West Browns Gulch Road
Butte, MT 59701

Receiving Water: Class I Ground Water

Number of Outfalls: 1 (one), designated as Outfall 001

Outfall/Type: Outfall 001 discharges to each of the 4 drainfield zones designated as follows. They are arranged from south to north.
001A – Type – Subsurface
001B – Type – Subsurface
001C – Type – Subsurface
001D – Type – Subsurface

Date: **March 2016**

I. PERMIT STATUS

The following fact sheet outlines the basis for renewing a MGWPCS wastewater discharge permit to Ronald Ueland (applicant) for the Homestake Meadows Phase II WWTP (facility) located about 6 miles southeast of the southern reaches of the town of Butte. The MGWPCS permit application and supplemental materials provide the information that serves as the basis for the development of the effluent limits and the monitoring requirements outlined within this fact sheet. The scope of this permitting action is for the construction, operation, and maintenance of the wastewater treatment and disposal system.

This is a renewal of the original Authorization To Discharge (MTX000204) under the MGWPCS. The original Authorization To Discharge was dated 20 January 2009.

A. Application Info

Ueland Land Development LLC for Homestake Meadows Phase II submitted an application for an MGWPCS permit on May 8, 2008 and was issued an MPDES permit dated January 20, 2009. A permit renewal application was submitted on September 6, 2013. DEQ identified deficiencies with the application which were addressed in a response letter to DEQ dated 25 October 2013. DEQ issued a Completeness Determination letter on 22 November 2013. Records exist in DEQ's Subdivision Review Section for a Homestake Meadows Phase I, but the Phase I has nothing to do with the current MGWPCS permit for Homestake Meadows Phase II.

B. Permit Changes

There are no changes in the Permit limits from the WWTP outfall.

II. FACILITY INFORMATION

A. Facility Location

The Homestake Meadows Phase II WWTP is located on Lot 44 of the Homestake Meadows subdivision. The WWTP for the subdivision is found along Liberty Lane. Liberty Lane is ~1 mile east of Continental Drive along Blacktail Canyon Road. The subdivision is about 6 miles southeast of the southern reaches of the town of Butte. Refer to the Location Map, Subdivision Map, and Site Map (Figures 1-3).

B. Facility and Operations

The Homestake Meadows Phase II subdivision transports its residential wastewater influent via a grinder pumps station to low pressure sewer mains. It is delivered to an International Wastewater System (IWS) wastewater treatment system. No individual or scattered group septic tanks appear to be part of the system. This treatment system is a Sequencing Batch Reactor (SBR) package plant. The influent from the collection system enters the distribution / surge tanks prior to being distributed to 3 SBR tanks for secondary treatment. The SBR tanks provide secondary treatment removing biological oxygen demand (BOD) and nitrogen within each tank by alternating between aerobic and anoxic conditions within the tank. Effluent is pumped from the filter feed tank to a sand filter. Prior to effluent reaching the sand filter, a coagulant is added to the discharge line for polishing. After the sand filter the effluent passes through UV disinfection, then through a turbidimeter. If the effluent is

greater than 5 Nephelometric Turbidity Units (NTU) the effluent is returned to the head of the plant for additional treatment. If the effluent is at or below a turbidity of 5 NTU it is sent to a dose tank. From the dose tank the effluent is gravity fed to a pump vault where 4 pumps, each pump assigned a different drainfield zone, distribute the effluent for final disposal. The WWTP is designed to treat domestic wastewater and discharge a daily maximum of 23,800 gallons/day (g/d) to ground water (DEQ 2008). A more detailed description of the sewage collection and handling, and the effluent treatment and disposal are found in Appendix I.

This permit authorizes discharge of residential wastewater to 1 pressure dosed drainfield, which will discharge to ground water. The discharge is rotated sequentially among the 4 zones within the drainfield. The WWTP, outfall, and drainfield are all located on Lot 44 along Liberty Lane within the subdivision with the following coordinates: 45.91833 Latitude, -112.449722 Longitude. The location of the drainfield relative to the WWTP is depicted on Figure 3 and a System Line Drawing for the WWTP is found on Figure 4 at the end of this document.

Table 1

Collection, Treatment, and Disposal System Summary	
Homestake Meadows Phase II Wastewater Treatment Plant	
Outfall 001 - Domestic Wastewater/Sewerage	
Method of Disposal: Infiltration to ground water by use of multiple drainfield zones	
Disposal Structure: Subsurface Drainfield zones (Outfall for 4 zones = 001) SE ¼ SE ¼ Section 15 Township 02 , Range 07 West, Platt 286B Latitude: 45.91833°, Longitude: -112.449722°	
Contributing Sources: Residential Septage Influent Lines from Subdivision	
Average Daily Design Flow (gpd): 13,600	Daily Maximum Design Flow (gpd): 23,800
Treatment consists of an International Wastewater System (IWS), which consists of a Sequencing Batch Reactor (SBR) package plant, with sand filtration and UV disinfection. Discharge to ground water is via an pressure dosed drainfield.	
Effluent Sampling Location: Effluent sampling port (EFF-001) is in the Control Bldg. after the treatment area and before the dose tank	
Flow Monitoring Equipment: Badger Meter, Magnetoflow FM-001: flow meter (located within junction box, within the Control Building)	
Flow Monitoring Location: Flow Meter (FM-001) is located in the Control Bldg. just before the effluent sampling port (EFF-001) and before the dose tank	

C. Effluent Monitoring Location

The location of the effluent sample tap is depicted on a System Line Drawing on Figure 4. The flow meter (FM-001) and sampling tap (EFF-001) for the effluent stream are both inside the Control Building and are located along the line before the effluent leaves the Control Building and enters the Dose Tank (see the Line Drawing on Figure 4). The Final Effluent Limits are further discussed in Section V.

D. Effluent Characteristics

Pursuant to ARM 17.30.1023, DEQ requires the applicant to disclose the quality of the effluent to be discharged such that the potential pollutants can be identified and the proposed discharge can be examined to determine if it will cause pollution of state water, 75-5-605, Montana Code Annotated (MCA). The applicant has provided WWTP effluent quality data for Outfall 001 as summarized on the Table within Appendix II.

E. Geology

Soils in the area are generally shallow and well drained sand and silty sand. The overburden (the thin soil and other unconsolidated sediments above harder bedrock) can be relatively thin, but ranges in thickness from 5-30 feet thick across the subdivision. The lower portion of the overburden is generally decomposed granite (heavily weathered and unconsolidated granular material) that lies on top of the more consolidated granitic bedrock. The well log and the geology encountered during drilling of MW1 (the monitoring well for this facility) is provided in Appendix III.

F. Hydrogeologic Characteristics

Groundwater beneath this site is present as a shallow unconfined water table aquifer that is present primarily within the fractured granitic bedrock. The ground water is considered to be Class I ground water (based on a low specific conductance stipulated in the ARM 17.30.1006 (1)(a)). The closest surface water to the drainfield is Blacktail Creek, which is approximately 800 feet south and downgradient from the discharge. For more information on hydrogeologic characteristics refer to Table 6 in Appendix IV.

G. Ground Water Monitoring Well

Data derived from a single monitoring well (MW1) was used to establish background / ambient ground water quality. MW1 has an MBMG GWIC ID# 258946. It is located immediately downgradient from the WWTP's 4 drainfield zones as shown on Figures 2 and 3. Information regarding this monitoring well is summarized on the well log in Appendix III. This well was used to determine background conditions prior to the WWTP began operation. Once operation began at the WWTP this well was used as a ground water monitoring point located downgradient from the septic drainfield.

H. Ground Water Quality Characteristics

The receiving water beneath this site for Outfall 001 is Class I ground water (ground water with specific conductance equal to or less than 1,000 micro-Siemens/cm) as defined in the ARM 17.30.1006 (1)(a). Class I ground waters are considered high quality waters and are subject to Montana's Nondegradation Policy (75-5-303, Montana Code Annotated (MCA)).

As a special condition (ARM 17.30.1031), ground water monitoring was established in the 2009 permit (DEQ, 2009) to provide for ambient and long term downgradient monitoring of the aquifer. Ground water monitoring requirements will be continued for monitoring well MW1 due to the following site-specific reasons:

- The aquifer beneath and downgradient from Outfall 001 is shallow, unconfined, and present within the fractured bedrock.
- The soil and sediments above bedrock are sandy textured which may be indicative of high permeability. As such, these sediments are susceptible to rapid infiltration.
- Continued downgradient ground water characterization is needed.

- Duty to reapply (Permit Part III.A.) requires ambient ground water quality monitoring.
- Proximity to Blacktail Creek and Passmore Gulch and their tributaries.

Ground water monitoring and reporting requirements are summarized in Table 10 in Appendix VIII. Requirements have been reestablished and are now based on parameters of interest associated with the proposed wastewater stream (Appendix VI). All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter. All existing ground water monitoring wells shall be maintained and monitored during the term of the upcoming permit cycle.

The applicant reported ambient and post-discharge ground water quality from monitoring well MW1 that is located west of the Phase I and II drainfield. The water quality data was collected prior to and after the WWTP and drainfield came on-line. After the WWTP became active and was discharging to ground water, the monitoring well was sampled to characterize ongoing ground water quality. That water quality data is presented in Table 5 found in Appendix IV.

III. MIXING ZONE

The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. DEQ will not be authorizing a mixing zone within this permit. The mixing zone rationale is further discussed in Appendix V.

IV. RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. This section presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715. The bases for deriving and establishing effluent limitations are further discussed in Appendix VI. Based on the information and analyses presented in Sections III and IV, pursuant to ARM 17.30.1031, DEQ proposes numerical effluent limitations for the following parameter:

A. Nitrogen

Application materials indicate that nitrogen parameters will be present in the proposed wastewater stream (Table 3 in Appendix II). The applicant has proposed an SBR (Sequencing Batch Reactor) treatment system that provides an advanced method for nitrogen treatment. A similar designed treatment system has reported total nitrogen concentrations in effluent that average 4.3 mg/L, which is lower than ground water quality standards (Table 7 in Appendix VI). The similar system is the Moon Lake Ranch Subdivision, located west of Boise, Idaho. Since the Homestake Meadows Subdivision WWTP has been online, the effluent sampling data reported in the DMRs (Discharge Monitoring Reports) indicated an average total nitrogen of 4.43 mg/L. In comparison, septic systems using conventional treatment (e.g., septic tanks) may discharge total nitrogen concentrations of approximately 40-100 mg/L (US EPA 2002).

Table 2

Final Effluent Limits – Outfall 001				
Homestake Meadows Phase II Wastewater Treatment Plant				
Parameter	Units	Effluent Limitations		Rationale
		Daily Maximum⁽¹⁾	Annual Maximum⁽¹⁾	
Nitrogen, Total (as N)	mg/L	7.5		Nondegradation Nonsignificance Criteria 715(1)(d)(iii) MCA
Phosphorus, Total (as P)	lbs/year		348.0	Nondegradation Significance Criteria ARM 17.30.715(1)(e)

Footnotes:

Beneficial Uses: ARM 17.30.1006

(1) See definition in Part V of permit.

V. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and therefore water quality standards. Effluent and ground water monitoring will be required as a condition of this permit. Monitoring requirements and respective rationale is summarized in Appendix VIII (A.-D.) and Tables 9 and 10.

VI. SPECIAL CONDITIONS

Special conditions have not been established within this permit.

VII. COMPLIANCE SCHEDULE

A compliance schedule has not been established within this permit.

VIII. NONSIGNIFICANT DETERMINATION

DEQ has determined (DEQ 2008) that the discharge constitutes a new source and is subject to the Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.702). The applicable water quality standards for Class I ground water and nondegradation-nonsignificance criteria are summarized in Table 7 and Appendix VI. Discharges in compliance with the limitations of this permit are considered nonsignificant. The permit includes monitoring, reporting and corrective action requirements to establish, confirm, and maintain compliance with the permit limits.

IX. PUBLIC NOTICE

Legal notice information for water quality discharge permits are listed at the following website: <http://deq.mt.gov/Public/notices/wqnotices>.

Public comments on this proposal are invited any time prior to close of business on 10 May 2016. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or,

Montana DEQ
Water Protection Bureau
PO Box 200901
Helena, MT 59620

All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit. DEQ will respond to all substantive comments pertinent to this permitting action and issue a final decision within thirty days of the close of the public comment period.

All persons, including the applicant, who believe any condition of the draft permit is inappropriate, or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under ARM 17.30.1372. All public comments received for this draft permit will be included in the administrative record and will be available for public viewing during normal business hours.

Copies of the public notice were mailed to the applicant, state and federal agencies and interested persons who have expressed interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this draft permit. Electronic copies of the public notice, draft permit, fact sheet, and draft environmental assessment are available at the following website: <http://deq.mt.gov/Public/notices/wqnotices>.

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email Jenna Stamper at JStamper@mt.gov. All inquiries will need to reference the permit number (MTX000204), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, the Department will accept requests for a public hearing. A request for a public hearing must be in writing and must state the nature of the issue proposed to be raised in the hearing (ARM 17.30.1373).

FIGURES

FIGURE 1 - Location Map

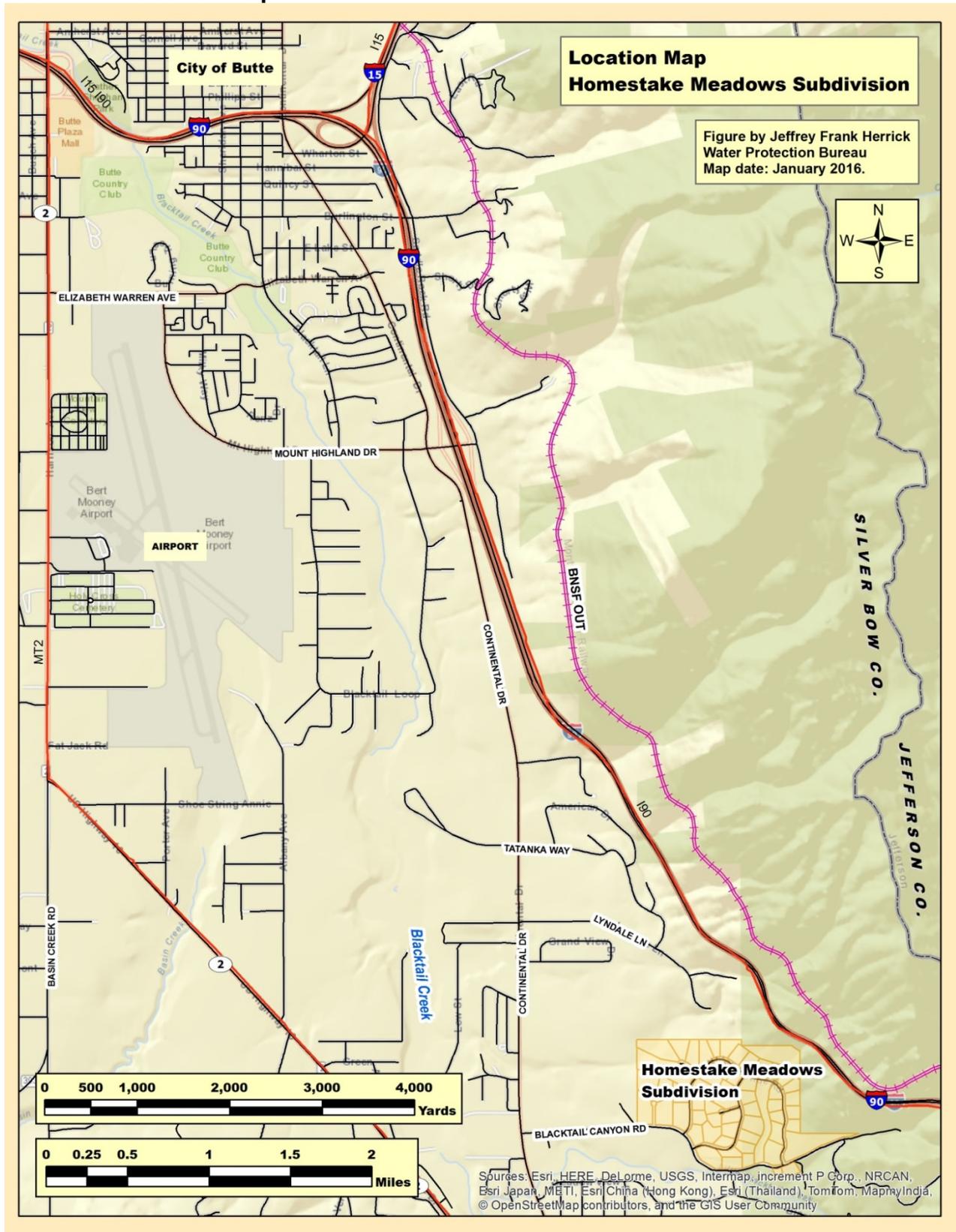


FIGURE 2 - Subdivision Map

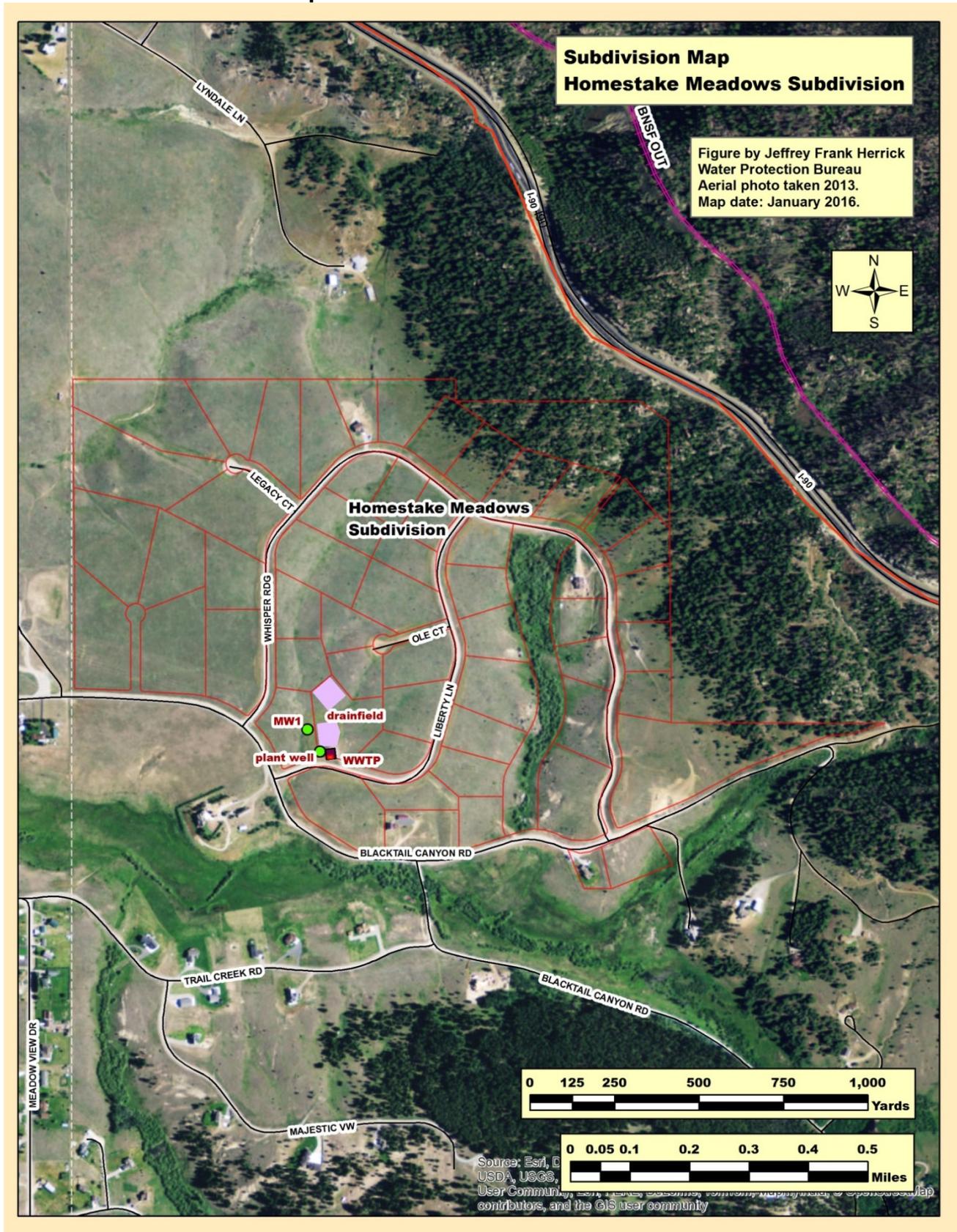


FIGURE 3 - WWTP Aerial Photo Map

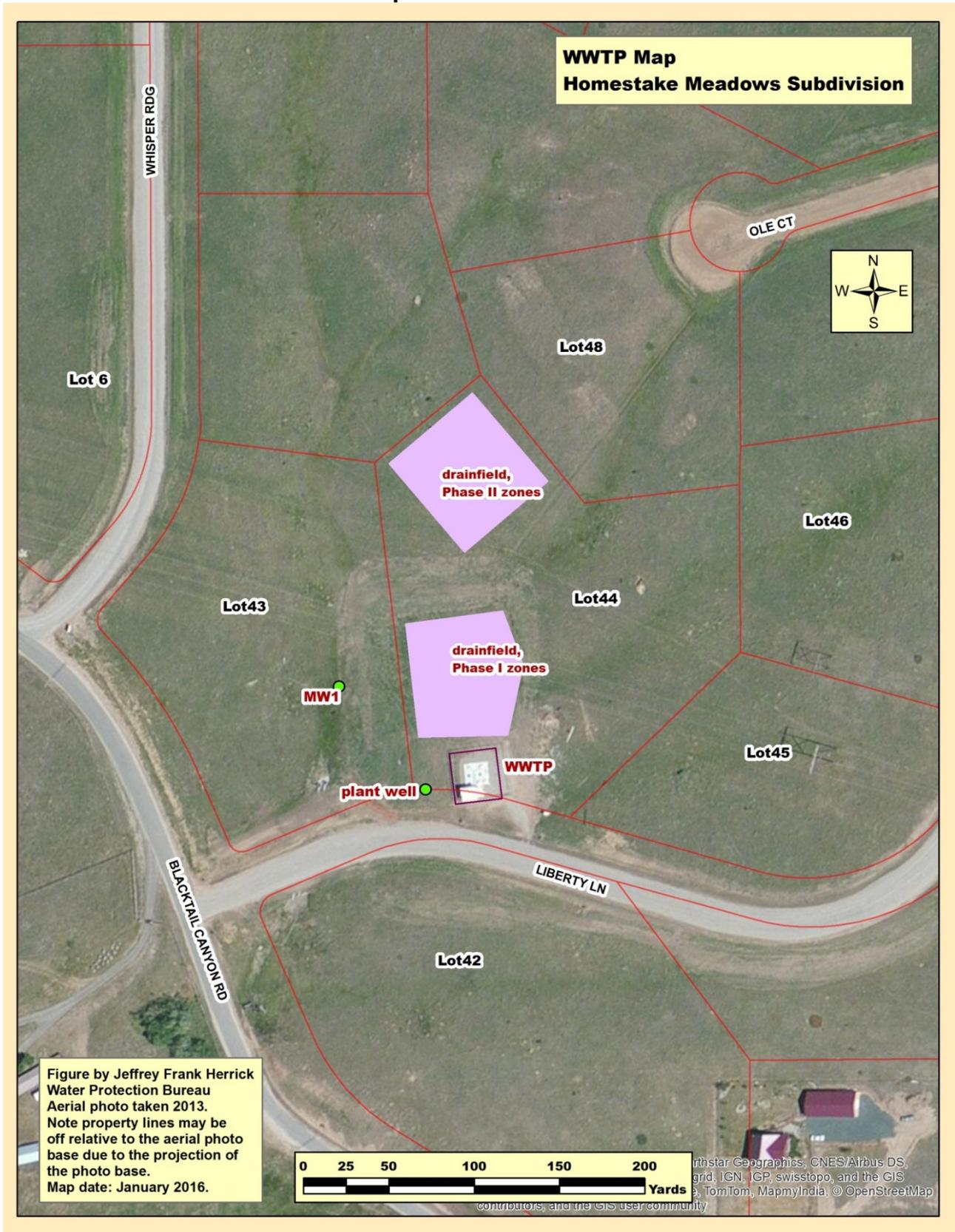
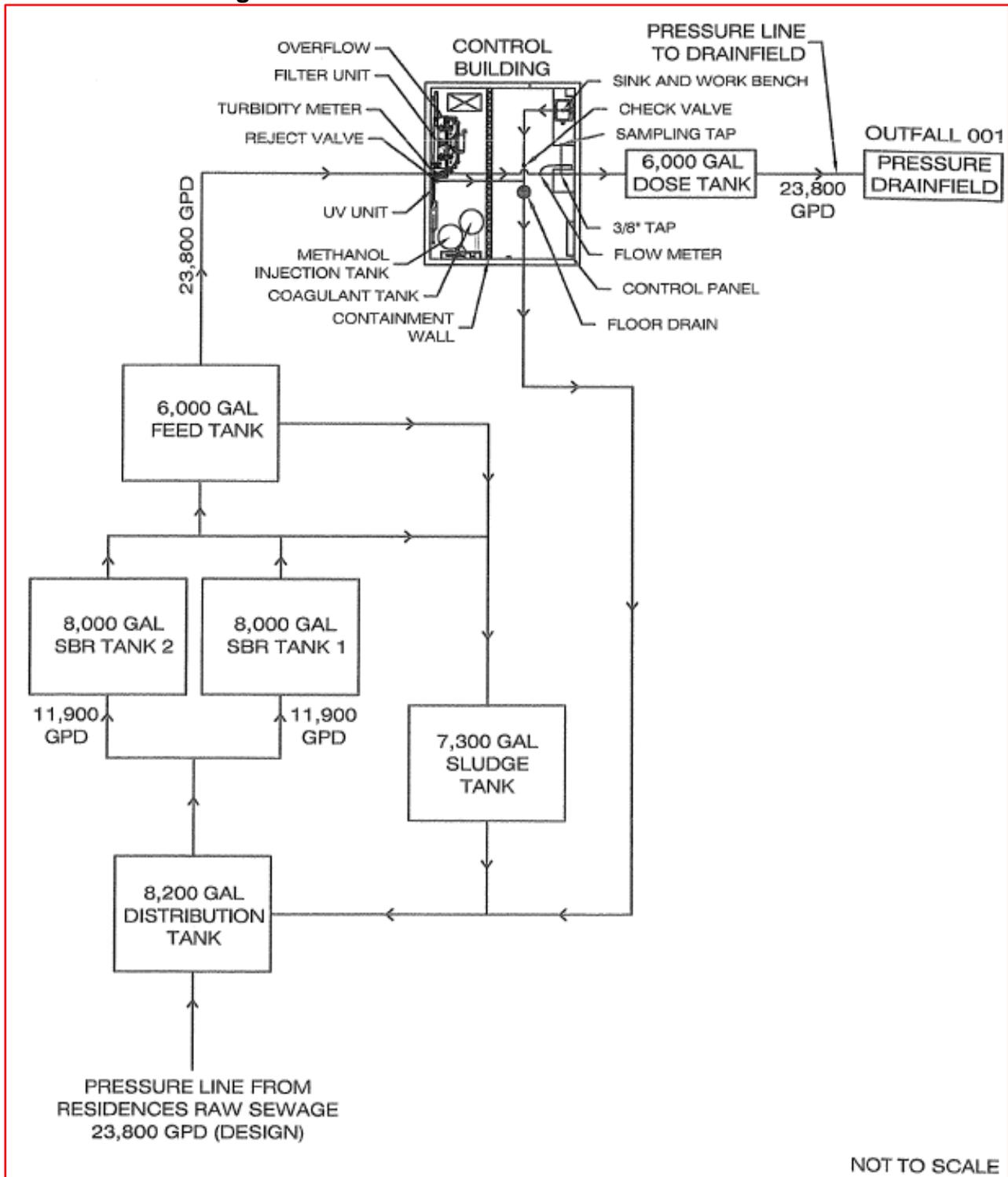


FIGURE 4 - Line Diagram of the WWTP



TERRITORIAL LANDWORKS, INC.
 CIVIL ENGINEERING • SURVEYING • LAND USE CONSULTING
 Ph: 406/721-0142 www.TerritorialLandworks.com P.O. Box 3851
 Fax: 406/721-5224 Missoula, MT 59808

HOMESTAKE MEADOWS
 SYSTEM LINE DRAWING
 SEC 14 & 15, T2N, R7W, P.M.M.
 BUTTE, SILVER BOW COUNTY, MONTANA

PROJECT#: 13-3218
 TAB: SBR SCHEMATIC
 DRAFTER: AW
 DATE: 10/17/2013
 SHEET 1 OF 1

APPENDICES

APPENDIX I

Facility and Operations

The Homestake Meadows Phase II subdivision WWTP treats the domestic wastewater produced from up to 58 lots of the subdivision and 2 neighboring lots. As of January 2016 the subdivision has not yet been fully built out. Influent is transported from the individual homes via a grinder pump station to low pressure sewer mains. Influent is delivered from the low pressure sewer mains to an International Wastewater System (IWS) wastewater treatment system. The IWS system is a Sequencing Batch Reactor (SBR) package plant. The influent from the collection system enters distribution/surge tanks prior to being distributed to 3 SBR tanks for secondary treatment. The SBR tanks provide secondary treatment removing biological oxygen demand (BOD) and nitrogen within each tank by alternating between aerobic and anoxic conditions within the tank. After the wastewater has had time to settle solids the clear decant effluent is pumped to a filter feed tank. Effluent is pumped from the filter feed tank to a sand filter. Prior to effluent reaching the sand filter a coagulant is added in the discharge line for polishing. After the sand filter the effluent passes through UV disinfection and through a turbidimeter. If the turbidity of the effluent is greater than 5 Nephelometric Turbidity Units (NTU) the effluent is returned to the head of the plant for additional treatment. If the effluent is at or below a turbidity of 5 NTU it is sent to a dose tank. From the dose tank the effluent is gravity fed to a pump vault where 4 pumps, each assigned a different drainfield, distribute effluent for final disposal. The wastewater treatment system has the capacity to discharge a daily maximum of 23,800 gallons/day (gpd) to ground water. This volume is the design capacity for the WWTP.

This permit authorizes discharge of residential (domestic in nature) wastewater to 1 pressure dosed drainfield, which will discharge to ground water. The discharge is directed to 1 of 4 zones at a time and that discharge is rotated sequentially among the 4 zones. The drainfield is located north of and adjacent to the treatment plant and is within the boundaries of the subdivision's Lot 44. The drainfield zones are designated 001A, 001B (Phase I), and 001C, and 001D (Phase II). The Phase I zones are north of and adjacent to the WWTP. The Phase II zones are located north of the Phase I zones (refer to Figure 3). The zone laterals are located approximately 1-2 feet below the ground surface. The WWTP, outfall, and drainfield are all located on Lot 44 along Liberty Lane within the subdivision with the following coordinates: 45.91833 Latitude, -112.449722 Longitude. Refer to Figures 1, 2, and 3 for maps of the area. A System Line Drawing is found on Figure 4.

APPENDIX II

Estimated Effluent Quality

Table 3

Effluent Quality – Outfall 001. Homestake Meadows Phase I & II WWTP								
Parameter⁽¹⁾	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum Value⁽²⁾	# of Samples	Source of Data	2009 Permit Limit
Escherichia coli	EFF-001 ⁽³⁾	MPN ⁽¹⁾	NR ⁽⁶⁾	2	120	NR ⁽⁶⁾	2009 & 2013 Application	NA ⁽⁵⁾
Biochemical Oxygen Demand (BOD ₅)	EFF-001	mg/L	3.40	14.78	31.40	4	DMR ⁽²⁾	NA
Chloride (as Cl)	EFF-001	mg/L	152.00	211.00	258.00	4	DMR	NA
Flow rate, Discharge	FM-001 ⁽⁴⁾	gpd	266.0	587.7	1387.0	4	DMR	NA
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	1.02	2.20	3.49	4	DMR	7.50
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	0.05	1.27	3.91	4	DMR	NA
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	0.33	2.23	6.18	4	DMR	NA
Nitrogen, Total (as N)	EFF-001	mg/L	2.30	4.44	8.08	4	DMR	NA
		lbs/day	0.01	0.02	0.03	4	DMR	NA
Phosphorus, Total (as P)	EFF-001	mg/L	1.24	4.21	7.08	4	DMR	NA
		lbs/day	0.001	0.015	0.032	4	DMR	0.95
Alkalinity	EFF-001	mg/L	NR	123	280	NA	2013 Application	NA
Soluble Phosphate	EFF-001	mg/L	NR	1	3	NA	2013 Application	NA
Temperature	EFF-001	Celsius	NR	11	29	NA	2013 Application	NA

Footnotes:

- 1) MPN = Most Probable Number
- 2013 Application = Application Form GW-2 and supplemental materials 2013.
- 2) DMR = Self- Reported Discharge Monitoring Reports
- 3) EFF-001: Effluent sample site located in Control Bldg. just before effluent leaves the building and before the Dose Tank.
- 4) FM-001 = Effluent flow meter located in Control Bldg. after the 6000 gal. tank and before the 6000 gal. Dose Tank.
- Period of Record: 12/2014 through 09/2015.
- 5) NA = Not Analyzed

6) NR = Not Reported

Note that the above data is derived from the most recent Permit To Discharge renewal application and the DMRs for the system over the last several quarters.

Conventional and nonconventional pollutants only, table does not include all possible toxics.

Maximum value recorded are of all quarterly reported Daily Maximum Values.

Data from pilot plant (application Form GW-1 Section M) and the submitted DMRs.

The effluent discharge from the wastewater treatment system exits the Control Building and enters a 6,000 gallon Dose Tank. It is then sent to the drainfield. The drainfield has 4 zones that receive the same effluent from a single outfall that is designated 001. The drainfield is located directly north of the Wastewater Treatment Plant (WWTP) Control Building and its associated process pumps, lines, valves, and tanks. The WWTP facilities, the Outfall 001, and the drainfield's 4 zones are all located on Lot 44 of the Homestake Meadows Phase II subdivision. The flow meter (FM-001) and sampling tap (EFF-001) for the effluent stream are both inside the Control Building. The location of the effluent sample tap is described on the System Line Drawing on Figure 4.

APPENDIX III

Monitoring Well Summary

Table 4

Monitoring Well Summary
Homestake Meadows Phase II Wastewater Treatment Plant
Monitoring Well: MW1
MBMG GWIC #: 258946
Status: Constructed on 09/10/2010
Location: 100 feet east of Phase 1 drainfield on lot 43 Latitude: 45.91809° North Longitude: -112.45019° West
Representation: This well represented ambient quality of the shallow ground water prior to the WWTP start up. It currently allow ground water monitoring downgradient of Outfall 001. This monitoring well is located on Lot 43 of the Homestake subdivision and is ~100 feet directly west of the Phase I drainfield zones. It appears to be roughly 220 feet northwest of the WWTP Control Building.
Additional Information taken from the Well Log
MBMG GWIC Site (Well) Name: Ueland Land Development
GWIC ID: 259846
Location: Latitude: 45.91809° Longitude: -112.45019°
Completed: 10 September 2010
Sealed: 0-18 feet deep, Bentonite
Screened: 90-115 feet (saw cut slots)
Total Depth: 115 feet
Static Water Level: 27 feet (below ground surface)
O'Keefe Drilling Co.

A single monitoring well (MW1) was drilled and installed to determine background / ambient ground water quality. It has an MBMG GWIC ID# 258946. It is located immediately downgradient from the 4 drainfield zones as shown on Figures 2 and 3. Information regarding this monitoring well is summarized on the well log seen on the following page. This well was used to determine background conditions prior to the WWTP began operation. Once operation began at the WWTP this well has been used as a ground water monitoring point located downgradient from the septic drainfield. It should be noted that another well was drilled and installed just southwest of the WWTP. The log for this well was included with the log for MW1. This well has a very poor well log with little useful information. It has an MBMG GWIC ID# 49388. This well is intended to be a non-potable water source for the WWTP operation. Note that other monitoring wells were initially installed in the subdivision and used to provide data for the initial permit application (MSE-HKM 2000, 2007, and 2008). For the purposes of this renewal, those wells haven't been identified on a map or directly used to establish ambient ground water conditions. The 2013 Application indicated that 8 monitoring wells were initially installed in the subdivision and 5 residential wells were used to assess the characteristics of ground water beneath the undeveloped subdivision (MSE-HMK 2000).

The following appears to be the other well at the plant and is used as the non-potable water source for the waste water treatment plant.

MONTANA WELL LOG REPORT

Site Name: UELAND OLE
GWIC Id: 49388

Section 7: Well Test Data

Total Depth: 25
Static Water Level:
Water Temperature:

Section 1: Well Owner(s)
1) UELAND, OLE (MAIL)
N/A
N/A N/A N/A [10/22/1999]

Unknown Test Method *

Section 2: Location

Township	Range	Section	Quarter Sections	
02N	07W	15	SW¼	SE¼ SE¼
County			Geocode	
SILVER BOW				
Latitude	Longitude	Geomethod	Datum	
45.917626	112.450016	TRS-SEC	NAD83	
Ground Surface Altitude		Method	Datum	Date
5616				
Addition		Block	Lot	

Yield 6 gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 8: Remarks

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)
Lithology Data

Section 5: Well Completion Date

Date well completed: N/A

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	0	6				

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Name:
Company:
License No:-
Date
Completed:

APPENDIX IV

Characteristics and Ground Water Quality Summary

Table 5

Ambient Ground Water Quality at MW1 (prior to Wastewater Treatment Plant going online)									
Homestake Meadows Phase II Wastewater Treatment Plant									
Parameter	Analyses	Units	Location	Minimum Value	Average Value	Maximum Value	RL⁽⁶⁾	# of Samples	Source of Data
Chloride (as Cl)	NR	mg/L	MW1	1.88	30.43	75.00	1.00	9	Lab , DMR ⁽³⁾⁽⁴⁾⁽⁵⁾
<i>Escherichia coli</i> Bacteria	NR	CFU ⁽¹⁾ / 100ml	MW1	NR	NR	1	1.00	9	Lab , DMR
Nitrogen, Nitrite + Nitrate (as N)	Total	mg/L	MW1	0.331	1.069	1.95	0.02	5	Lab
Nitrogen, Total Kjeldahl Nitrogen	NR	mg/L	MW1	0.067	0.447	1.41	0.15	8	Lab , DMR
Specific Conductivity @ 25°C	NR	µS/cm	MW1	193.7	329.5	528.0	1.00	9	Lab , DMR

Footnotes:

- 1) CFU = Colony Forming Units
- 2) Lab: Data was taken from laboratory data provided in the 2013 permit application.
- 3) DMR = Self Reported Discharge Monitoring Reports
- 4) Lab, DMR: The data reported above was taken primarily from the Permit Application dated 10/25/2013 as compiled on Section K - Ground Water Characteristics pg. 5 of 13. The analytical data provided in the Application for MW1 was collected between 12/31/2013-06/30/2015. The values presented on the table above are a hybrid of the supplied data and is an attempt to better represent the ground water at MW1.
- 5) NR = Not Reported
- 6) RL = Laboratory analyte reporting limit. The RL values on the table above come from the lab analytical data report for sample collected on 07/01/2013.

Refer to Section II of the Fact Sheet for the existing or proposed location of the monitoring wells.

(Citation, 2013) Form GW-1 Section K, and supplemental application materials.

Historically, MW1 represented background (ambient) receiving (shallow) ground water quality. Currently it represents water quality downgradient from the effluent outfall (EFF-001).

DMR Data was taken from the data that was self-reported from 12/2013-06/2015.

Ground water beneath this site is present as a shallow unconfined water table aquifer. The ground water beneath this site is considered to be Class I ground water (based on a low specific conductance stipulated in the ARM 17.30.1006 (1)(a)). The typical depth to water below the surface is between 25-42 feet across the subdivision. The static water level in MW1 at the time of drilling in 2010 was 27 feet. Shallower ground water was reported by HKM consultants for the initial permit and the application as between 3-42 feet, with the shallower water reported in the south and western lowland portion of the subdivision. Note

that there were several monitoring wells used for the initial permit application. These wells are not being considered directly for this permit renewal. The unconfined aquifer is present within the granite, which means that ground water flow is through the open joints and fractures in the bedrock. The slope of the water table indicates that ground water flows to the southwest with an estimated gradient of 0.05 feet/foot. The hydraulic conductivity of the aquifer was estimated as 8.71 feet/day. A summary of some of the relevant hydrogeologic information is found in Table 6 below. The MSE-HKM Engineering Hydrogeologic Investigation Report was used in developing the original (2008) and most recent (2013) permit application.

Table 6

Ground Water & Dilution Area Information @MW1 Homestake Meadows Phase II		
Parameter	Units	Value
Mixing Zone Type	-	No Mixing Zone Required
Authorized Parameters	-	Total Nitrogen
Ambient Ground Water Concentrations (Total N)	mg/L	1.52
Ground Water Flow Direction	Azimuth / bearing	S34.7°W
Length of Effluent Dilution Area / Mixing Zone	feet	500
Static Water Level (at MW1 in the Dilution Area). The unconfined aquifer is primarily within the shallow bedrock	feet	27
Depth to Bedrock ⁽¹⁾	feet	5
Hydraulic Conductivity (K) ⁽³⁾	feet/day	8.71
Hydraulic Gradient (I)	ft/ft	0.050
Distance to Nearest Surface Water (Blacktail Creek to the south)	feet	800

Footnote:

Much of this data was derived from pump tests performed prior to the initial permit submittal (2008) and before the treatment system came on line (2013).

The total nitrogen values presented here came from the table in Appendix IV, Ambient Ground Water Quality at MW1.

- 1) The depth to competent bedrock is variable across the site. The value listed above is the depth to bedrock at MW1.
- 2) Measuring point (point of reference) for SWL measurements shall be from top of casing and measured to within 1/100th of one foot.
- 3) This K value was derived from information provided in the 2008 and 2013 application materials. The K value appears to originate with the MSE-HKM Engineering ground water investigation and the resulting Hydrogeologic Report, 2000.

APPENDIX V

Mixing Zone Rational

A mixing zone was not authorized for this wastewater discharge for the previous permit cycle. The Montana Water Quality Act (75-5-103 Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. Mixing zones are subject to the conditions imposed by DEQ and consistent with the rules adopted by the Board of Environmental Review (Board).

The applicant requested a mixing zone in the permit application renewal submittal (DEQ 2013). A mixing zone for the proposed discharge was not authorized by DEQ in the 2009 permit and will not be authorized for this permit (2016). In determining whether a mixing zone is applicable for a proposed discharge, DEQ notes the following site specific conditions:

- Potential limiting conditions such as shallow unconfined bedrock (ARM 17.30.517(1)(a));
- The reported low volume of ground water available may not provide for dilution (ARM 17.30.506); and
- The need to accurately estimate the anticipated concentration of pollutants at the downgradient boundary of the mixing zone (which may require considerable site characterization)(ARM 17.30.517(1)(c).

DEQ has determined that based on site specific conditions listed above and DEQ's consideration assessment of the following:

- General considerations in designation of a mixing zone (ARM 17.30.505);
- Water quality assessment for ground water mixing zones (ARM 17.30.506); and
- Specific restrictions for ground water mixing zones (ARM 17.30.508).

DEQ will not be establishing a mixing zone for the current or proposed discharge in this permit cycle.

APPENDIX VI

Rationale For Proposed Discharge Limitations And Conditions

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715.

A. Water Use Classification & Applicable Water Quality Standards

The receiving water is Class I ground water and high quality waters of the state (75-5-103 MCA). The quality of Class I ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006):

- Public and private water supplies;
- Culinary and food processing purposes;
- Irrigation;
- Drinking water for livestock and wildlife; and,
- Commercial and industrial purposes.

Persons may not cause a violation of the following specific water quality standards in Class I ground water, pursuant to ARM 17.30.1006, except within a DEQ approved mixing zone as provided in ARM 17.30.1005:

- The human health standards for ground water listed in Circular DEQ-7;
- For concentrations of parameters for which human health standards are not listed in DEQ-7, no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class I water. DEQ may use any pertinent credible information to determine these levels; and,
- No increase of a parameter that causes a violation of the nondegradation provisions of 75-5-303, MCA.

The nondegradation rules (ARM 17.30.701, et seq.) implement Montana's nondegradation policy, which applies to any activity of man resulting in a new or increased source which may cause degradation (ARM 17.30.705). In accordance with ARM 17.30.706, DEQ is required to determine whether a new or increased source may cause degradation or whether it is nonsignificant according to ARM 17.30.715.

DEQ performed a significance determination for the proposed activity as part of permit development (DEQ, 2008). The determination established that the proposed discharge is a new or increased source (ARM 17.30.702) because it is an activity resulting in a change of existing water quality occurring on or after April 29, 1993. Discharges in compliance with the nondegradation-nonsignificance criteria established within this permit, constitute nonsignificant degradation. The applicable ground water standards pursuant to ARM 17.30.1006 and the nondegradation-nonsignificance criteria at ARM 17.30.715 for the identified parameters are summarized in the table below and will be used as the basis for developing effluent limitations in the permit.

Table 7

Applicable Ground Water Quality Standards.					
Parameter ⁽¹⁾	Units	17.30.1006(1)(b)(i) Human Health Standards - Ground Water	17.30.1006(1)(b)(ii) Beneficial Uses - Ground Water	Pollutant Category ⁽²⁾	17.30.715 Nondegradation - Nonsignificance Criteria ⁽⁴⁾
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	-	T	7.5
Nitrogen, Total (TN)	mg/L	-	10.0	T	7.5
Phosphorus, Total Inorganic	-	-	-	H	Surface water breakthrough time greater than 50 years ⁽³⁾⁽⁴⁾

Footnotes:

CFU = Colony Forming Unit

These standards establish the maximum allowable changes in ground water quality and are the basis for limiting discharges to ground water, ARM 17.30.1005(1); Circular DEQ-7 (2012), Footnote 16; and **ARM 17.30.715(1)(d)**.

- 1) Includes known pollutants and parameters of concern only.
- 2) Circular DEQ-7 (2012): Carcinogen (C), Harmful (H), and Toxic (T) parameter. Toxic pollutant with a Bioconcentrator (B) factor.
- 3) Changes in receiving ground water quality are not significant if water quality protection practices approved by the DEQ have been fully implemented and if the listed nonsignificance criteria is met.
- 4) Discharges in compliance with the nondegradation significance criteria constitute nonsignificant degradation.

B. Pollutants and Parameters of Interest (POI)

In the 2008 and this current Fact Sheet, DEQ identified pollutants and parameters of interest (POI's) for the proposed discharge based on the following:

- Reported effluent characteristics (Section II,D and Appendix II of this Fact Sheet);
- Water quality standards (Table 7 above);
- Water use classification of the receiving ground water (Appendix III, IV, and VI); and
- US EPA reference documents (Appendix IX).

Each POI is further discussed below.

C. Development of Effluent Limits

ARM 17.30.1006 and 17.30.715 set forth the basis for developing effluent limitations that will protect water quality. The ground water quality standards establish the maximum allowable changes to ground water quality; are the basis for limiting discharges to ground water; and may only be exceeded within a mixing zone authorized by DEQ.

1) Water Quality Based Effluent Limitations

a) *Escherichia coliform* Bacteria

The applicant has applied for and received plan and specification review by DEQ Public Water Subdivision Bureau - Plan Review. The WWTP does include a UV disinfection unit designed to treat bacteria. The WWTP system discharges treated

wastewater through subsurface pressure dosed discharge structures. The system has reported low counts of bacteria within the treated at Outfall 001 (Table 3 in Appendix II). Therefore an effluent limit will not be established in this permit for bacteria.

b) Nitrogen

To protect beneficial uses (ARM 17.30.1006(1)(b)(ii)), there shall be no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses. DEQ will establish the effluent limitations for nitrogen based on the projection that the entire nitrogen load in the wastewater stream will ultimately be converted to nitrate (US EPA 2002a).

To protect beneficial uses (ARM 17.30.1006(1)(b)) and with little available dilution (Appendix VI), the most restrictive of the ground water human health standards and nondegradation nonsignificant criteria will be used as the effluent limitation. The effluent limitation for nitrogen is displayed within Section IV.

c) Phosphorus

Phosphorus levels in surface waters are measured as total phosphorus (as P). As such, any permit condition regarding phosphorus and its potential effect on surface water will be measured as total phosphorus. Phosphorus in wastewater discharged to the subsurface is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the load of phosphorus from the wastewater source between the discharge point and the closest downgradient surface water.

A phosphorous breakthrough analysis was conducted by DEQ (DEQ, 2008) using information provided by the applicant, submitted as part of permit application materials. The limiting layer depth was originally based on data collected from on-site monitoring wells scattered around the area of the WWTP. Bedrock in these wells was encountered from 5-30 feet below ground surface. Bedrock in MW1 was found at 5 feet below ground surface. Static water levels in area wells were measured between 25-42 feet deep. The static water level in MW1 was measured at the time of drillings as 27 feet below ground surface.

The design capacity for the treatment system is based on the reported maximum daily flow of the treatment system which is 23,800 gpd. This is the maximum flow that the system is permitted to discharge for this MGWPCS permit (DEQ, 2009). Since going on line in 2012 the permittee has been reporting actual effluent characteristics to DEQ. The self-reported effluent average for phosphorus concentrations were 4.21 mg/L or 0.015 lbs/day (Table 3 in Appendix II). The actual average phosphorus loads being discharged is close to, but lower than, the 4.8 mg/L (0.9534 lbs/day) which was originally projected (DEQ 2008).

DEQ took a conservative approach in this analysis and used Blacktail Creek as the potential receiving surface water body (DEQ, 2008). In use of the most conservative data, the phosphorus breakthrough analysis indicated that phosphorous discharged

to ground water would not reach the ditch from Outfall 001 in a significant amount of time (DEQ, 2008). At the proposed discharge rate the phosphorous breakthrough is expected to occur in 80 years. The 2009 permit established an effluent limit in order to maintain the 50-year breakthrough. This limit will be maintained within this proposed renewal. It is to be noted, that updated site specific information received since 2013 shows that the original determination was reasonably accurate and sufficiently conservative to protect surface water.

D. Final Effluent Limitations

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402, MCA and ARM 17.30.1031, DEQ proposes the following numerical effluent limitations.

The proposed final limitations are the most stringent applicable limitations for each individual parameter as developed above. Effluent limits based on water quality standards are expressed as a daily maximum concentration. The proposed final effluent limits are listed in Section IV.

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715. The bases for deriving and establishing effluent limitations are further discussed in Appendix VI. Based on the information and analyses presented in Sections III and IV, pursuant to ARM 17.30.1031, DEQ proposes numerical effluent limitations for the following parameter:

Table 8

Final Effluent Limits – Outfall 001				
Homestake Meadows Phase II Wastewater Treatment Plant				
Parameter	Units	Effluent Limitations		Rationale
		Daily Maximum⁽¹⁾	Annual Maximum⁽¹⁾	
Nitrogen, Total (as N)	mg/L	7.5		Nondegradation Nonsignificance Criteria 715(1)(d)(iii) MCA
Phosphorus, Total (as P)	lbs/year		348.0	Nondegradation Significance Criteria ARM 17.30.715(1)(e)

Footnotes:

Beneficial Uses: ARM 17.30.1006

(1) See definition in Part V of permit.

APPENDIX VII

Phosphorus Breakthrough Analysis

A phosphorous breakthrough analysis conducted by DEQ in 2008 (DEQ 2008) estimated the phosphorous breakthrough to occur in 80 years (which is greater than 50 years). A phosphorus breakthrough that would occur within 50 years would be considered significant (ARM 17.30.715). The 2009 permit established an effluent limit in order to maintain the 50-year breakthrough. This 2009 effluent limitation will be maintained within this proposed permit renewal. Refer to Appendix VI for more background on this analysis.

APPENDIX VIII

Rationale for Monitoring And Reporting Requirements

ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and the water quality standards. Effluent monitoring and ground water monitoring requirements will be required as conditions of this permit.

A. Effluent Monitoring - Compliance

Final numeric effluent limitations are developed for this permit with specific magnitudes and durations based on site-specific conditions that ensure the discharge will not cause or contribute to an exceedance of an applicable water quality standard (see Sections III and IV). Accordingly, the permittee will be required to monitor and report monitoring results at a specified frequency in order to demonstrate compliance with the applicable effluent limitations. Effluent monitoring and reporting requirements are summarized in the table below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

B. Effluent Monitoring - Sampling Location

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). The location of the effluent sample tap (EFF-001) is depicted on a System Line Drawing on Figure 4. The flow meter (FM-001) and sampling tap (EFF-001) for the effluent stream are both inside the Control Building and are located along the line before the effluent leaves the Control Building and enters the Dose Tank (see the Line Drawing on Figure 4). The rationale for sampling are further discussed in Section V of this document and effluent sampling and reporting requirements are discussed in Table 9.

C. Discharge Monitoring

Measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant is required to install, maintain, and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow (Permit Part II.B.). The flow meter (FM-001) (like the sampling tap (EFF-001)) for the effluent stream is inside the Control Building. The location of the effluent sample tap is described on a System Line Drawing on Figure 4. Flow monitoring and reporting requirements are summarized in Table 9.

Table 9

Effluent Monitoring and Reporting Requirements – Outfall 001							
Homestake Meadows Phase II Wastewater Treatment Plant							
Parameter /Method	Monitor Location^{(1) (2)}	Units⁽⁸⁾	Sample Type^{(3) (7)}	Minimum Sample Frequency	Reporting Requirements⁽⁴⁾⁽⁵⁾ _{(8) (9)}	Report Frequency⁽¹⁰⁾	Rationale
Flow Rate, Effluent ⁽⁶⁾	FM-001	gpd	Continuous	Continuous	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Biological Oxygen Demand (BOD)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement & Effluent Characterization
Nitrogen, Nitrite + Nitrate (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total Kjeldahl (TKN)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total (as N) ⁽⁶⁾	EFF-001	mg/L	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
	EFF-001	lbs/day ⁽⁸⁾	Calculate	1/Quarter	Daily Maximum ⁽⁹⁾ Quarterly Average ⁽¹⁰⁾	Quarterly	
Phosphorus, Total (as P)	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Permit Compliance
	EFF-001	lbs/day ⁽⁸⁾	Calculate	1/Quarter	Quarterly Average ⁽¹⁰⁾	Quarterly	
	EFF-001	lbs/year ⁽¹¹⁾	Calculate	1/Year	Annual Maximum ⁽¹²⁾	Annually ⁽¹³⁾	
Chloride	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance

Footnotes:

- 1) FM-001 = Effluent flow meter located in Control Bldg. just before effluent leaves blg. and before the 6000 gal. Dose Tank.
- 2) EFF-001: Effluent sample site located in Control Bldg. just before effluent leaves blg. and before the Dose Tank.
If no discharge occurs during the reporting period, “no discharge” shall be recorded on the effluent DMR report forms.
- 3) Grab sample will represent concentration for a 24 hour period.
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.
- 4) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.
- 5) Daily Minimum: Report lowest measured daily value for the reporting period on Discharge Monitoring Report (DMR).
The geometric mean must be reported if multiple samples are taken during a reporting period.
Recording device or totalizing meter must record daily effluent volume.
- 6) Requires recording device or totalizing meter, must record daily effluent volume.
- 7) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
- 8) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶].
- 9) Daily Maximum Load calculation: lbs/day=the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
- 10) Quarterly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
- 11) Annual Load calculation: lbs/year = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶] x 365 (days/year)..

- 12) Annual Load calculation: lbs/year = the total average of all calculated individual daily average loads (lbs/day) recorded during the calendar year, multiplied by 365 (days/year).
- 13) Annual maximum load shall be reported on an annual basis on the DMR (due January 28 each year of the permit cycle).

D. Ground Water Quality Monitoring

Ground water monitoring and reporting requirements are summarized in the table below.

Table 10

Ground Water Monitoring and Reporting Requirements							
Homestake Meadows Phase II Wastewater Treatment Plant							
Parameter /Method	Monitor Location⁽¹⁾ (8)	Units⁽²⁾	Sample Type⁽⁴⁾	Minimum Sampling Frequency	Reporting⁽⁷⁾ Requirements	Reporting Frequency	Rationale
Chloride (as Cl)	MW1	mg/L	Grab	1/6 months	6-Month Average	Biannually	Current Permit Requirement
<i>Escherichia coli</i> Bacteria	MW1	CFU /100 ml ⁽³⁾	Grab	1/6 months	Daily Maximum	Biannually	Permit Compliance
Nitrogen, Nitrate + Nitrite (as N)	MW1	mg/L	Grab	1/6 months	Daily Maximum 6-Month Average	Biannually	Effluent Characterization
Nitrogen, Total Kjeldahl (TKN)	MW1	mg/L	Grab	1/6 months	Daily Maximum 6-Month Average	Biannually	Effluent Characterization
Specific Conductivity @ 25°C	MW1	µS/cm	Grab or Instantaneous	1/6 months	Daily Maximum 6-Month Average	Biannually	Effluent Characterization
Static Water Level (SWL) ⁽⁵⁾⁽⁶⁾	MW1	ft-bmp ⁽⁵⁾	Instantaneous	1/6 months	Daily Maximum 6-Month Average	Biannually	Permit Compliance

Footnotes:

- 1) MW1 is the monitoring well located downgradient from the drainfield. Refer to Figures 2 and 3.
- 2) See definitions in Part V of the permit.
- 3) CFU = Colony Forming Units
- 4) Grab sample will represent concentration for a 24 hour period.
- 5) Measuring point (point of reference) for SWL measurements shall be from top of casing and measured to within 1/100th of one foot.
- 6) Refer to Figures 1, 2, & 3, and Appendix 3 of the Fact Sheet for the existing location of the monitoring well.
- 7) Submittal of DMRs will be required, regardless of the installation status of each individual monitoring well. If the monitoring well is not installed for an individual monitoring period, the following shall be stated upon each applicable DMR: “monitoring well has not been installed”.

At no time shall the permittee mark or state “no discharge” on any monitoring well DMR form.

The monitor well to be individually sampled and analyzed for each respective parameter listed above.

If any monitoring well(s) are abandoned, destroyed or decommissioned, or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install a new well to replace the abandoned, destroyed, decommissioned, or non-viable well(s).

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.

APPENDIX IX

References Cited

40 CFR § 136 – *Guidelines Establishing Test Procedures for the Analysis of Pollutants*. 2011.

Administrative Rules of Montana, Title 17, Chapter 30, *Water Quality*:

- Subchapter 2 - Water Quality Permit Fees.
- Subchapter 5 – Mixing Zones in Surface and Ground Water.
- Subchapter 7 – Nondegradation of Water Quality.
- Subchapter 10 – Montana Ground Water Pollution Control System.
- Subchapter 13 – Montana Pollutant Discharge Elimination System.

Department of Environmental Quality, *Water Quality Circulars*:

- Circular DEQ-2 – Design Standards for Wastewater Facilities.
- Circular DEQ-4 – Montana Standards for On-Site Subsurface Sewage Treatment Systems.
- Circular DEQ-7 – Montana Numeric Water Quality Standards, Required Reporting Values, and Trigger Values.

Montana Code Annotated, Title 75, Chapter 5, *Montana Water Quality Act*, 2011.

Fetter, C.W., *Applied Hydrogeology*, 1994.

Freeze, R., and Cherry, J., *Groundwater*, 1979.

Kendy, E. and R.E. Tresch. 1996. *Geographic, Geologic, and Hydrologic Summaries of Intermontane Basins of the Northern Rocky Mountains, Montana*. USGS Water-Resources Investigations Report: 96-4025.

Montana Bureau of Mines and Geology, *Ground-Water Information Center*, Retrieved November, 2014, from the GWIC database, <http://mbmaggwic.mtech.edu>.

Montana Department of Environmental Quality. 2008 & 2013. *Administrative Record of Montana Ground Water Pollution Control System (MGWPCS) permit application and supplemental materials*, and the original permit (2009), Homestake Meadows Phase II WWTP, MTX000204.

Montana Department of Environmental Quality, *Compliance Evaluation Inspection Report* 12 July 2010, Homestake Meadows Phase II WWTP, MTX000204. Inspection Date was 22 June 2010.

Montana Department of Environmental Quality, *Environmental Assessment*, Homestake Meadows, December 2008.

Montana Department of Environmental Quality, *Environmental Assessment*, Homestake Meadows, DRAFT-unsigned 2008.

Montana Department of Environmental Quality, *Nitrate Sensitivity Analysis* 2007.

Montana Department of Environmental Quality, *Phosphorus Breakthrough Analysis* 2007.

MSE-HKM Engineering, *MGWPCS Permit Application submitted to DEQ* 28 August 2007.

MSE-HKM Engineering, *MGWPCS Supplemental Permit Application Materials received by DEQ* 08 May 2008.

MSE-HKM Engineering, *Homestake Meadows Major Subdivision Hydrogeologic Investigation*, 04 May 2000. Homestake Meadows Phase II WWTP, MTX000204

Territorial Land Works, Inc., *MGWPCS Permit Application* submitted to DEQ 23 October 2013.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. *National Cooperative Soil Survey*. Retrieved from <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>, November, 2010.

U.S. Environmental Protection Agency, *Effluent Limitation Guidelines*, <http://water.epa.gov/scitech/wastetech/guide/>, 2013.

U.S. Environmental Protection Agency, *Guidance Manual for Developing Best Management Practices* <<http://www.epa.gov/npdes/pubs/owm0274.pdf>>, 1993.

U.S. Environmental Protection Agency, *NPDES Permit Writers' Manual*, 833-K-10-001, September 2010.

U.S. Environmental Protection Agency, *Nitrification*, 625/R-00/008, Office of Ground Water and Office of Water. 2002a.

U.S. Environmental Protection Agency, *Onsite Wastewater Treatment Systems Manual*, 625/R-00/008, Office of Research and Development and Office of Water. 2002b.

U.S. Environmental Protection Agency, 1991. *Technical Support Document for Water Quality-Based Toxics Control (TSD)*. EPA-505/2-90-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. <www.epa.gov/npdes/pubs/owm0264.pdf>.

Woessner, W., Troy, T., Ball, P. and D.C. DeBorde. 1998. *Virus Transport in the Capture Zone of a Well Penetrating a High Hydraulic Conductivity Aquifer Containing a Preferential Flow Zone: Challenges to Natural Disinfection*. In Proc. Source Water Protection Int., Dallas, TX. 28–30 Apr. 1998. National Water Research Inst., Fountain Valley, CA.

This Fact Sheet was Prepared By: Jeffrey Frank Herrick
Permit Writer
Water Protection Bureau
Montana Department of Environmental Quality.
April 2016.