

**MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY**

Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

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

Applicant: Red Creek Sewer Inc.

Permit Number: MTX000119

Facility Name: Red Creek Ranch Waste Water Facility

Facility Location: T12S, R4E, NW1/4, NE 1/4 Section 11
Gallatin County, MT
44.80892, -111.20131

Facility Address: Red Creek Ranch
16990 Hebgen Lake Road
West Yellowstone, MT 59758

Facility Contact: Marsha Phillips
President Red Creek
2159 C 700 East, #200
Salt Lake City, UT 84106

Receiving Water: Class I Ground Water

Number of Outfalls: One

Outfall/Type: Conventional septic tank treatment with force main to six siphon dosing tanks discharging to groundwater through conventional gravel trenches.

I. PERMIT STATUS

The following fact sheet outlines the basis for renewing a MGWPCS wastewater discharge permit to Red Creek Sewer Inc. (formerly Red Creek Ranch, LLC) for the Red Creek Sewer Inc. wastewater facility located on Highway 287 north of Hebgen Lake, north of the town of West Yellowstone, Montana. 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.

The Red Creek Sewer Inc. facility was originally permitted July 1, 2001. The permit was renewed in 2006 and discussion began in 2006 regarding nitrification problems in the system. The applicant recognized the issue and indicated that Level II treatment was planned (Hyalite Engineering May 2006) as the system added hookups. In an August 23, 2007 inspection report, Pat Potts of DEQ stated that the system was not meeting the TIN (total inorganic nitrogen) limit of 54 mg/L. She also noted that sampling was being reported incorrectly and that the effluent was not domestic in nature as required by DEQ. Examination of 2005, 2006, and 2014 sampling records for the RV park indicates that this part of the system was discharging high-strength waste (greater than 300 mg/L BOD₅) which by DEQ Circular 4 may require pre-treatment. The renewal in 2006 changed the limit to 54 mg/L TN (total nitrogen).

This facility is subject to the Montana Nondegradation Policy (75-5-303, MCA) and the Administrative Rules of Montana (ARM 17.30.701, et seq.). A nondegradation significance review was completed as part of the review process for the original permit and the discharge was determined to be non-significant. Based on the information provided in the permit renewal application (GW-1), no new or increased source of pollutants is proposed [ARM 17.30.702(18)].

This development was subject to review and approval under the Montana Sanitation in Subdivision Act. The applicant submitted plans and specifications for review and received Department approval through EQ#97-2517, EQ#99-1301, EQ#99-2262, EQ#02-2199, EQ#02-2662, and EQ#05-2213.

A. Application Information

Red Creek Sewer Inc. is an active registered business entity with the State of Montana. The original permit for this facility was effective from June 1, 2001 to May 31, 2006. The renewed permit was issued on July 24, 2009 (effective on September 1, 2009) and expired on August 31, 2014. The permittee submitted a permit application for renewal on February 27, 2014. The Department requested supplemental fees on March 5, 2014. The applicant responded with additional fees on March 18, 2014. The application was determined to be complete on March 26, 2014 and the permit was administratively extended.

B. Permit Changes

This facility is currently operating under the extended July 24, 2009 permit (MTX000119). The applicant name has been changed from Red Creek Ranch User's Association. The applicant is now doing business as Red Creek Sewer Inc. A permit transfer was received and processed by the Department on March 7, 2016.

This renewal includes new nitrogen limits and additional monitoring and sampling requirements. Nitrogen limits have been changed from 54 mg/L to 50 mg/L to reflect regulatory changes. Downgradient monitoring has been expanded to include a second well, and effluent monitoring has been expanded to include three additional locations in order to assess the character of the effluent more accurately. More information on these changes can be found in Appendix V and Appendix VII of this Fact Sheet.

C. Compliance History

The Red Creek wastewater facility has had three exceedances of their total nitrogen limit of 54 mg/L between 5/31/2013, and 10/31/2015. Other violations have been issued for non-reporting of DMRs to DEQ.

Although the Red Creek system is usually operating within its nitrogen limits, DEQ has concern regarding the quality of the treatment the effluent is receiving. Sampling indicates ammonia levels are high due to a lack of nitrification in the treatment system. Discussions with the operator regarding the treatment of the Red Creek Ranch effluent and the challenges of this particular system to handle recreational vehicle waste with a seasonally operated conventional treatment system began with the 2006 permit renewal. See Section II.B. below for more operational information.

II. FACILITY INFORMATION

A. Facility Location

This facility is located north of West Yellowstone, Montana on Highway 287 north of Hebgen Lake, Gallatin County Montana.

B. Facility and Operations

The Red Creek Sewer Inc. wastewater treatment system serves a recreational community consisting of commercial retail, rental cabins, a recreational vehicle park and marina on the north-shore of Hebgen Lake.

Facilities served include the Yellowstone Holiday Resort and Marina (YHRM) consisting of a main "facilities" building/complex with a store and a laundry, 10 cabins, and a recreational vehicle (RV) park with a total of 35 RV spaces. An occupancy limit of 68 families with 3 people per family-unit was used in the previous permits and will be used in this permit renewal. The system consists of gravity collection to two concrete 4000-gallon septic tank effluent pumps (STEP tanks) and one fiberglass 6,000 gallon septic tank and pump. These tanks pump through a low pressure force main to six drainfields fed by six siphon-dose

tanks. Effluent sampling is done prior to splitting the effluent to the six dose tanks. Both EFF-001 and FM-001 are at this stage of the operation.

Table: 1

Collection, Treatment, and Disposal System Summary, Red Creek Ranch	
Outfall 001 - Domestic Wastewater/Sewage	
Method of Disposal: Infiltration to ground water	
Disposal Structure: Subsurface Drainfields (Outfall 001) NW1/4, NE1/4, Section 11, 12S, 4E Latitude: 44.809044 ; Longitude: -111.201390	
Contributing Sources: Yellowstone Holiday Marina and Resort, Yellowstone Holiday Marina Cabin Sites, Yellowstone Holiday Marina RV	
Average Daily Design Flow (gpd): 9,400 (ft ³ /day): 1,256	Daily Maximum Design Flow (gpd): 39480 (ft ³ /day): 5,277
Current effluent Sampling Location: EFF-001: Effluent sampling is done at the splitter valve prior to dose tanks (see Figure 2).	
Proposed Effluent monitoring location: EFF-002: Effluent sampling done at RV East STEP Station (see Figure 2).	
Proposed Effluent monitoring location: EFF-003: Effluent sampling is done at YH Marine Cabin Site STEP Station (see Figure 2).	
Proposed Effluent monitoring location: EFF-004: Effluent monitoring done at the Facility Building YHM&R STEP Station (see Figure 2).	
Flow Monitoring Equipment: Totalizing Flow meter located in vault prior to splitter valve (see Figure 2).	
Flow Monitoring Location: FM-001 Located in the monitoring and diversion vault at the end of the low pressure main (see Figure 2).	
Treatment: Level I treatment via two 4000-gallon septic tanks and one 6,000-gallon septic tank pumping to 6 siphon dosing tanks to 3000 lf. of 36-inch gravel infiltration trench.	

C. Effluent Sampling Location

Effluent samples have been taken at EFF-001 located prior to splitter valve. Additional effluent monitoring locations are being added to the conditions of this permit renewal. Sampling requirements are further discussed in Section V. See Table 1 and Figure 2 for location of EFF-002, EFF-3 and EFF-004.

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 provided effluent quality data for Outfall 001 as summarized within Appendix I.

E. Geology

Red Creek Ranch is located approximately 12 miles northwest of the town of West Yellowstone, along Highway 287. Mount Hebgen (elevation 9,721 feet) lies to the north of the site. The south side of the property is bounded by the north shore of the Narrows Channel leading to the Grayling Arm (a shallow bay), that flows into Hebgen Lake. Red Canyon Creek is east of the property and the outfall. The creek forms a naturally terraced drainage from the topographically higher elevations (i.e., Mount Hebgen) down to the lakeshore.

Bedrock in the Red Canyon area consists of alternating layers of shale (Park Shale) and limestone (Meagher Limestone) of the Madison Formation resting on metamorphosed Precambrian rocks. The facility lies within the Madison River Canyon Earthquake Area. Structural geologic features in the Red Canyon area are evidence of warping and displacement from faulting, with major earthquake activity (20-foot displacement) as recent as 1959.

The thickness of the alluvial sediments increase (90 inches+) at the mouth of Red Canyon. Laterally, the fan deposits consist of a coalescence of multiple alluvial fans from the west and the east. The Red Canyon alluvial fan deposits are from the upper Red Canyon soils and subsoil material. The alluvium found in the lower/bottom of the canyon and in the fan at the mouth of Red Canyon Creek consists of loam and clay loam-textured soils. Test pits dug in the area of the subsurface drainfields prior to construction (BEI, 1998) support this depositional interpretation. On the north and northwest side of the drainfield area, test pit soil descriptions identified gravel with silt and sand as the predominant subsoils. Lenses of red sandy clay with gravel were also encountered. Percolation tests conducted on soils from approximately 2.5 to 3 feet below ground surface (bgs) ranged from 4 to 7 minutes per inch (mpi) on the north and northwest side of the drainfield area, to 10 to 20 mpi to the south.

Deeper soil penetrations conducted on the south side of the drainfield area identified a lean clay with sand and a trace of gravel from 8 to 9 feet bgs. This lean clay layer was also encountered and described in the boring log information for ground water monitoring well MW1. This deeper subsoil information suggests that the drainfield has been constructed over the lean clay zone.

F. Hydrogeologic Characteristics

Ground water reserves in this area are found within the surficial alluvial fill and the limestone bedrock. The canyon is drained by Red Canyon Creek, which flows along the east side of Mount Hebgen into the Grayling Arm.

The lower portions of the fan may contain water from the Grayling Arm of Hebgen Lake. The alluvial fan system formed by the creek is a mile long and two miles wide (MDHES, 1979). Ground water levels within the alluvium near the Grayling Arm of Hebgan Lake appear to be strongly influenced by water levels in the lake.

A “measured” hydraulic gradient at the site of 0.019 ft/ft to the S23°W was used in the previous permit.

A summary table is provided within Appendix IV.

G. Ground Water Monitoring Wells

Downgradient ground water monitoring is presently conducted at MW-1 at the downgradient edge of the mixing zone. An additional downgradient monitoring site (MW-2) is being required for this renewal period.

Information regarding these monitoring wells has been summarized and listed in Appendix II and Figure 2.

H. Ground Water Quality Characteristics

The ambient specific conductivity reported by applicant indicates the receiving water is Class I state water. Ground water quality results are summarized in Appendix III.

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. The applicant requested a standard mixing zone in the 2016 application. DEQ will be authorizing a mixing zone within this permit renewal. The mixing zone rationale is further discussed in Appendix IV.

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. 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 basis for deriving and establishing effluent limitations are further discussed in Appendix V. Based on the information and analyses presented in Sections III and IV, in pursuant to ARM 17.30.1031, DEQ proposes numerical effluent limitations for the following parameter:

A. Nitrogen

The nitrogen limit for this renewal is being changed from 54 mg/L to 50 mg/L in response to regulatory changes that do not account for the reduction of nitrogen under the drainfield. The applicant requested that the nitrogen limit for this facility be changed from a concentration based limit to a load based limit. DEQ is denying this request and will be keeping the nitrogen limit as a concentration based limit. Concentration based limits were established in 2009 and will be maintained in this renewal.

A nitrogen sensitivity analysis was conducted using current monitoring data (see Appendix V). The calculated nitrogen limit for Water Quality Based Effluent Limits (WQBELs) is 52.13

mg/L (DEQ). This Water Quality Based Effluent Limit is less stringent than the Definition Based Effluent limit of 50 mg/L.

Based on the information and analyses presented in Appendix V and pursuant to 75-5-402, MCA; DEQ proposes the following numerical effluent limitations. The proposed final effluent limitations are the most stringent applicable limitations.

Table: 2

Proposed Final Effluent Limits – Outfall 001			
Parameter	Units	Daily Maximum⁽¹⁾	Rationale
Nitrogen, Total (as N)	mg/L	50.0 (at EFF-001)	TN limits Renewal
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 monitoring and ground water monitoring requirements will be required as a condition of this permit. Monitoring requirements and rationale thereof is summarized in Appendix VII.

VI.SPECIAL CONDITIONS

In accordance with ARM 17.30.1031 this section contains the basis for special permit conditions that are necessary to assure compliance with the ground water quality standards and the Montana Water Quality Act. The following special condition(s) will be included in the permit.

A. Establish new down gradient monitoring well:

Applicant will establish a second down gradient ground water monitoring well. This well will be designated as MW-2. A report outlining the plan for the establishment and the monitoring of this monitoring well must be submitted to DEQ following the compliance schedule in Table 3 of this Fact Sheet. Monitoring parameters and reporting frequencies are included in Appendix VII.D. of this Fact Sheet. A summary of the special conditions for the establishment of MW-2 is included below.

1. As a condition of this permit renewal, the permittee will locate a second down gradient monitoring well (MW-2) from which to begin monitoring. Within 180 days of the effective date of this renewal, the permittee will submit to the Department for approval, a plan for the establishment of MW-2, and a brief summary of a monitoring, sampling and analysis plan for MW-2. The plan is to include the location and the monitoring, sampling and analysis methods that will be used to meet the monitoring required in this permit. This plan should include but not be limited to the requirements in Table 3 and 4 of the permit.
2. Within one year of the issuance of this permit, the applicant will supply to the Department the details of sampling well MW-2, including the final location, a well log or report containing well information on drilling methods used, borehole lithologic log, well construction details, elevation of measuring point, and the depth to the top contact of the first ground water bearing zone.
3. Within one year of the effective date of this permit, applicant will begin sampling MW-2 as approved by the Department.
4. The required sampling and reporting frequency for MW-2 is included in the compliance schedule in Table 3.
5. DEQ has the discretion to suspend monitoring of MW-2 at any time.

B. Establish new effluent monitoring locations EFF-002, EFF-003, EFF-004:

1. As a condition of this permit, within 180 days of the effective date of this permit, the applicant will submit a plan for the monitoring of effluent at EFF-002, EFF-003 and EFF-004. The plan is to include the location and the monitoring sampling and analysis methods that will be used to meet the monitoring required in this permit. This plan should include but not be limited to the parameter requirements in Table 2 of this permit.
2. Within one year of the effective date of this permit the applicant will begin sampling at EFF-002, EFF-003 and EFF-004 at the locations approved by the Department. Applicant will report monitoring data to the Department per the requirements in Part II of this permit. Respective sampling and reporting frequency for EFF-002, EFF-003 and EFF-004 are included in the compliance schedule in Table 2. Effluent samples must be representative of the nature of the monitored discharge.

C. Annual report:

- 1 As a condition of this permit, the applicant will provide to the Department an annual progress report documenting steps taken, and the effectiveness of these steps, toward the improvement of effluent quality at the Red Creek Sewer Inc. wastewater facility. This progress report will be due yearly on January 28th. See table 4 for implementation dates.

VII.COMPLIANCE SCHEDULE

A compliance schedule is included here to allow a reasonable opportunity for the permittee to attain or maintain compliance with permit requirements. The actions listed in Table 3. below must be completed on or before the respective scheduled completion date. A report documenting each respective action must be received by DEQ on or before the scheduled reporting date. Completion of all actions or deliverables must be reported to DEQ in accordance with Table 4 of the permit and Table 3 of this fact sheet.

Table 3

Compliance Schedule :				
Permit Condition	Action	Frequency	Scheduled Completion Date of Action⁽¹⁾	Scheduled Report Due Date.⁽²⁾
GROUND WATER MONITORING				
Part I. E.1.a.	Complete a plan for installation of or location of ground water monitoring well MW-2.	Single event	<i>Within 180 days of the effective date of the permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Part I.E.1.a.	Develop and a site specific Sampling and Analysis Plan (SAP) for monitoring and sampling the ground water at MW-2.	Single event	<i>Within 180 days of the effective date of this permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Part I. E.1.b.	Provide the Department with drilling details and well log for MW-2.	Single event	<i>Within one year of the effective date of this permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Part I.E.1.c.	Commence sampling and reporting of required parameters.	Single event	<i>Within one year of the effective date of this permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
EFFLUENT MONITORING				
Part I.E.2.a.	Develop (or update) and implement a revised facility, site specific effluent sampling plan. ⁽³⁾	Single event	<i>Within 180 days of the effective date of the permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Part I.E.2.b	Commence sampling and reporting required parameters at EFF-002, EFF-003 and EFF-004.	Single event	<i>Within one year of the effective date of this permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Part I.E.3.	Submit annual progress report recording steps taken toward the	Annual event	<i>Annually by on the 28th of January</i>	<i>Annually by the 28th of January</i>

	improvement of the effluent discharged from the Red Creek Ranch wastewater facility.			
Footnotes: (1) The actions must be completed on or before the scheduled completion dates. (2) Reports must be received by DEQ on or before the scheduled report due dates. The reports must include all information as required for each applicable action as listed in Part VI of Fact sheet. (3) The completed plan (action), in place of a written report, must be received by the DEQ on or before the scheduled "report" due date. (4) The written report documenting monitoring well installation and effluent monitoring must include details included in Part I.E.				

VIII.NONSIGNIFICANT DETERMINATION

DEQ has determined (DEQ, 2014) that the discharge constitutes a new source and is subject to Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.702). The applicable water quality standards for Class I ground water and nondegradation significance criteria are summarized in Appendix V. Discharges in compliance with the limitations of this permit constitute nonsignificant degradation. 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 **October 11, 2016** Comments may be directed to:

DEQWPBPublicComments@mt.gov

or at:

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 may 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). 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 DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000119), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, DEQ 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.

FIGURE 1-a Vicinity Map



FIGURE 2
Site Map

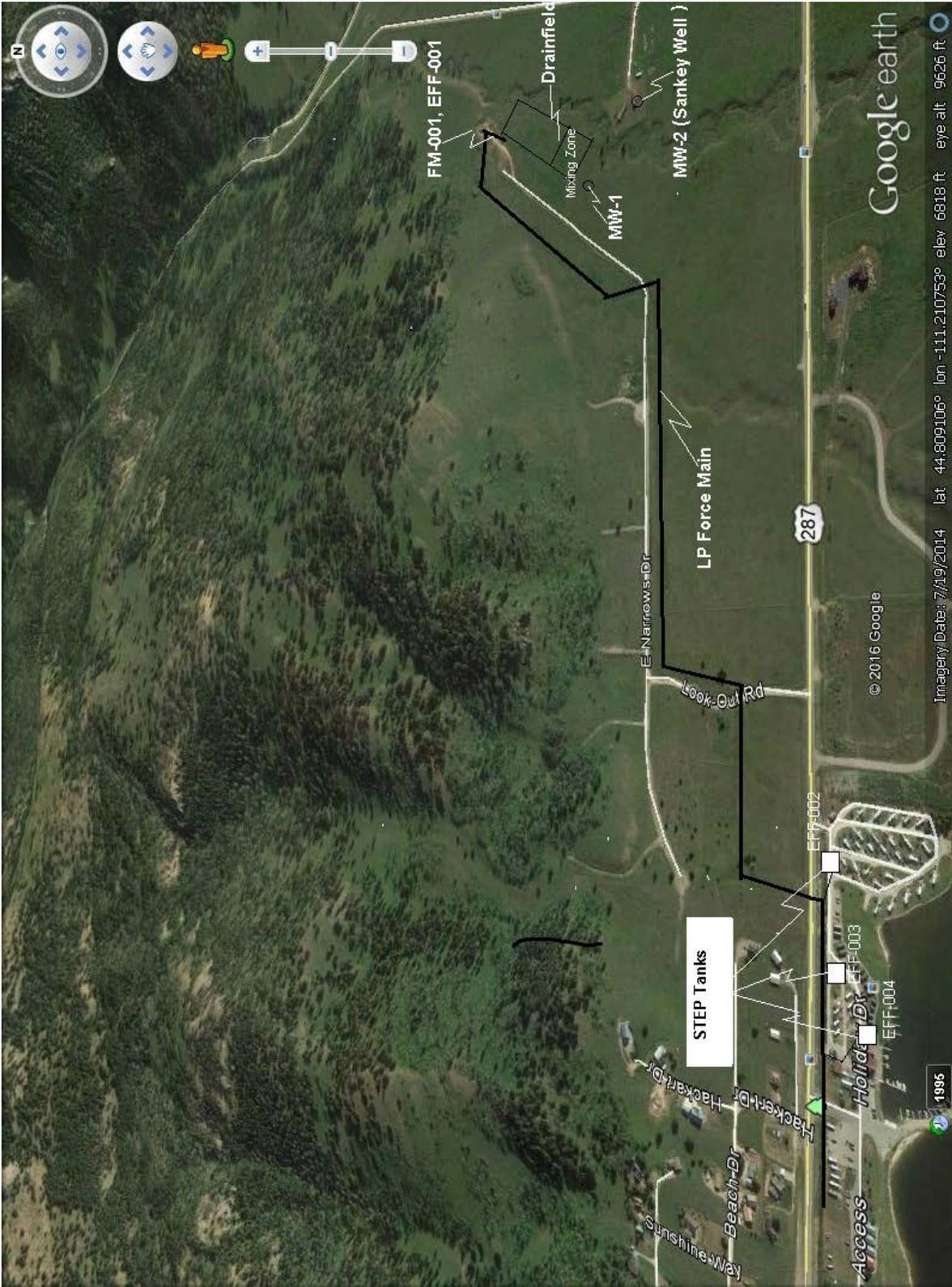
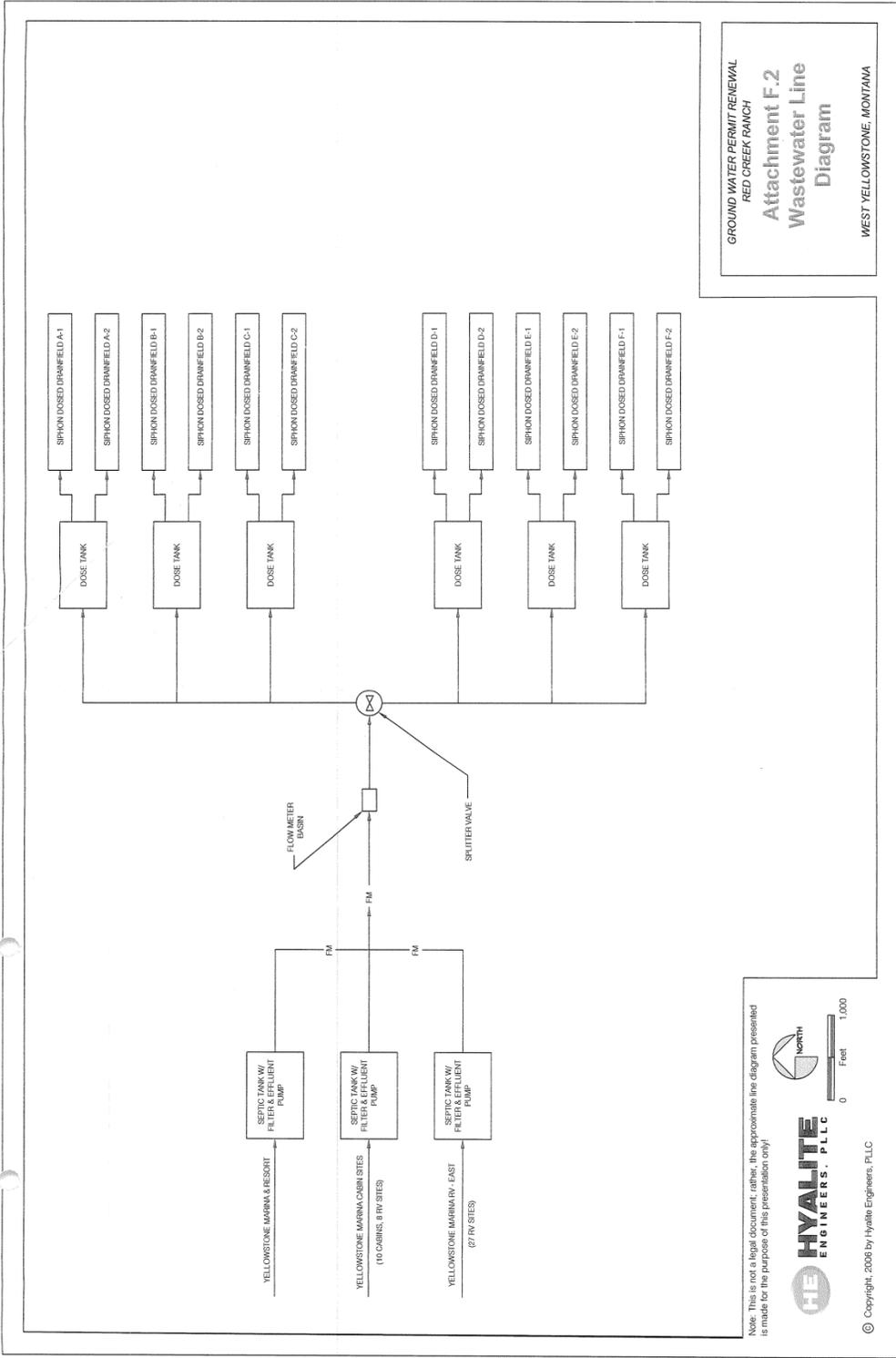


FIGURE 3
 Line Diagram



GROUND WATER PERMIT RENEWAL
 RED CREEK RANCH
Attachment F.2
Wastewater Line
Diagram
 WEST YELLOWSTONE, MONTANA

Note: This is not a legal document; rather, the approximate line diagram presented is made for the purpose of this presentation only!



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APPENDIX I - EFFLUENT QUALITY MTX000119

Effluent Quality – Outfall 001. Period of Record, 5/31/2013 - 2/29/2016, Red Creek Ranch								
Parameter⁽¹⁾	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum⁽²⁾ Value	# of Samples	Source of Data	2009 Permit Limit
Biochemical Oxygen Demand (BOD ₅)	EFF-001	mg/L	15.0	125.2	530.0	18	DMR	NA
Flow rate, Discharge	FM-001	gpd	2410	5547	9311	18	DMR	NA
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	0.01	0.03	0.05	18	DMR	NA
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	2.5	39.2	148.0	18	DMR	NA
Nitrogen, Total (as N)	EFF-001	mg/L	2.5	39.2	148.0	18	DMR	54.0
		lbs/day	0.1	1.8	7.8	18	DMR	4.2
Phosphorus, Total (as P)	EFF-001	mg/L	0.5	4.6	14.5	18	DMR	NA
		lbs/day	0.02	0.20	0.70	18	DMR	NA
Total Dissolved Solids (TDS)	EFF-001	mg/L	19	66	238	18	DMR	NA
Total Suspended Solids (TSS)	EFF-001	mg/L	19	66	238	18	DMR	NA

Footnotes:
DMR = Self- Reported Discharge Monitoring Reports
EFF-001: Effluent sample site located at splitter , at end of force main and prior to dose tanks (See Figure 2)
FM-001 = Effluent flow meter located in metering vault prior to splitter valve (See Figure 2).
Period of Record: 05/2013 through 02/2016.
NA = Not Applicable
NR = Not Reported
(1) Includes known parameters of concern only.
(2) Maximum value recorded of all quarterly reported Daily Maximum Values.

APPENDIX II – MONITORING WELL SUMMARY

Monitoring Well Summary , Red Creek Ranch
Monitoring Well: MW-1
MBMG GWIC #: 167608
Lithologic Log ID: Tertiary colluvium, sand/gravel lenses and clay layers to 96 feet (SWL 65 feet).
Status: Constructed on May 30, 1998
Location: On slope above north shore of Hebgen Lake in Gallatin County. Located on the uphill corner of the down gradient edge of mixing zone Latitude: 46.874712 Longitude: -113.860793
Representation: Down gradient water quality, shallow aquifer.
Monitoring Well Summary: MW-2 (Sankey Well)
Monitoring Well: Sankey/Manship Well
MBMG GWIC #: 152506
Lithologic Log ID: No data recorded
Status: Construction date not recorded
Location: Slope above north shore of Hebgen Lake, Gallatin County Latitude: 44.8066 Longitude: -111.2008
Representation: Down gradient water quality, shallow aquifer.

APPENDIX III - GROUND WATER QUALITY MONITORING RESULTS

Ground Water Monitoring Results								
Monitor Source⁽¹⁾	Representation	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum⁽²⁾ Value	# of Samples	Source of Data
MW1	Downgradient Ground Water Quality Static Water Level= 65 feet, Total Depth= 95 feet. Located on the uphill corner of the end of the mixing zone.	<i>Escherichia coli</i> Bacteria	CFU/100 ml	<1	<1	<1	9	DMR
		Nitrogen, Nitrate + Nitrite (as N)	mg/L	1.01	1.89	3.08	9	DMR
		Specific Conductivity (@ 25°C)	µS/cm	648	667	690	9	DMR
Footnotes: CFU = Colony Forming Units DMR = Self Reported Discharge Monitoring Reports Period of Record: May 2013 - February 2016. s.u. = standard units (1) Refer to Section II of the Fact Sheet for the existing or proposed location of the monitoring wells. (2) Maximum value recorded of all monthly or quarterly reported values.								

APPENDIX IV – MIXING ZONE RATIONALE

The applicant has requested authorization of one standard ground water mixing zone. DEQ determines whether a mixing zone is appropriate pursuant to the requirements and procedures of ARM 17.30.501 et seq. DEQ must conduct a water quality assessment in accordance with ARM 17.30.506 to determine if and what type of mixing zone may be authorized. A person applying to DEQ for a mixing zone must indicate the type of mixing zone requested and supply information of sufficient detail for DEQ to make a determination regarding the authorization of the mixing zone (ARM 17.30.515).

A mixing zone may be denied if it will threaten or impair existing uses (Section IV) in accordance with ARM 17.30.505. In making this determination DEQ will consider whether current available data can accurately predict ground water or pollutant movement, or whether there is sufficient unpredictability that might result in adverse impacts due to a particular concentration of a parameter within the mixing zone [ARM 17.30.506; and 517].

For purposes of authorization determination, DEQ will reference the following rules for water quality assessment of the mixing zone. A mixing zone may be granted for individual parameters in a discharge (ARM 17.30.505). As part of the water quality assessment described above, the concentration of pollutants at the downgradient boundary of the mixing zone must be estimated in accordance with ARM 17.30.517 to determine if the discharge qualifies for a (500 foot) ground water mixing zone. After an assessment of the application information (ARM 17.30.505), DEQ will reauthorize a mixing zone for the parameters listed within Table 2 as the potential impact to beneficial uses may be minimal (Section II and Section IV).

For purposes of determining the mixing zone area, DEQ will reference the following rules for the mixing zones. Pursuant to ARM 17.30.502 a "Mixing Zone" is defined as a limited area of a portion of an aquifer where initial dilution of a discharge takes place, where water quality changes may occur, and where certain water quality standards may be exceeded. DEQ will reauthorize the mixing zone based on the hydrogeologic and mixing zone information as previously established (DEQ, 2000, 2006). ARM 17.30.517 states that a specific depth and width are necessary to determine the aquifer cross-section area (A) for a mixing zone. The width of the outfall structures perpendicular to ground water flow direction are reported within the table below. ARM 17.30.517 states that the depth of a ground water mixing zone extends from the top of the water table beneath the source down to 15 feet below the water table.

The cross sectional area (A) is the area of the ground water flux boundary at the terminus of the mixing zone (ARM 17.30.517). The down gradient boundary mixing zone width is the width of the source (drainfield width perpendicular to ground water flow direction), plus the distance determined by the tangent of 5° (0.0875) times the length of the mixing zone times two (2) (ARM 17.30.517). The calculated widths and respective cross section areas (A) are listed within the table below.

Based on the dimensions of the standard mixing zones, and the hydrogeologic characteristics (Section II), the volume of ground water (Q_{gw}) available to mix with the effluent is calculated using Darcy's Equation (ARM 17.30.517):

$$Q_{gw} = KIA$$

Where:

Q_{gw} = ground water flow volume (ft³/day)

K = hydraulic conductivity (ft/day)

I = hydraulic gradient (ft/ft)

A = cross-sectional area (ft²) of flow at the downgradient boundary of the mixing zone.

The table below lists the volume of ground water available to mix at Outfall 001.

Based on the description of the mixing zone above, and analysis presented in Section III, DEQ has determined pursuant to ARM 17.30.505 that a standard mixing zone is still applicable and will be reauthorized for the individual parameters for Outfall 001 listed below.

Mixing Zone Information - Outfall 001, Red Creek Ranch		
Parameter	Units	Value
Mixing Zone Type	-	Standard
Authorized Parameters	-	Total Nitrogen
Ambient Ground Water Concentrations, Nitrate + Nitrite	mg/L	1.89
Ground Water Flow Direction	azimuth/bearing	S23°W
Length of Mixing Zone	feet	500
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	400
Width of Mixing Zone at Down Gradient Boundary	feet	487.5
Cross Sectional Area of Mixing Zone (A)	ft ²	7312.5
Hydraulic Conductivity (K)	feet/day	137
Hydraulic Gradient (I)	ft/ft	0.019
Volume of Ground Water Available for Mixing (Q _{gw})	ft ³ /day	19,034

APPENDIX V - 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, the department 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 in December 2000, for the proposed activity as part of permit development (DEQ, 2000). It established the proposed discharge as 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 significance criteria established within this permit, constitute nonsignificant degradation.

The applicable ground water standards pursuant to ARM 17.30.1006 and the nondegradation nonsignificant 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 this permit.

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⁽³⁾⁽⁴⁾
Nitrate (as N)	mg/L	10.0	–	T	–
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	–	T	–
Nitrogen, Total (TN)	mg/L	–	10.0		5.0
Phosphorus, Total Inorganic	–	–	–	H	Surface water breakthrough time greater than 50 years ⁽⁵⁾

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 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) Discharges in compliance with the nondegradation significance criteria constitute nonsignificant degradation.
(4) Toxic parameters, the change is not significant if the resulting concentration outside of a mixing zone designated by DEQ does not exceed 15% of the lowest applicable standard per ARM 17.30.715(1)(c). Carcinogen parameters or parameters with a bioconcentration factor (>300); change is not significant if concentrations are less than or equal to the concentrations of those parameters in the receiving water per ARM 17.30.715(1)(b).
(5) 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.

B. Pollutants and Parameters of Interest (POI)

DEQ has identified POI's for the proposed discharge based on those identified in the previous permit and based on the following:

- Reported effluent characteristics (Section II.D),
- Water quality standards (Appendix V),
- Water use classification of the receiving ground water (Appendix V).
- 2009 DEQ, MTX000119

Each individual Parameter of Interest is further discussed below (section C).

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. Nitrogen

Application materials indicate that nitrogen will be present in the proposed wastewater stream (Section II.D.). 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. Therefore, no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. DEQ will establish the effluent limitations for nitrogen based on the projection that the entire nitrogen load in the wastewater stream may ultimately be converted to nitrate (USEPA, 2002a).

The allowable discharge concentrations will be derived from a mass-balance equation (ARM 17.30.517) which is a simple steady-state model, used to determine the POI concentration after accounting for other sources of pollution in the receiving water and any dilution as provided by a mixing zone. The equation factors in cumulative impacts of existing upgradient discharges and will limit the discharger to the assimilative capacity currently available in the receiving aquifer. The mass-balance equation (Equation 1) derived for ground water is as follows:

<u>Equation 1:</u>	
$Q_{gw}C_{gw} + Q_{eff}C_{eff} = Q_{comb}C_{proj}$	
Where:	
Q_{gw}	= ground water available for mixing
C_{gw}	= ambient receiving ground water concentration
Q_{eff}	= maximum design capacity of wastewater system
C_{eff}	= effluent pollutant concentration
Q_{comb}	= combined ground water and effluent ($Q_{comb} = Q_{gw} + Q_{eff}$)
C_{proj}	= projected pollutant concentration (after available mixing)

The mass-balance equation below has been arranged to calculate effluent limits so that the discharge does not cause or contribute to an exceedance of the most restrictive water quality standard. This equation can be applied to any effluent and receiving water where the applicable dilution ratio is known. This equation will only be used for nitrogen which has been authorized for mixing (Section III).

Equation 2:

$$C_{\text{Imt}} = C_{\text{std}} + D(C_{\text{std}} - C_{\text{gw}})$$

Where:

C_{Imt} = effluent limitation concentration

C_{std} = water quality standard concentration

C_{gw} = ambient receiving ground water concentration

D = dilution ratio ($Q_{\text{gw}}/Q_{\text{eff}}$)

The permittee must comply with the ground water mixing zone rules pursuant to ARM Title 17, Chapter 30, Subchapter 5. The effluent limit for Nitrogen in Permit MTX000119, 2016, is established in Section IV. of this fact sheet. The effluent limit established in this renewal is based on actual effluent characteristics and flow, ambient water quality and mixing zone characteristics.

The proposed wastewater system constitutes a new source [ARM 17.30.702 (16)(a)]. The Class I ground water is considered high quality water and is subject to Montana's Nondegradation Policy (75-5-303, MCA). The applicable ground water standard is based on nondegradation, a nitrate concentration of 5.0 mg/L [ARM 17.30.715 (1)(d)(iii)] at the end of the proposed standard, 500-foot mixing zone.

The total Nitrogen (TN) concentration is the sum of nitrate plus nitrite, as nitrogen (N) plus total Kjeldahl nitrogen (as N) [TKN]. TKN is the sum of ammonia and organic nitrogen components. Raw wastewater consists primarily of ammonia. The Department assumes that under proper conditions, all ammonia should be converted to nitrate.

The volume of ground water that will mix with the discharge (Q_1) is estimated using Darcy's equation: $Q_1 = K I A$. The calculated value of Q_1 is 19033 ft³/day for the mixing zone; assuming an aquifer K value of 137 ft/day, an average measured gradient of 0.019 ft/ft (I), and a cross sectional area of flow at the downgradient boundary of the standard 500-foot mixing zone of 7312 ft² (A).

Using Equation #2, solving for effluent limit, the design capacity of the wastewater disposal system is 9400 gpd, or 1256 ft³/day (Q_{eff}). The quantity of available ground water for mixing is 19033 cf. (Q_{gw}). The total nitrogen (TN) concentration must not exceed 5 mg/L at the end of the mixing zone (C_{std}). The average ambient concentration of nitrate-nitrogen in the ground water was reported is 1.89 mg/l (C_{gw}). It is assumed that the entire total nitrogen load in the effluent converts to nitrate and enters the ground water.

The calculated water quality based effluent limit (WQBEL) is 52.13 mg/L (C_{Imt}).

b. Phosphorus

Appendix VI includes discussion of the phosphorus breakthrough analysis for the site done in 2009 and in 2000. That analysis was conducted for the establishment of phosphorus limits in the previous permits. This permit renewal will use the determinations of those previous permits in determining phosphorus significance.

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.

Having compared the above Water Quality Based Effluent Limit of 52mg/L and the Definition Based Effluent Limit for conventional Level I treatment of 50mg/L, DEQ will use the most conservative limit which is 50mg/L TN.

APPENDIX VI – PHOSPHORUS BREAKTHROUGH ANALYSIS

There is no limit on phosphorus in ground water. DEQ uses the Breakthrough Analysis in Appendix for computing estimated time of migration to surface water. Anything over 50 years is considered to be non-significant. The computed breakthrough time for the Red Creek facility is 249 years (DEQ 2009); therefore it is considered a non-significant risk.

APPENDIX VII – 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 a condition of this permit.

A. Effluent Monitoring - Compliance

Final numeric effluent limitations are developed in this document with specific magnitudes and durations based on site-specific conditions that ensures the discharge does 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 effluent quality 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 parameter analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136.

B. Effluent Monitoring - Sampling Location

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). As discussed in Section II.C, the effluent sample location has been established before the splitter valve and dose tanks (Figure 3). In order to better understand the nature of the current treatment quality, additional effluent monitoring is required at the three Septic Tank Effluent Pump (STEP) tanks for this renewal application. These tanks include the STEP tanks for the East RV site, West RV site, and the Facilities STEP tank. See Effluent Monitoring Table below for specifics.

C. Discharge Monitoring

Measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant will be required to maintain and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow being measured (Permit Part II.B.). The flow measuring device (FM-001) is located in the flow and cleanout vault before the splitter valve (Figure 3). Flow monitoring and reporting requirements are summarized in the table below.

Effluent Monitoring and Reporting Requirements – EFF-001 (Outfall 001)						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾⁽³⁾	Report Frequency
Flow Rate, Effluent ⁽⁴⁾	FM-001	gpd	Contin-uous	Contin-uous	Daily Maximum Monthly Average	Quarterly
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total (as N) ⁽⁵⁾	EFF-001	mg/L	Calculate	Monthly	Daily Maximum Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Daily Maximum ⁽⁷⁾ Monthly Average ⁽⁸⁾	Monthly
Phosphorus, Total (as P)	EFF-001	mg/L	Composite	Monthly	Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Monthly Average ⁽⁸⁾	Monthly
		lbs/year ⁽⁹⁾	Calculate	Monthly	Annual Maximum ⁽¹⁰⁾	Annually ⁽¹¹⁾
BOD ₅	EFF-001	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Effluent Monitoring and Reporting Requirements – EFF-002 (RV East STEP Tank)						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾⁽³⁾	Report Frequency
Nitrogen, Nitrite+Nitrate (as N)	EFF-002	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia (as N)	EFF-002	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-002	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total (as N) ⁽⁵⁾	EFF-002	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Daily Maximum ⁽⁷⁾ Monthly Average ⁽⁸⁾	Monthly
Phosphorus, Total (as P)	EFF-002	mg/L	Composite	Monthly	Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Monthly Average ⁽⁸⁾	Monthly
		lbs/year ⁽⁹⁾	Calculate	1/Year	Annual Maximum ⁽¹⁰⁾	Annually ⁽¹¹⁾
BOD ₅	EFF-002	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Effluent Monitoring and Reporting Requirements – EFF-003 (RV West STEP Tank)						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾⁽³⁾	Report Frequency
Nitrogen, Nitrite+Nitrate (as N)	EFF-003	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia (as N)	EFF-003	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-003	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total (as N) ⁽⁵⁾	EFF-003	mg/L	Calculate	Monthly	Daily Maximum Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Daily Maximum ⁽⁷⁾ Monthly Average ⁽⁸⁾	Monthly
Phosphorus, Total (as P)	EFF-003	mg/L	Composite	Monthly	Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Monthly Average ⁽⁸⁾	Monthly
		lbs/year ⁽⁹⁾	Calculate	1/Year	Annual Maximum ⁽¹⁰⁾	Annually ⁽¹¹⁾
BOD ₅	EFF-003	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly

Effluent Monitoring and Reporting Requirements – EFF-004 (Facility STEP Tank)						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾⁽³⁾	Report Frequency
Nitrogen, Nitrite+Nitrate (as N)	EFF-004	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia (as N)	EFF-004	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-004	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly
Nitrogen, Total (as N) ⁽⁵⁾	EFF-004	mg/L	Calculate	Monthly	Daily Maximum Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Daily Maximum ⁽⁷⁾ Monthly Average ⁽⁸⁾	Monthly
Phosphorus, Total (as P)	EFF-004	mg/L	Composite	Monthly	Monthly Average	Monthly
		lbs/day ⁽⁶⁾	Calculate	Monthly	Monthly Average ⁽⁸⁾	Monthly
		lbs/year ⁽⁹⁾	Calculate	1/Year	Annual Maximum ⁽¹⁰⁾	Annually ⁽¹¹⁾
BOD ₅	EFF-004	mg/L	Composite	Monthly	Daily Maximum Monthly Average	Monthly

Footnotes:
EFF-001: located at splitter at end of force main and prior to dose tanks
EFF-002: Located at Pumping tank north and west of RV-East site (See Figure 2).
EFF-003: Located at Pumping tank east and south of RV-West site
EFF-004: Located East and North of main facility building
FM-001: located between wastewater sumps and prior to release into the collection tank.
(1) See definitions in Part V of the permit.
(2) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.
(4) Requires recording device or totalizing meter, must record daily effluent volume.
(5) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(6) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶].
(7) Daily Maximum Load calculation: lbs/day = the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
(8) Monthly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
(9) Annual Load calculation: lbs/year = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶] x 365 (days/year).
(10) 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).
(11) Annual maximum load shall be reported (DMR) on an annual basis (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. All parameter analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136. A second monitoring well is being required for this permit cycle (see Section VI). Because of the nature of the effluent being discharged to the drainfields, it is important that it can be demonstrated that the beneficial uses of state water is not being impacted.

Ground Water Monitoring and Reporting Requirements, Separately

Parameter/Method	Monitor Location ⁽¹⁾	Units	Sample Type ⁽²⁾	Minimum Sampling Frequency	Reporting Requirements ⁽²⁾⁽³⁾⁽⁴⁾	Reporting Frequency	Rationale
<i>Escherichia coli</i> Bacteria	MW-1 MW-2	CFU/100ml	Grab	Monthly	Daily Maximum Quarterly Average ⁽⁵⁾	Quarterly	Current Permit Requirement
Nitrogen, Nitrate + Nitrite (as N)	MW-1 MW-2	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Nitrogen, Total Ammonia (as N)	MW-1 MW-2	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly	Aquifer Characterization
Nitrogen, Total Kjeldahl (TKN)(as N)	MW-1 MW-2	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly	Aquifer Characterization
Specific Conductivity @ 25°C	MW-1 MW-2	µS/cm	Grab or Instantaneous	Monthly	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Static Water Level (SWL) ⁽⁷⁾	MW-1 MW-2	ft-bmp	Instantaneous	Monthly	Daily Maximum Quarterly Average	Quarterly	Aquifer Characterization

Footnotes:

CFU = Colony Forming Units

ft-bmp = feet below measuring point

µS/cm = micro-Siemens per centimeter

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

Each monitoring 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.

Submittal of discharge monitoring report forms (DMRs) will be required, regardless of the operational status of the facility or of each individual monitoring well.

(1) Refer to Appendix II and Section II-G. of the Fact Sheet for the existing or proposed location of the monitoring wells.

(2) See definitions in Part V of the permit. Each Monitoring well to be individually sampled and analyzed for each respective parameter listed above.

(3) Submittal of DMRs will be required, regardless of the installation status of each individual monitoring well. If the monitoring well(s) is not installed for an individual monitoring period, the following shall be stated upon each applicable DMR: “monitoring well has not been installed”.

(4) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR).

(5) The geometric mean must be reported if more than one sample is taken during a reporting period.

APPENDIX VIII - REFERENCES CITED

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

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- 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.

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