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)

Permittee:	East Gallatin Commercial Center Property Owners Association Inc.
Permit Number:	MTX000165
Permit Type:	Domestic wastewater
Application Type:	Renewal
Facility Name:	East Gallatin Commercial Center
Facility Location:	NW ¼ Section 5, T1S, R5E Gallatin County, MT Latitude: 45.785588° Longitude: -111.13958°
Facility Address:	East Baseline and Tubb Road, Belgrade Montana
Facility Contact:	Terry Hooge, Rocky Mountain Wastewater, LLC
Treatment Type:	SBR to sand filter
Receiving Water:	Class I Ground Water
Number of Outfalls:	1
Outfall / Type:	001 / Pressure dosed subsurface drainfield
Effluent Type:	Domestic strength wastewater
Mixing Zone:	Standard
Effluent Limit Type:	WQBEL
Effluent Limits:	Total Nitrogen: 2.7 lbs/day
Flow Rate:	Design maximum: 12,000 gpd
Effluent sampling:	Quarterly sampling at EFF-1 and quarterly reporting. Monthly reporting for flow parameters.
Ground water sampling:	Quarterly sampling at MW-1 and quarterly reporting.
Fact Sheet Date:	July, 2019
Prepared By:	Rich Morse

1.0 PERMIT INFORMATION

DEQ issues MGWPCS permits for a period of five years. The permit may be reissued at the end of the period, subject to reevaluation of the receiving water quality and permit limitations. This fact sheet provides the basis for DEQ's decision to renew a MGWPCS wastewater discharge permit to East Gallatin Commercial Center Property Owners Association Inc.(applicant) for the East Gallatin Commercial Center wastewater treatment system.

1.1 APPLICATION

DEQ received an application for renewal of the permit on March 12, 2018. Renewal fees accompanied the application. DEQ reviewed the submittal and issued a completeness letter on April 3, 2018.

1.2 PERMIT HISTORY

This facility is owned by the East Gallatin Commercial Center Property Owners Association, Inc. and operated by Rocky Mountain Wastewater, LLC. The previous permit, MTX000165, was issued on March 8, 2013 became effective on May 1, 2013, and expired on April 30, 2019. The permit was modified on November 6, 2008, to reflect a transfer of ownership from S&S Construction, LLC to the East Gallatin Commercial Center Property Owners Association, Inc. (DEQ, 2008). This facility is currently at 54% build out. Peak discharges from this facility have exceeded 12,000 gpd. DEQ and Gallatin County are in discussions with the owner to limit the discharge to the maximum permitted 12,000 gpd.

In addition to the application for the MGWPCS permit, the applicant maintains Subdivision Plan and Specification review and approval (EQ# 06-1064) pursuant to 76-4-101 *et seq*., Montana Code Annotated (MCA).

1.3 CHANGES TO THIS PERMIT

This renewal will include a change in the reporting requirements for this facility. See Section 6.1 of this Fact Sheet (Effluent Monitoring) and subsequent table for monitoring schedule. This permit also includes a special condition for the submittal of a plan for the control of maximum daily flow. See Section 5.3 of this Fact Sheet (Special Conditions) and Table 10 of this Fact Sheet (Compliance Schedule).

2.0 FACILITY INFORMATION

2.1 LOCATION

The East Gallatin Commercial Center wastewater treatment system is located north of Belgrade near the junction of E. Baseline and Tubbs Road (**Figure 1**).

Figure 1. Location of the East Gallatin Commercial Center

East Gallatin Commercial Center (EGCC) is a 176 acre business park development with 40 industrial and commercial lots. The businesses are expected to be retail in nature and producing residential strength wastewater. Each commercial lot is authorized to contribute 300 gpd to the maximum daily design flow of 12,000 gpd (COSA).

The domestic water supply for each lot within the East Gallatin Commercial Center is provided by individual wells located on each lot. The 500 foot mixing zone for the WWTS drainfield ends outside of the 100 foot zone of influence for the water supply well on Block 2 Lot 5.

Figure 2. East Gallatin Commercial Center Site Map.

2.2 OPERATIONS

System operations are summarized below in **Table 1**.

Table 1. Collection, Treatment, and Disposal Summary

Collection	
Contributing sources:	40 Business Lots
Standard industrial code(s) of sources:	8999, Misc. Business Services
Collection method:	Gravity-driven sewer lines to lift station
Flow volume:	Average daily design flow: 12,000 gallons per day Maximum daily design flow: 12,000 gallons per day
Treatment	
Treatment level:	SBR advanced treatment
Treatment technology:	Sequencing Batch Reactor SBR treatment
Treatment location:	Latitude 45.785596, longitude -111.139605
Disposal	
Method of disposal:	Infiltration to ground water
Disposal structure:	Subsurface drainfield (Outfall 001)
Outfall location:	Latitude 45.78431, longitude -111.140249

The WWTS is an International Water Systems model 6000 sequencing batch reactor (SBR) system. The waste stream is directed into one of the three 6,000 gallon SBR tanks. The system includes off-site sludge disposal, coagulation, polishing and UV disinfection. The system is currently removing 93% of the nitrogen load. Effluent is pressure-dosed into a subsurface drainfield.

Influent sampling is done in the 6,000 gallon distribution tank prior to the SBR units. Effluent monitoring is done in the 6,000 gallon dose tank prior to the discharge. Flow metering occurs between the dose tank and Outfall 001 (see Figure 3).

Monitoring and sampling requirements are further discussed in **Section 6.**

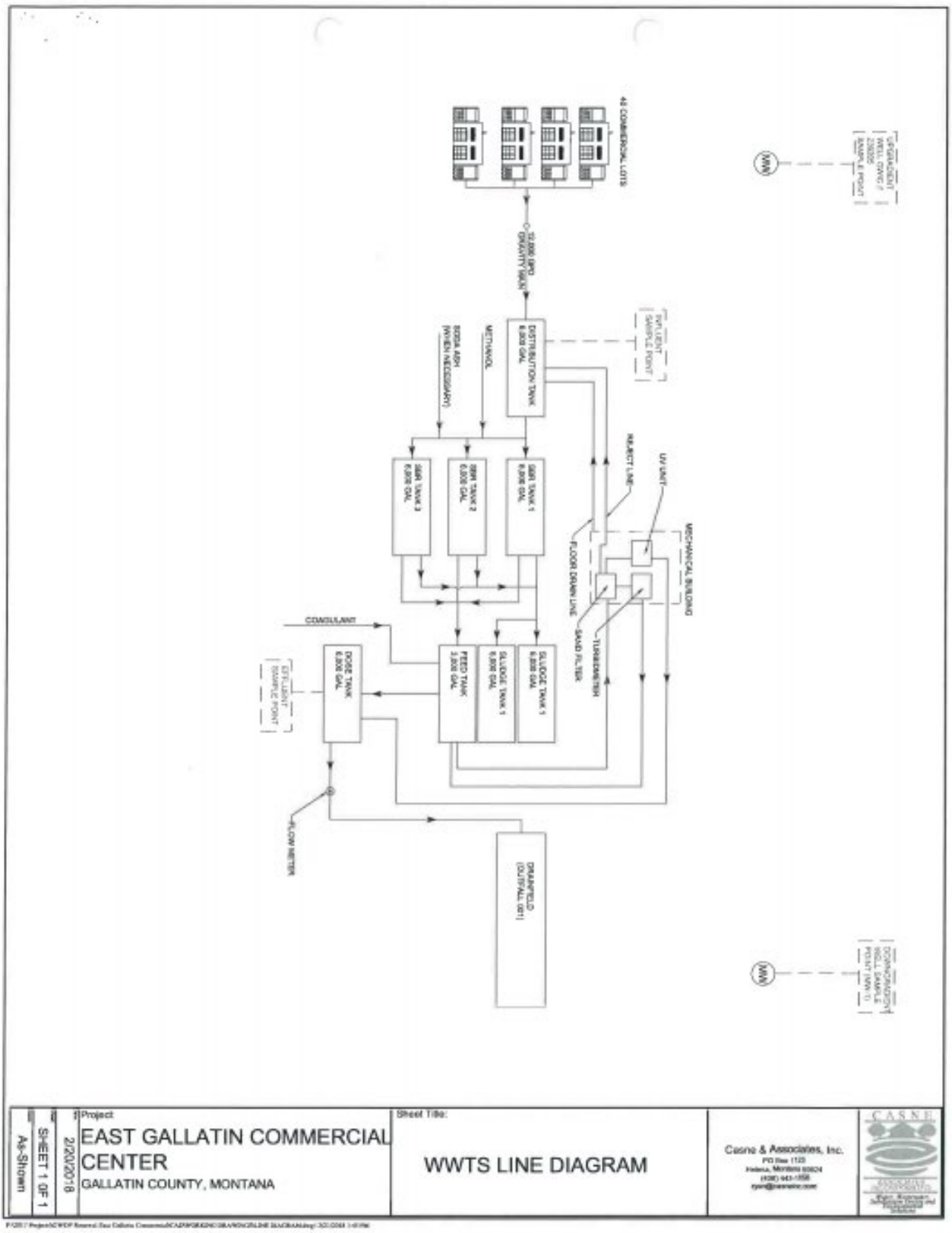


Figure 3. Wastewater Treatment System Line Diagram.

2.3 EFFLUENT CHARACTERISTICS

DEQ requires a permit applicant to disclose the quality of the effluent so that DEQ may evaluate the potential for pollution of state water. During the previous permit cycle, the facility sampled and reported effluent quality criteria to DEQ in the form of discharge monitoring reports (DMRs). These data are summarized below in **Table 2**. The majority of the concentrations are reported in units of milligrams per liter (mg/L), which is equivalent to one part per million.

Table 2. Effluent Quality Data from Outfall 001

Parameter	Units	Reported DMR values			2013 Limit	# of Samples
		Minimum	Maximum	Average		
Flow rate	Gallons/day	3,750	16,667	8,533	12,000	Continuous
	Gallons/day (30 day average)	2348	12,116	4,694	12,000	Continuous
Nitrogen, nitrate+nitrite	mg/L	0.8	11.5	3.5	–	22
Nitrogen, total ammonia	mg/L	0.07	16.7	3.4	–	15
Nitrogen, total Kjeldahl	mg/L	.4	16.9	3.7	–	22
Nitrogen, total*	mg/L	1.12	17.9	7.03		23
	pounds/day	.04	.52	.25	2.7	23
Phosphorus, total	pounds/year	12.4	55.7	25.3	387	6
BOD	mg/L	2	20	8.3	–	21
Total suspended solids	mg/L	1	31	5.5	–	19

*Total Nitrogen = Nitrate + Nitrite + Total Kjeldahl Nitrogen (as N). Period of record 09/30/13 through 06/30/19.

2.4 GEOLOGY

The Gallatin Valley, drained by the Gallatin River and its tributaries, is an intermontane basin consisting of a broad alluvial plain surrounded by upland benches (Slagle, 1995; Mulder, 2007). The Gallatin Valley was filled with Tertiary (lacustrine) and Quaternary (alluvial) sediments to a depth of up to 6,000 feet following the formation of the Three Forks structural basin (Slagle, 1995). The Quaternary alluvial deposits found in the Gallatin Valley contain very prolific aquifers; these aquifers consist of gravel with numerous interbeds of sand, silt, and clay (Mulder, 2007).

2.5 HYDROGEOLOGY

Ground water in the aquifers of the Gallatin Valley is recharged by the infiltration of irrigation water and by the seepage from streams during periods of high runoff (Mulder, 2007). The flow of ground water in the Gallatin Valley is from the east and southeast to the north-northwest, discharging in the area near Logan in the northwest corner of the valley (Slagle, 1995; Mulder, 2007).

The applicant has submitted information estimating that the ground water gradient (I) is 0.0047 ft/ft, the ground water flow direction is N24°W, and the hydraulic conductivity (K) is 180 ft/day (Territorial Landworks, 2012a). The ground water flow direction and gradient are based on the United States Geological Survey (USGS) ground water contour map for the Gallatin Valley (Slagle, 1995). The value for the hydraulic conductivity at the EGCC site was determined from an aquifer pump test on the Lot 9 well northwest of EGCC WWTS drainfield (Gateway Engineering and Surveying, 2005). This data was taken from 2013 permit.

The closest downgradient surface water to the East Gallatin Commercial Center WWTS, as listed on application form GW-1, is Thompson Creek (2,700 feet northeast of Outfall 001). This surface water was used in the calculations for the breakthrough of phosphorus to surface water.

Important hydrogeologic characteristics are summarized below in **Table 3**.

Table 3. Hydrogeologic Summary

Average depth to ground water	15 feet
General ground water flow direction	N24°W
Hydraulic conductivity	180 feet per day
Hydraulic gradient	0.0047 feet/feet
Nearest downgradient surface water	Thompson Creek (2,700 feet)

2.6 GROUND WATER MONITORING WELLS

There is one monitoring well associated with this permit: MW-1 is plotted on **Figure 2**. Monitoring well construction details are provided below in **Table 4**. MW-1 is a downgradient monitoring well located on the north edge of the property.

Table 4. Monitoring Well Summary

Monitoring Well MW-1	
MBMG GWIC ID:	NR
Location- latitude/longitude:	45.787339° Longitude: -111.139156°
Location- narrative:	North property line on E. Baseline Road
Rationale:	Down gradient
Depth; screened interval:	NR
Notes:	No well log available. See special conditions for well characterization requirement

If a DEQ-approved monitoring well is abandoned, destroyed or decommissioned, or is no longer able to be sampled due to fluctuations in the ground water table, the permittee must install or designate a new well to replace the abandoned, destroyed, decommissioned, or non-viable well.

2.7 GROUND WATER QUALITY CHARACTERISTICS

Water sampling results from Ambient monitoring are provided below in **Table 5**. Based on the 460 microsiemens per centimeter (µS/cm) specific conductance, the receiving water is Class I ground water. Data reported in the table is taken from application material.

Ambient water quality monitoring is done at the upgradient GWIC well #239205 which is located at 461 Jetway Drive in the southeast part of the site. A well log for this well was included in the application material. The well is open bottom and is 40 feet in total depth with static water level at eleven feet. The calculated total nitrogen concentration in the receiving water is 2.23 mg/L (most conservative recordings). This ambient well is approximately 1000 feet upgradient from Outfall 001.

Table 5. Ambient Water Quality Reported From Monitoring Well GWIC #239205

Samples represents shallow ground water 1000 feet upgradient of Outfall 001						
Parameter	Units	Reported values			Reporting Limit	# of Samples
		Minimum	Maximum	Average		
Chloride (as Cl)	mg/L	4.9	6.9	5.7	0.1	3
Total dissolved solids	mg/L	234	292	267	1	3
Escherichia coli bacteria	CFU/100mL	<1	<1	<1	1	3
Nitrogen, nitrate+nitrite (as N)	mg/L	1.34	1.89	1.62	.5	3
Nitrogen, total Kjeldahl (as N)	mg/L	ND	.34	ND	.2	3
Organic carbon	mg/L	ND	1.2	1.15	1	3
pH	Standard units	7.55	7.71	7.61	0.1	3
Specific conductivity (@25°C)	µS/cm	439	478	460	0.1	3
Static water level	Feet below ground surface	17	18	17.5	0.1	3

*Total Nitrogen = Nitrate + Nitrite + Total Kjeldahl Nitrogen (as N). Period of record, 6/22/17 through 12/21/17.

3.0 WATER QUALITY STANDARDS AND NONDEGRADATION

Part of DEQ's mission is to protect, sustain, and improve the quality of state waters. Water quality standards provide the basis for effluent limits that DEQ applies to discharge permits (**Section 5**). These standards include three components: designated uses, water quality criteria, and nondegradation policy. DEQ protects all designated uses of state water by basing effluent limits on the most restrictive water quality limitations, intended to protect the most sensitive uses.

3.1 DESIGNATED USES

With a specific conductivity of 460 µS/cm (**Table 5**), the receiving water is Class I ground water and therefore a high-quality water of the State. Class I ground waters must be maintained suitable for the following uses with little or no treatment:

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

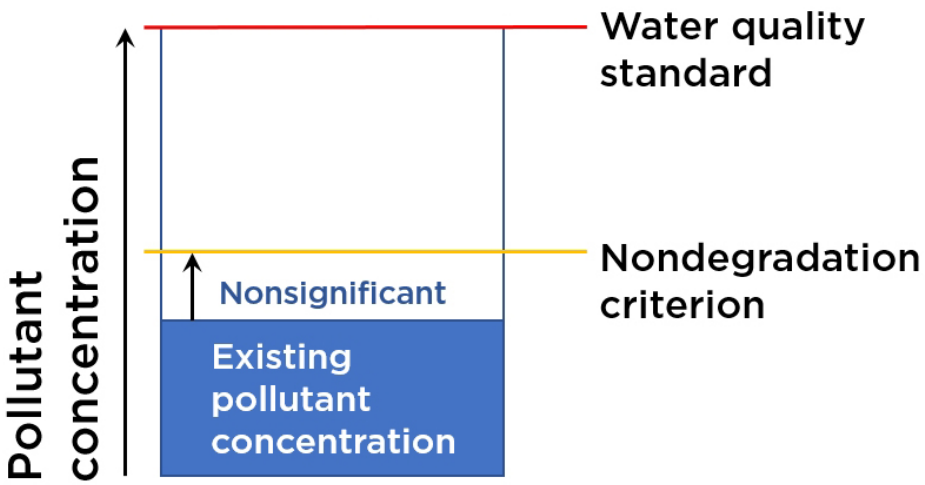
DEQ protects all the assigned beneficial uses by protecting the most sensitive. Drinking water is the most sensitive use of this receiving water.

3.2 WATER QUALITY CRITERIA

Montana has water quality standards for both surface water and ground water. The numeric criteria for each are different because they must support different uses. DEQ writes permits to protect the most sensitive, thereby protecting all uses. DEQ's ground water standard for nitrate is 10.0 mg/L, as is the standard for nitrate + nitrite (as nitrogen). Class I ground water must be maintained suitable for use as a drinking water supply with little or no treatment, and therefore must meet the corresponding human health standard of 10.0 mg/L total nitrogen. These water quality standards may not be exceeded outside a designated mixing zone (**Section 4**).

3.3 NONDEGRADATION

Montana's nondegradation policy is intended to preserve the existing condition of high-quality state waters. Any water whose existing condition is better than the water quality standards must be maintained in that high quality. Nondegradation policy allows discharges to cause only nonsignificant changes in water quality. Changes in water quality that are deemed significant require an authorization to degrade. An authorization to degrade is not an authorization to pollute; the water quality standard must not be exceeded.



DEQ must determine whether the proposed discharge will result in significant changes in water quality.

3.4 NONSIGNIFICANCE

When developing the initial permit (DEQ, 2006), DEQ determined that discharges in compliance with this permit result in nonsignificant changes in water quality. This discharge has not increased or changed in character since this determination, therefore DEQ did not perform a new significance determination for this permit renewal. DEQ determined that the discharge continues to meet ground water nonsignificance/nondegradation criteria (described below) at the end of the mixing zone (**Section 4**). DEQ used these criteria and updated ground water quality data to establish effluent limits (discussed below in **Section 5**).

3.4.1 Ground Water Nonsignificance Criteria

For this discharge to ground water, the following nonsignificance criteria are relevant:

Nitrogen

Under Montana statute, ground water total nitrogen at or below 7.5 mg/L at the downgradient end of the mixing zone (see **Section 4**) is a nonsignificant change in water quality, so long as the discharge does not cause degradation of surface water. Using the nonsignificance criterion of 7.5 mg/L, DEQ established effluent limits that cause the discharge to comply with ground water nonsignificance/nondegradation criteria at the end of the mixing zone. This is discussed in detail in **Section 5.1**.

Phosphorus

A total phosphorus surface water breakthrough time of greater than 50 years is a nonsignificant change in water quality. The phosphorus criterion requires an analysis to determine a breakthrough time. Breakthrough occurs when the subsurface soils lose their capability to adsorb any more phosphorus, and it reaches surface water.

The Phosphorus breakthrough analysis performed as part of this permit renewal indicated that phosphorus breakthrough would occur in 156 years. A phosphorus breakthrough of greater than 50 years is considered nonsignificant. Therefore an effluent limit for TP load will not be established in this Fact Sheet.

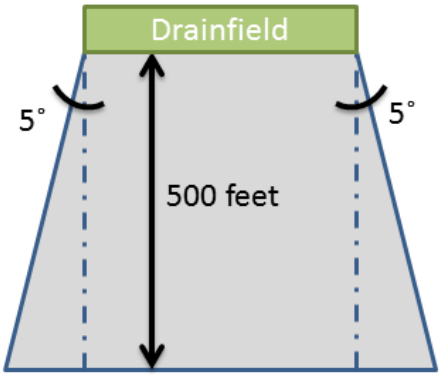
Ground water discharges meeting these criteria are nonsignificant, so long as they do not cause degradation of surface waters.

4.0 MIXING ZONE

DEQ authorizes a standard mixing zone for total nitrogen discharged from Outfall 001. A mixing zone is a specifically defined area of the receiving water where water quality standards may be exceeded. DEQ evaluates the suitability according to criteria established in the Administrative Rules of Montana. The mixing zone is then defined in the permit. The applicant requested a standard mixing zone for this discharge, consistent with previous permit cycles.

A standard mixing zone extends 500 feet downgradient from the source. The upgradient boundary is equal to the width of the source (measured perpendicular to the of ground water flow direction). The mixing zone widens in the downgradient direction by 5° on either side. The width of the downgradient boundary is calculated by adding the increased width for each side (the tangent of 5° (0.0875) times the mixing zone length) to the width of the upgradient boundary. Standard mixing zones extend 15 feet below the ground water table.

The volume of ground water (Q_{GW}) available to mix with the effluent is calculated using Darcy's Equation: Q_{GW} =



KIA

Where:

Q_{GW} = ground water flow volume (feet^3/day)
K = hydraulic conductivity (feet/day)
I = hydraulic gradient (feet/feet)
A = cross-sectional area (feet^2) at the downgradient boundary of the mixing zone.

Table 6 summarizes the variables used in Darcy's equation and the resulting volume of ground water available to mix at Outfall 001. These values are drawn from the current permit application, and previous application material and DMRs.

Table 6. Standard Mixing Zone for Total Nitrogen Discharged from Outfall 001

Parameter	Units	Value
Receiving water nitrogen concentration	1.62	mg/L
Ground water flow direction	N24°W	Bearing
Length of mixing zone	500	Feet
Thickness/depth of mixing zone	15	Feet
Upgradient width of mixing zone	350	Feet
Downgradient width of mixing zone	437.5	Feet
Cross-sectional area of mixing zone (A)	6,555	Square feet
Hydraulic conductivity (K)	180	Feet per day
Hydraulic gradient (I)	.0047	Feet per feet
Volume of ground water available for mixing (Q_{GW})	5,545	Cubic feet per day

In order to determine whether a mixing zone is allowable, DEQ calculates a predicted concentration at the downgradient end of the mixing zone. This mixing calculation follows the following procedure:

- Volume of ground water times the concentration of the parameter = existing load;
- Volume of discharge times the concentration of the parameter = waste load; and
- (Existing load + waste load) / total volume = predicted concentration.

Because the predicted concentration must satisfy the most stringent nonsignificance criterion (**Section 3**), DEQ can calculate water quality based effluent limits (WQBELs) by rearranging the equation and solving for the effluent concentration (**Section 5**).

5.0 PERMIT CONDITIONS

Discharge permits include conditions that ensure compliance with the Montana Water Quality Act and the regulations used to implement it. These conditions include effluent limits as well as any special conditions that DEQ deems necessary to protect the quality of the receiving water.

Montana's numeric water quality standards are published in Circular DEQ-7. Water quality criteria applicable to this permit are summarized below in **Table 7**. The permit establishes effluent limits that will meet water quality standards and nondegradation criteria, thereby protecting beneficial uses and existing high quality waters. The most restrictive criteria in **Table 7** provide the basis for the effluent limits.

Table 7. Applicable Ground Water Quality Criteria

Parameter	Human Health Standard	Beneficial Use Support	Nondegradation Criteria
Nitrate plus nitrite (as Nitrogen[N])	10 mg/L	-	-
Total Nitrogen	-	10 mg/L	**7.5 mg/L**
Total Phosphorus	-	-	**>50 year breakthrough**

This discharge permit includes numeric WQBELs that restrict the strength and volume of the discharge. The ground water nonsignificance criteria (**Section 3.4.1**) provide the basis for the limits. DEQ calculates WQBELs by rearranging the mixing zone equation (**Section 4**) and solving for the effluent concentration that satisfies the water quality criteria. DEQ evaluates and recalculates the limits using updated water quality data as part of every permit renewal cycle. In this way, DEQ protects the receiving water quality by continually assessing cumulative impacts to the receiving water.

DEQ calculated the effluent limits using the same method as for the previous permit. DEQ uses updated ambient ground water quality data to re-evaluate the receiving water quality and the assimilative capacity for dilution.

5.1 TOTAL NITROGEN EFFLUENT LIMIT

The nonsignificance criterion of 7.5 mg/L is the most restrictive of the water quality criteria applicable to this permit; therefore it is the water quality target for this effluent limit. DEQ established the final WQBEL for this discharge by back-calculating the effluent concentration that results in 7.5 mg/L at the end of the mixing zone, given the available dilution. Available dilution is determined by recent ground water quality sampling of the receiving water. Ambient total nitrogen averaged 1.62 mg/L (**Section 2**). DEQ calculates an effluent limit that protects receiving water quality and beneficial uses according to the following equation:

$$\underline{\text{Equation 1:}}\ C_{lmt} = C_{std} + D(C_{std} - C_{gw})$$

Where:

C_{lmt} = effluent limitation concentration
C_{std} = limiting water quality criterion
C_{gw} = ambient receiving ground water concentration
D = dilution ratio (Q_{gw} / Q_{eff})
Q_{gw} =ground water flux at the end of the mixing zone
Q_{eff} = average maximum daily discharge

Using the values provided above in **Table 6**, the result for C_{lmt} is 27.8 mg/L. This is the final WQBEL expressed as a concentration. Load limits are more appropriate for discharges to ground water since the long-term loading is the greater concern in absence of aquatic life considerations. Additionally, load limits inherently control both the strength and volume of the discharge. A discharge of 12,000 gallons per day containing 27.8 mg/L total nitrogen is equivalent to 2.7 pounds per day. 2.7 lbs per day total nitrogen is the nitrogen load limit for this permit. The limit calculations are provided in detail in **Appendix B**.

5.2 TOTAL PHOSPHORUS EFFLUENT LIMIT

DEQ determined (2019) that phosphorous discharged to ground water would reach the surface water (Thompson Creek) in 156 years. A phosphorous breakthrough time of greater than 50 years is considered nonsignificant. Therefore an effluent limit for TP will not be established in this Fact Sheet.

Proposed Effluent Limits

Based on the information and analyses presented above, DEQ proposes the numerical effluent limitations shown in **Table 8** below.

Table 8.

Proposed Final Effluent Limits – Outfall 001		
Parameter	**Units**	**Daily Maximum**(1)
Total Nitrogen (as N)	lbs/day	2.7
Footnotes: Beneficial Uses: ARM 17.30.1006 (1) See definition in Part V of permit.		

5.3 SPECIAL CONDITIONS

The following special conditions will be included in the permit.

1. The East Gallatin Commercial Center is experiencing higher than anticipated discharge flow. At the time of this renewal, the facility is in discussions with Gallatin County and DEQ regarding measures available to the operator to bring daily maximum flows into compliance with the facility's Certificate of Survey Approval. Current effluent limits and non-degradation calculations for this facility use the design maximum daily flow of 12,000 gallons per day. A change in maximum daily flow may require a modification of this Ground Water Discharge Permit.

As a condition of this permit, the applicant will submit to DEQ a plan addressing the control of maximum daily flows. This plan shall be approved by the DEQ Subdivision program. See Compliance Schedule Table 10 for the timetable for the completion of this condition. This plan will include a timetable for the completion of the approved actions.

2. The applicant will supply DEQ with a characterization of the downgradient monitoring well MW-1. This characterization will include the total depth of the well, the static water level and screening or construction information available. MW-1 should be drawing samples from the first 15 feet of the shallow aquifer.

6.0 MONITORING AND REPORTING REQUIREMENTS

DEQ requires effluent and ground water monitoring to assure compliance with the effluent limitations and therefore water quality standards. Effluent monitoring and ground water monitoring is required as a condition of this permit. All monitoring and sampling required by this permit must be representative; therefore the permit identifies specific monitoring locations. Monitoring requirements and rationale are summarized below.

6.1 INFLUENT AND EFFLUENT MONITORING

This permit includes numeric effluent limitations with specific magnitudes and durations to ensure the discharge will not cause or contribute to an exceedance of an applicable water quality standard (see **Section 3**). Accordingly, the permittee is required to monitor and report at a specified frequency in order to demonstrate compliance with these limitations.

Influent and effluent samples and discharge flow measurements must be representative of the nature and volume of the effluent. The influent sampling (INF-001) is done in the distribution tank prior to treatment. The effluent sample location (EFF-001) is located at dose tank prior to discharge. Both are shown in **Figure 3**. The permittee 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. The flow measuring device (FM-001) is located between the dose tank and the drainfield (**Figure 3**).

Effluent and influent monitoring and reporting requirements are summarized in **Table 9** below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

Table 9. Influent and Effluent Monitoring Requirements

Effluent Monitoring and Reporting Requirements – Outfall 001

Analyte/Measurement	Monitor Location	Units	Sample Type[1]	Minimum Sample Frequency	Reporting Requirements[1][2]	Report Freq
Count of Daily Samples Collected During Reporting Period	EFF-001	-	-	-	Count	Quarterly
Flow Rate, Effluent[3]	FM-001	gpd	Contin-uous	Contin-uous	Daily Maximum Monthly Average	Monthly
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N)[4]	EFF-001	mg/L	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly
		lbs/day[5]	Calculate	1/Quarter	Daily Maximum[6] Quarterly Average[7]	Quarterly
Phosphorus, Total (as P)	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly

Influent Monitoring and Reporting Requirements – Outfall 001

Analyte/Measurement	Monitor Location	Units	Sample Type[1]	Minimum Sample Frequency	Reporting Requirements[1][2]	Report Freq
Nitrogen, Nitrite+Nitrate (as N)	IFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	INF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N)[4]	INF-001	mg/L	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly

(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.
(3) Requires recording device or totalizing meter, must be capable of recording daily effluent volume.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10^{-6}].
(6) Daily Maximum Load calculation: lbs/day = the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
(7) Quarterly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day) recorded during the reporting period.

6.2 GROUND WATER MONITORING

Ground water monitoring was established in the 2006 and continued in the 2013 permit renewal. Monitoring will continue at MW-1. Results will be recorded on DMRs.
Ground water monitoring and reporting requirements are summarized in **Table 10**. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

Table 10.

Ground Water Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location(1)	Units	Sample Type(2)	Minimum Sampling Frequency	Reporting(2)(3) Requirements	Reporting Frequency
Chloride (as Cl)	MW-1	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Count of Daily Samples Collected During Reporting Period	MW-1	-	-	-	Count	Quarterly
Escherichia coli Bacteria	MW-1	CFU/100m	Grab	1/Quarter	Quarterly Average(4)	Quarterly
Nitrogen, Nitrate + Nitrite (as N)	MW-1	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	MW-1	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Specific Conductivity @ 25°C	MW-1	µS/cm	Instant-aneous	1/Quarter	Quarterly Average	Quarterly
Static Water Level (SWL)(5)	MW-1	ft-bmp	Instant-aneous	1/Quarter	Quarterly Average	Quarterly
Well Depth	MW-1	ft-bmp	Instant-aneous	1/Quarter	Quarterly Average	Quarterly

Footnotes:
CFU = Colony Forming Units
ft-bmp = feet below measuring point
s.u. = standard units
At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.
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
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 monitor
(1) Refer to Section 2. and Figure 1 of the Fact Sheet for the location of the monitoring well.
(2) See definitions in Part V of the permit.
(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) The geometric mean must be reported if more than one sample is taken during a reporting 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.

COMPLIANCE SCHEDULE

The actions listed in **Table 11** 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 Part II.D and Part IV.G of the permit.

Table 11.

Compliance Schedule			
Action	**Freq.**	**Scheduled Completion Date of Action**(1)	**Scheduled Report Due Date.**(2)
Submit to DEQ Subdivision Program a plan describing how the East Gallatin Commerical Center Subdivision will maintain compliance with its existing Certificate of Subdivision Approval for Maximum Daily Flow to the subsurface drainfiield.	**Single event**	**Within 180 days of the effective date of the permit.**	Due on or before the 28th day of the month following the completion date.
Submit to DEQ Subdivision Program a report documenting the insallation or implmentation of the necessary procedures or facility improvements, approved by the Department for the East Gallatin Commercial Center Subdivision to comply with its existing Certificate of Subdivision Approval for Maximum Daily Flow to the subsurface drainfield.	**Single event**	**Within 365 days of the effective date of the permit.**	Due on or before the 28th day of the month following the completion date.
Submit to DEQ a report characterizing the downgradient monitoring well MW-1. Provide total depth, well construction details, screens, diameter and measuring depth. If MW-1 does not provide for the sampling of the top 15 feet of the shallow aquifer a new well must be installed or identified for use in downgradient monitoring.	**Single event**	**Within 180 days of the effective date of the permit.**	Due on or before the 28th day of the month following the completion date.

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 Section 5.3.

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 23, 2019 for Public notice MT-19-20. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or to:

Montana Department of Environmental Quality
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 are 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) 444-5546 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000165), 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.

APPENDIX A – NONSIGNIFICANCE PROJECTIONS

DEQ performed a new Phosphorus Breakthrough Analysis for Thompson Creek in August 2019. This is attached below.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHOROUS BREAKTHROUGH ANALYSIS TO THOMPSON CREEK

SITE NAME:	East Gallatin Commercial Center
COUNTY:	Gallatin County
Permit #:	MTX000165
NOTES:	Variables used are based on conservative measurements
	Design Capacity = 12,000 gpd = 1,604 ft³/day

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	380	ft
L	Length of Primary Drainfield's Long Axis	375	ft
W	Width of Primary Drainfield's Short Axis	94	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	6	ft
D	Distance from Drainfield to Surface Water	2700	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	1.0	ft
Ne	1.0 ft for fine soils)**		
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#I	Number of proposed wastewater treatment systems	40	
CONSTANTS			
PI	Phosphorous Load per proposed wastewater treatment system	6	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (PI)(#I)	240	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	21150000	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	166387500	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	37508	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	156	years

BY: R. Morse
DATE: 08/19

NOTES: ** Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*

REV. 04/2000

APPENDIX B – EFFLUENT LIMIT CALCULATIONS

The system consists of Sequencing Batch Reactor (SBR) system.

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 establishes 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 are derived from a mass-balance equation (ARM 17.30.517) which is a simple steady-state model, used to determine concentration after accounting for other sources of pollution in the receiving water and any dilution as provided by a mixing zone. The mass-balance equation (Equation 1) derived for ground water is as follows:

Equation 1:

$$Q_{gw}C_{gw} + Q_{eff}C_{eff} = Q_{comb}C_{proj}$$

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 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 mixing (Section 4).

Equation 2:

$$C_{lmt} = C_{std} + D(C_{std} - C_{gw})$$

Where:
C_{lmt} = effluent limitation concentration
C_{std} = water quality standard concentration = 7.5 mg/L
C_{gw} = ambient receiving ground water concentration = 1.62 mg/L
D = dilution ratio (Q_{gw} / Q_{eff}) = 5546 / 1604

C_{lmt} =7.5 + (5546/1604)(7.5 – 1.62) **= 27.8 mg/L**

A mass-balance approach is used to calculate the effluent quality of the discharge that meets the most restrictive water quality standard at the end of the mixing zone. Numeric effluent limitations are expressed as loads since this type of limitation inherently regulates both volume and strength of the effluent as prescribed by 75-5-402(3), MCA. Load limits ensure compliance with the ground water standards at the end of the mixing zone. Based on the proposed design capacity, the respective load effluent limitation is:

2.7 lbs/day
[(8.34*10-6)* 27.8 mg/L*19,000 gpd]
as based on the following equation:

Equation 3:

$$L_{lmt} = CON * C_{eff} * DC_{eff}$$

Where:
L_{lmt} = effluent limitation-load
C_{eff} = allowable effluent concentration
DC_{eff} = design capacity of wastewater treatment system (gpd)
CON = conversion factor [$8.34*10^{-6}$]

The Final Effluent Limits for Outfall-001 are summarized in **Table 8**.