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:	DRH Chico Tenant, LLC
Permit Number:	MTX000105
Permit Type:	Domestic wastewater
Application Type:	Renewal
Facility Name:	Chico Hot Springs Resort and Day Spa
Facility Location:	Section 01, Township 06 South, Range 08 East Park County Latitude: 45.34001° Longitude: -110.69501°
Facility Address:	163 Chico Road, Pray, MT 59065
Facility Contact:	Gideon Bernstein
Treatment Type:	Level 2
Receiving Water:	Class I Ground Water
Number of Outfalls:	1
Outfall / Type:	001 / subsurface drainfield
Effluent Type:	Domestic strength wastewater
Mixing Zone:	Standard
Effluent Limit Type:	WQBEL
Effluent Limits:	Total nitrogen: 7.9 lbs/day
Flow Rate:	Design maximum: 21,000 gpd Design average: 17,000 gpd
Effluent sampling:	Quarterly, EFF-001
Ground water sampling:	Annually, cold spring
Fact Sheet Date:	March 13, 2026
Prepared By:	Melinda Horne

1.0 PERMIT INFORMATION

The following fact sheet outlines the basis for issuing a new Montana Ground Water Pollution Control System (MGWPCS) wastewater discharge permit to DRH Chico Tenant, LLC (permittee) for the Chico Hot Springs Resort and Day Spa (facility). 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 operation, and maintenance of the wastewater treatment and disposal system.

DEQ issues MGWPCS permits for a period of five years. The permit may be renewed at the end of the period, subject to timely application, reevaluation of compliance, water quality, and operations and maintenance.

1.1 PERMIT HISTORY

This facility gained MGWPCS permit coverage in 1999 and subsequent permit renewals occurred in 2009 and 2017. DEQ received an application for renewal of the 2017 permit on July 12, 2021. Renewal fees accompanied the application. DEQ reviewed the submittal and issued a completeness letter on July 13, 2022.

On September 14, 2023, DEQ received a permit transfer notification requesting that permit ownership be transferred to DRH Chico Tenant, LLC. On November 14, 2023, DEQ modified the 2016-issued permit to reflect this change in ownership.

1.2 COMPLIANCE HISTORY

In 2022, a compliance inspection performed by the Department found no major violations.

1.3 CHANGES TO THIS PERMIT

The 2017 permit gave the facility total nitrogen effluent limits in the form of a maximum daily load using a nonsignificance criteria applicable to conventional treatment systems (5.0 mg/L; ARM 17.30.715). This permit will give the facility a total nitrogen effluent limit in the form of an average quarterly load using the nonsignificance criteria applicable to Level 2 systems (7.5 mg/L; ARM 17.30.715). This results in the total nitrogen effluent limit increasing from 5.1 lb/day to 7.9 lb/day (**Section 5.0**).

Additionally, due to the permittee's ongoing compliance with permit requirements, daily maximum monitoring will no longer be required (**Section 6.0**).

Finally, this permit includes annual monitoring of the facility's cold spring prior to drinking water treatment (**Section 6.0**). This data will be used to develop future effluent limits.

2.0 FACILITY INFORMATION

2.1 LOCATION

Chico Hot Springs is an existing resort and spa with a hotel, bar, restaurant and convention center, located approximately two miles south-east of Emigrant Montana (**Figure 1**). It is situated at the valley edge, bordering the Montana Absaroka mountain range (**Figure 2**).

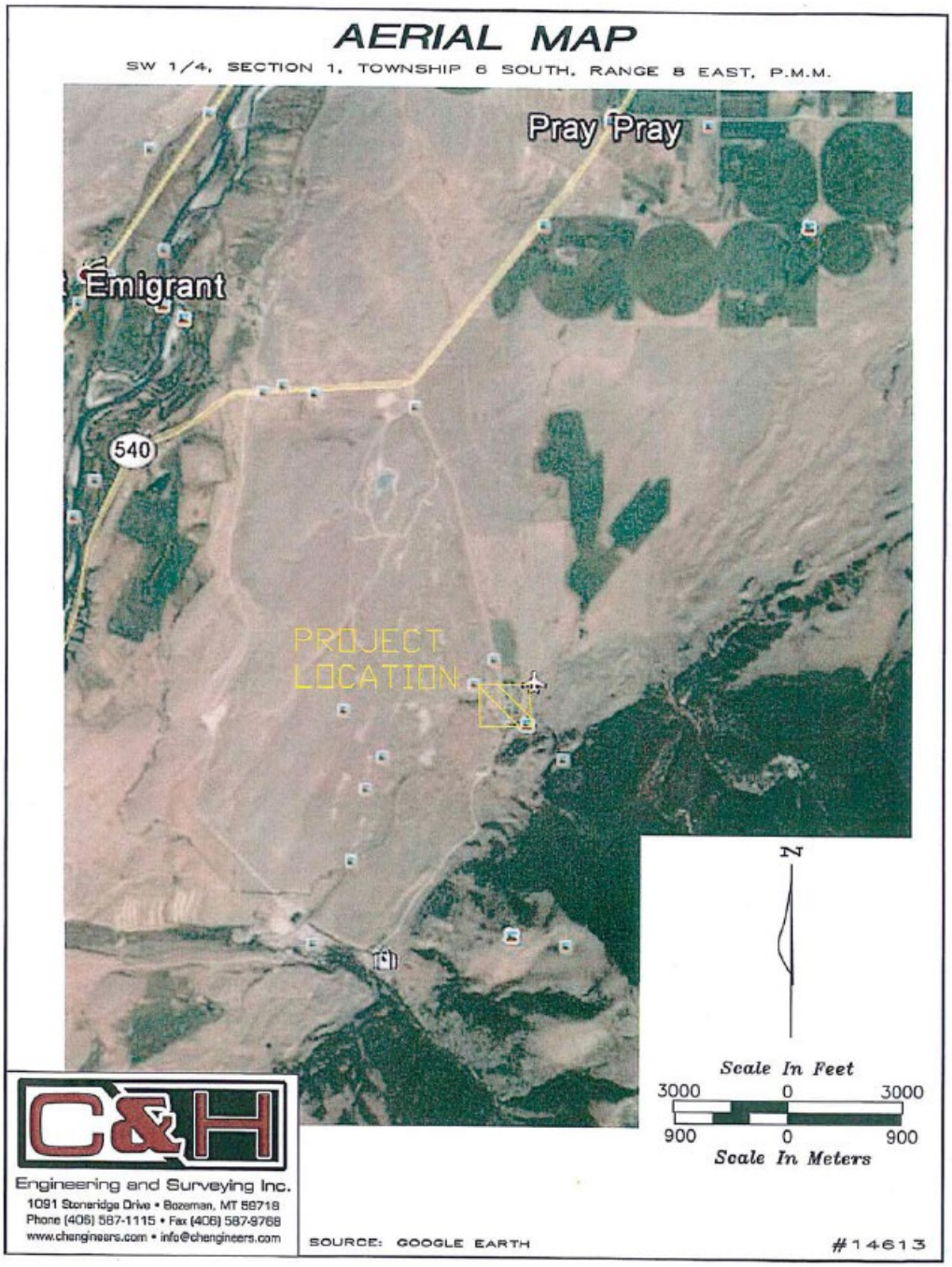

Figure 1: Location of the facility

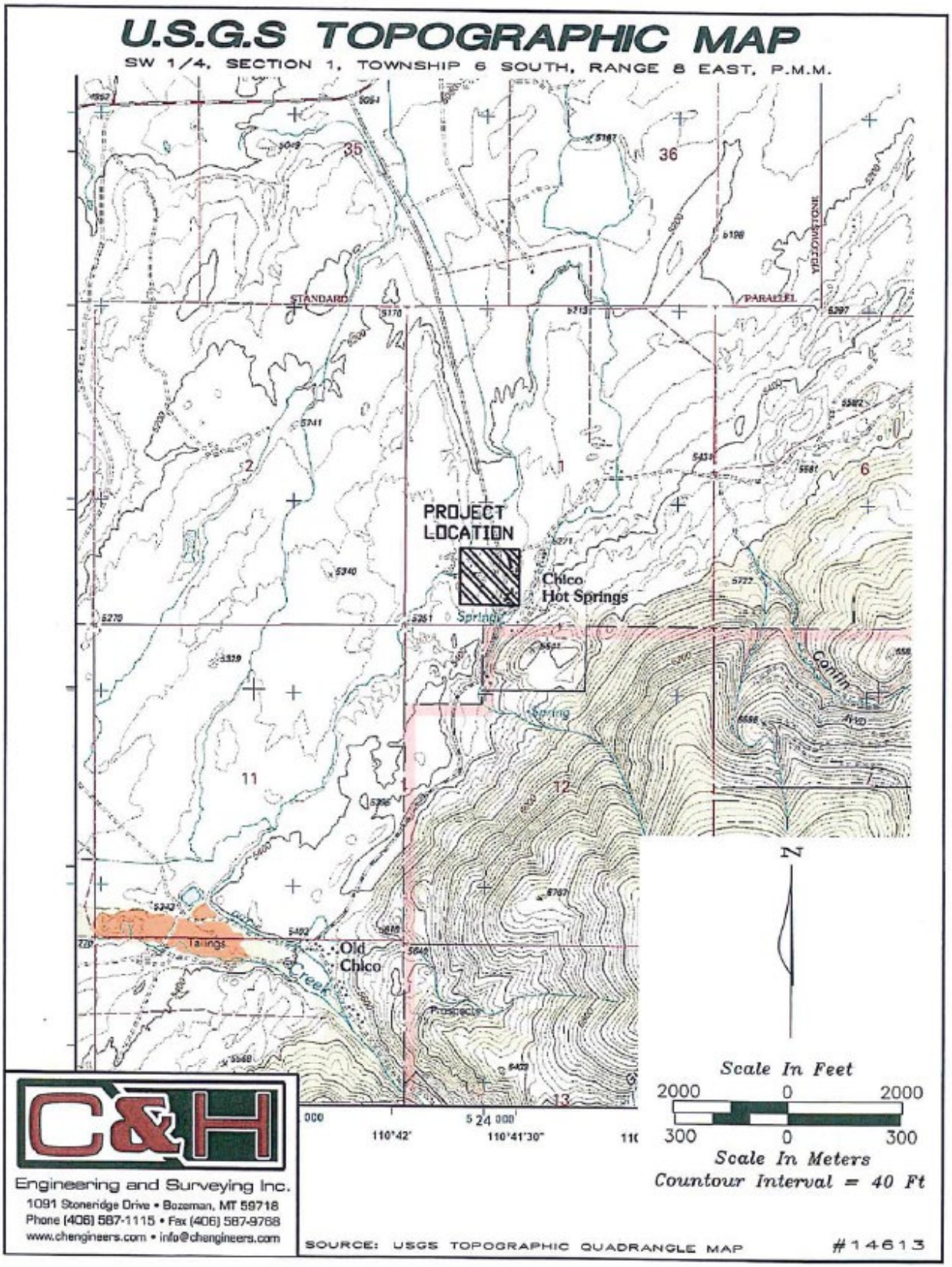

Figure 2: Topographic map of the Chico Hot Springs area

2.2 OPERATIONS

The wastewater treatment system was originally reviewed and approved by DEQ public water program in 1996 (EQ# 96-1773). DEQ approved updates to the system in 1999 and 2016 (EQ#99-1771 and EQ#17-1135, respectively). In 2021, the entire system underwent two phases of upgrades which resulted in converting the treatment system from conventional to Level 2, recirculating trickle filters (EQ#18-2254).

The current system consists of two 15,000-gallon septic tanks, a 35,000-gallon multi-purpose tank, a 25,000-gallon anoxic tank, an eight-pod Advantex AX100 wastewater treatment system, a 5,000-gallon dose tank, and four drainfields. Wastewater is pumped from the septic tanks, which are located at the main lodge area, to the treatment system, which is located uphill and adjacent to the day-spa. The multi-purpose tank consists of three smaller tanks: aeration tank, recirculation tank, and clarification tank; the multi-purpose tank also houses pumps. Effluent flow is measured using a magnetic meter; flow is recorded using a totalizer. Samples are collected from a sampling port following the dose tank and before discharge to the drainfields.

See **Figure 3** for the facility site plan and **Figure 4** for the wastewater line diagram. System operations are summarized below in **Table 1.**

Table 1: Operations Summary
Sources and Treatment
Contributing Sources of Wastewater: Domestic-in-Nature, Residential Strength Standard Industrial Code(s) (SIC) of contributing sources: 4952 Population served: 415 Treatment System: Level 2 Recirculating Trickling Filter Location of System: Section 01, Township 06 South, Range 08 East Latitude: 45.34001, Longitude: -110.69501 Park County
Sampling/Monitoring
Wastewater System: EFF-001: Effluent wastewater sample point located at sample port located at the dose tank. FM-001: Effluent flow meter located in meter vault at the 35,000 gal pre-anoxic tank.
Disposal Operation
Outfall 001 - Subsurface Drainfield Method of Disposal: Pressure dosed subsurface infiltration to groundwater Location: Section 01, Township 06 South, Range 08 East Latitude: 45.34001, Longitude: -110.69501 Design Capacity: Average Daily Flow (gpd): 17,000 Maximum Daily Flow (gpd): 21,000

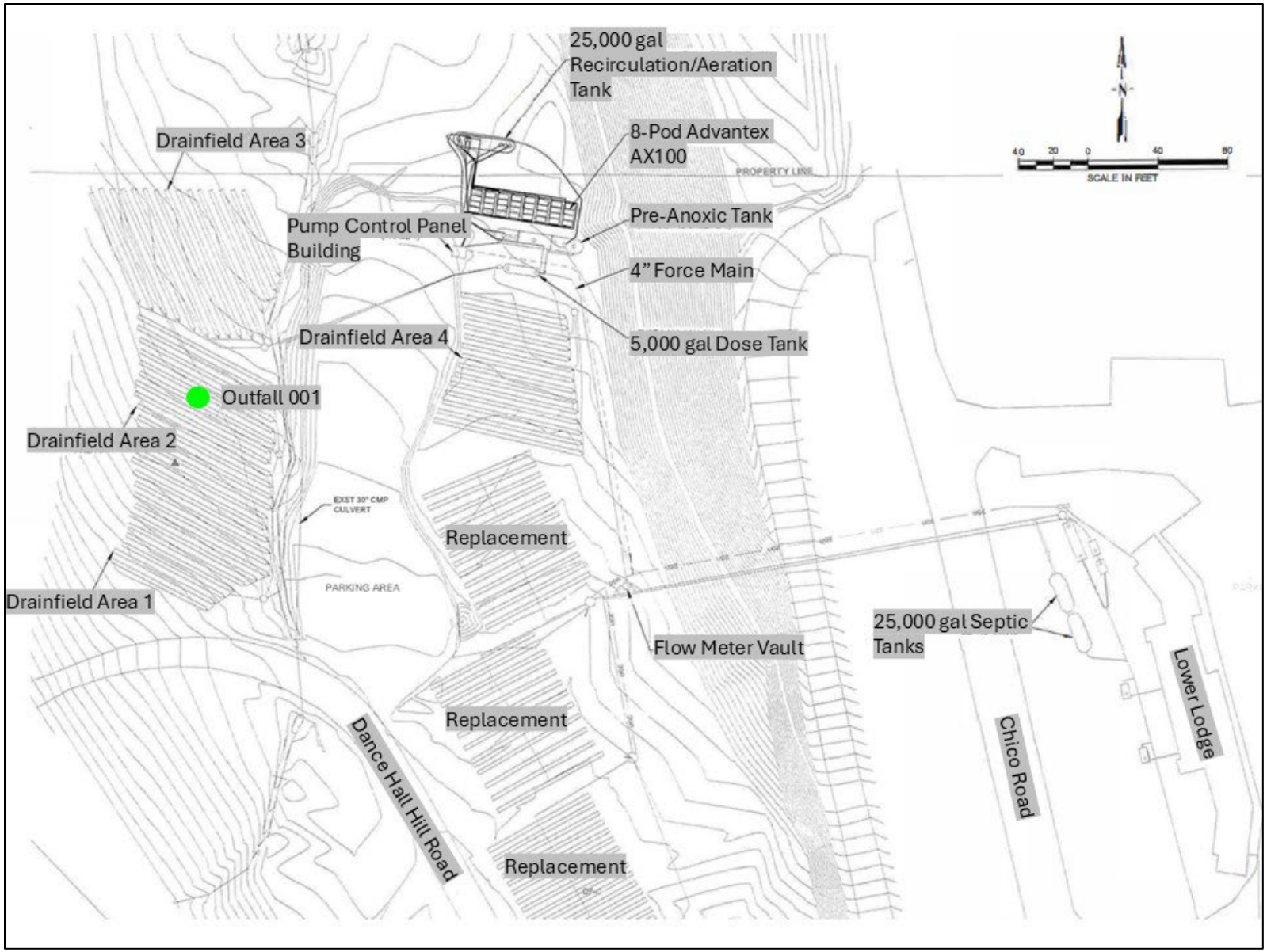

Figure 3: Facility Site Plan

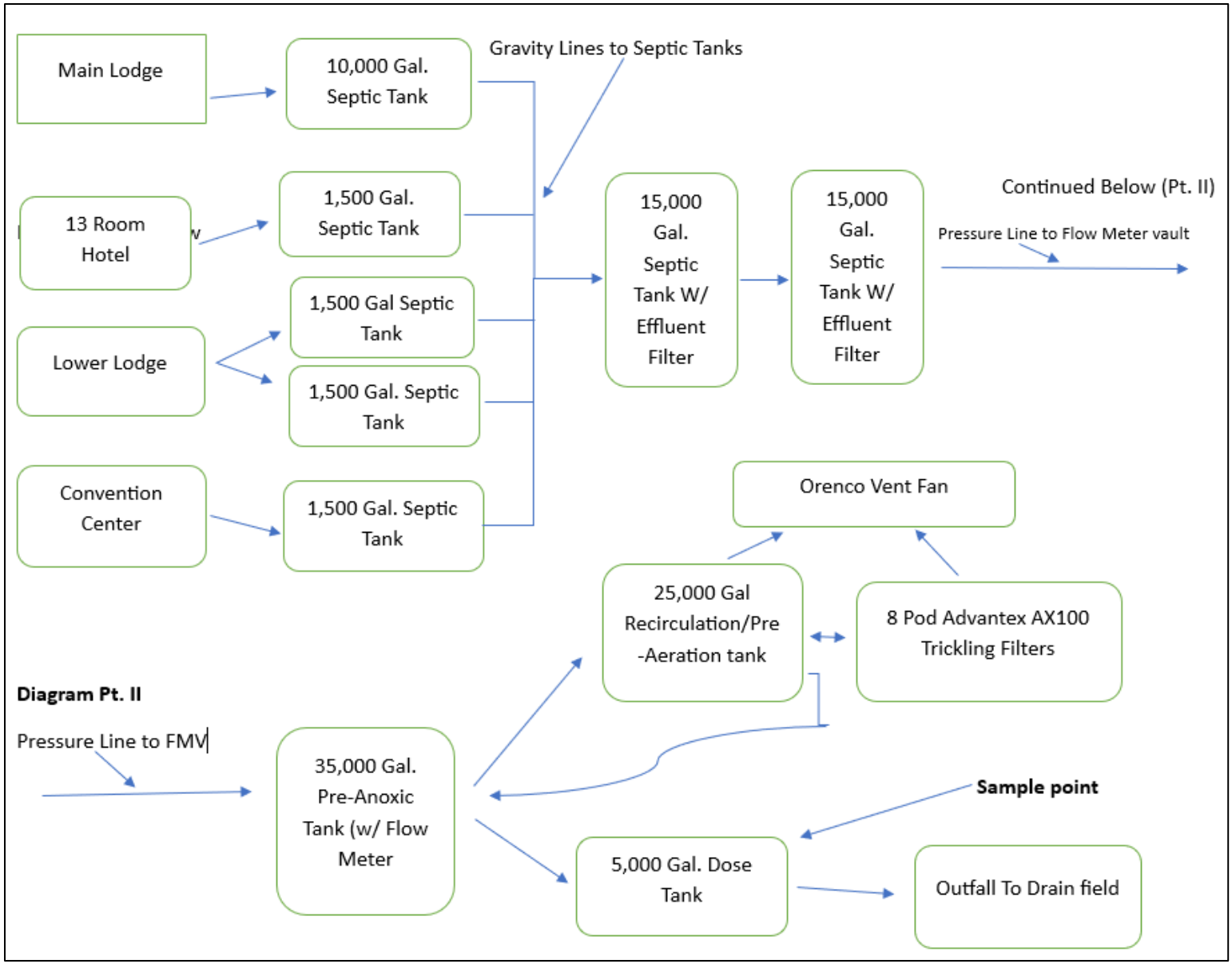

Figure 4: Wastewater Treatment System Line Diagram

2.3 GEOLOGY/HYDROGEOLOGY/HYDROLOGY

A summary of the site geology and ground water characteristics are provided in **Table 2**. A geologic map is provided as **Figure 5**.

Table 2: Geology/Hydrogeology/Hydrology Summary	
Geology	The facility is located within the Paradise Valley; the structure of which was produced by Sevier-Laramide style compression, Basin-and-Range extension, Yellowstone Hotspot migration, and late Pleistocene glaciation (Edinburg, 2024). Chico and most of the surrounding foothills downslope of the Absaroka Range are located on surficial glacial till and outwash deposits (Lopez and Reiten, 2003). Several normal faults separate the facility from Madison limestone, Tertiary dacite, and Proterozoic mylonite (**Figure 5**). Underlying the drainfields is glacial till from the Pinedale Chico advance, which consists of unsorted, unstratified sediment ranging from clay to boulders (**Figure 5**; Lopez and Reiten, 2003).
Hydrogeology	Most water wells in the Paradise Valley are located in unsorted glacial drift deposits. Wells are generally completed in sand and gravel lenses that have limited lateral connectivity, making ground water flow within the aquifer unpredictable. Wells within the glacial drift aquifer have variable depths and yields, with a median well depth of 159 ft and a median yield of 30 gpm (Edinburg, 2024). The ground water wells nearest to the drainfields are approximately 1 mile northeast and are not expected to be impacted by the effluent discharge. In 2001, the permittee provided a hydraulic conductivity of 54 ft/day, hydraulic gradient of 0.0437 ft/ft, and ground water flow direction of N50°W (DEQ, 2001). The Yellowstone River is approximately 2.75 miles northwest of the facility in the direction of ground water flow. The connectivity between the glacial drift aquifer and alluvial aquifer surrounding the river has not been studied. The alluvial aquifer in the Paradise valley has a median well depth of 65 ft and median yield of 35 gpm (Edinburg, 2024). The facility's drinking water source is the cold spring south of the resort (**Figure 6**; **Table 3**). This spring emerges from the fractured Tertiary dacite porphyry aquifer (DEQ, 2002). The facility's hot spring is sourced from an intersecting fault system that fractures the Madison limestone formation, enabling deep thermal waters to rise to the land surface (**Table 3**; Chadwick and Leondard, 1979). These springs are a reasonable indicator of the potential water sources that

	leak into the glacial drift aquifer underlying the drainfields. Therefore, samples collected from the springs may be a reasonable indicator of water quality in the subsurface.
Hydrology	The nearest surface water in the direction of ground water flow (N50°W) is an unnamed ephemeral tributary approximately 4,200 feet downgradient of the drainfield. There are also multiple ditches that may originate from the Emigrant Creek, south of the facility. The ephemeral drainage and ditches both trend north-east along the foothills. These all are non-gaining surface water bodies as they are higher in elevation than the water level of the shallow aquifer.

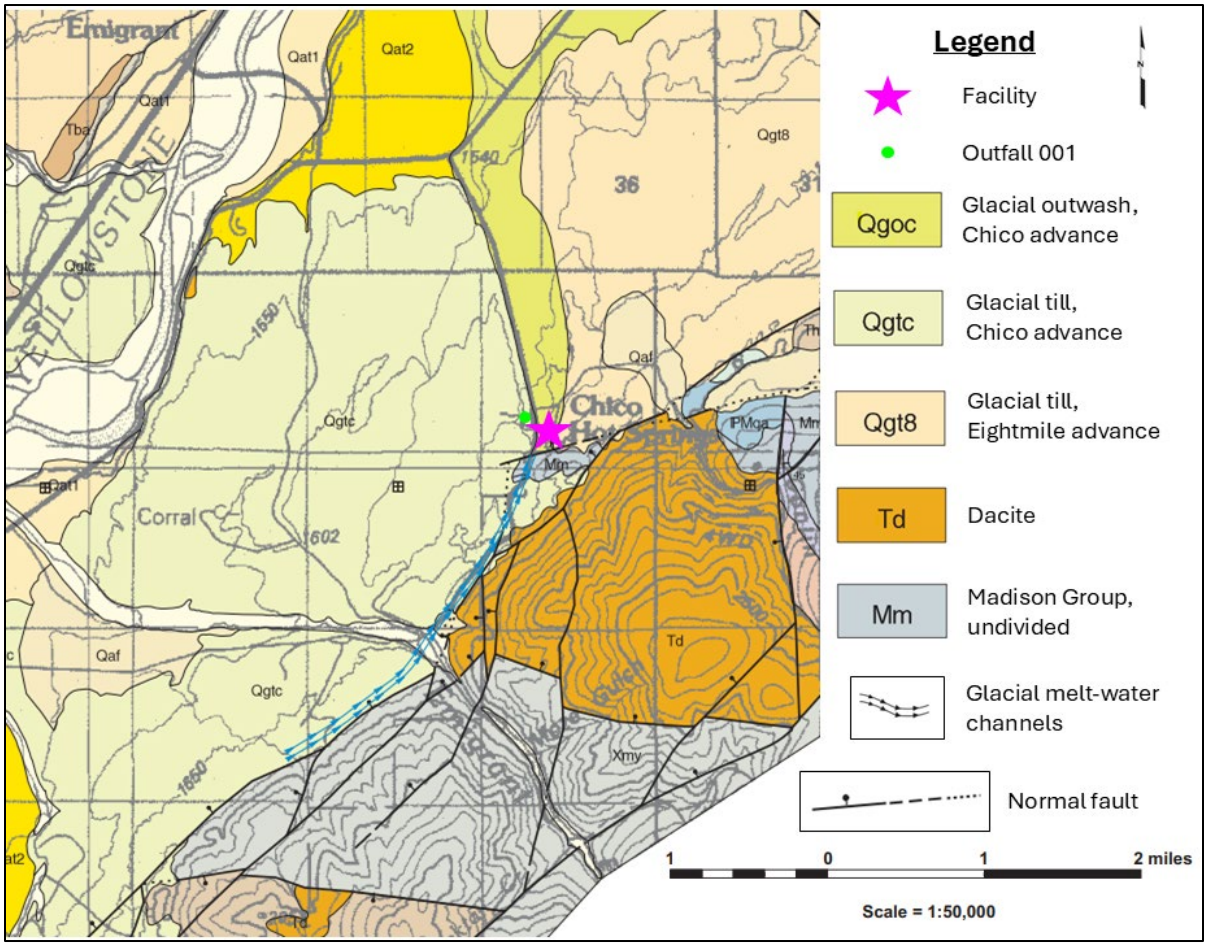

Figure 5: Geologic Map

2.4 GROUND WATER MONITORING NETWORK

The facility has one hot spring, one cold spring, and one well. There are no monitoring wells located in the receiving aquifer downgradient or upgradient of the treatment system. Due to the limited connectivity and availability of ground water in the aquifer, ground water monitoring has not been required for this facility.

Spring and well characteristics are provided in **Table 3.** A map of the features are included in **Figure 6.**

Table 3: Monitoring Well Summary
Spring: Chico Hot Spring
MBMG GWIC #: 260068
Use: This geothermal water is used for recreation, radiant heat, and on-site irrigation.
Permit Status: Inactive. Constructed on: n/a.
Location: South of the parking lot located on the south side of the Chico Main Lodge and Pool building. Latitude: 45.33690 Longitude: -110.69260
Representation: The geothermal water is sourced from deep in the subsurface via the Madison group. Any excess water not used by the facility likely discharges via gravity into the shallow aquifer underlying the facility.
Spring: Chico Cold Springs
MBMG GWIC #: 184649
Use: Public water supply for the resort.
Permit Status: Active. Constructed on: n/a.
Location: Located on the hill (upgradient) to the south of the resort. Latitude: 45.3325 Longitude: -110.6908
Representation: This spring is upgradient of the outfall. It is representative of a fractured bedrock aquifer that likely discharges via gravity into the glacial drift aquifer underlying the facility. This spring reasonably represents the ambient aquifer characteristics.
Water Well: Chico Well 2
MBMG GWIC #: 103651
Use: This well is not actively used.
Permit Status: Inactive. Constructed in 1977.
Location: Southeast of the drainfield. Latitude: 45.3378 Longitude: -110.6914
Representation: This well is completed in a zone of confined saturated clay over 215 feet in depth. It is not representative of the receiving aquifer.

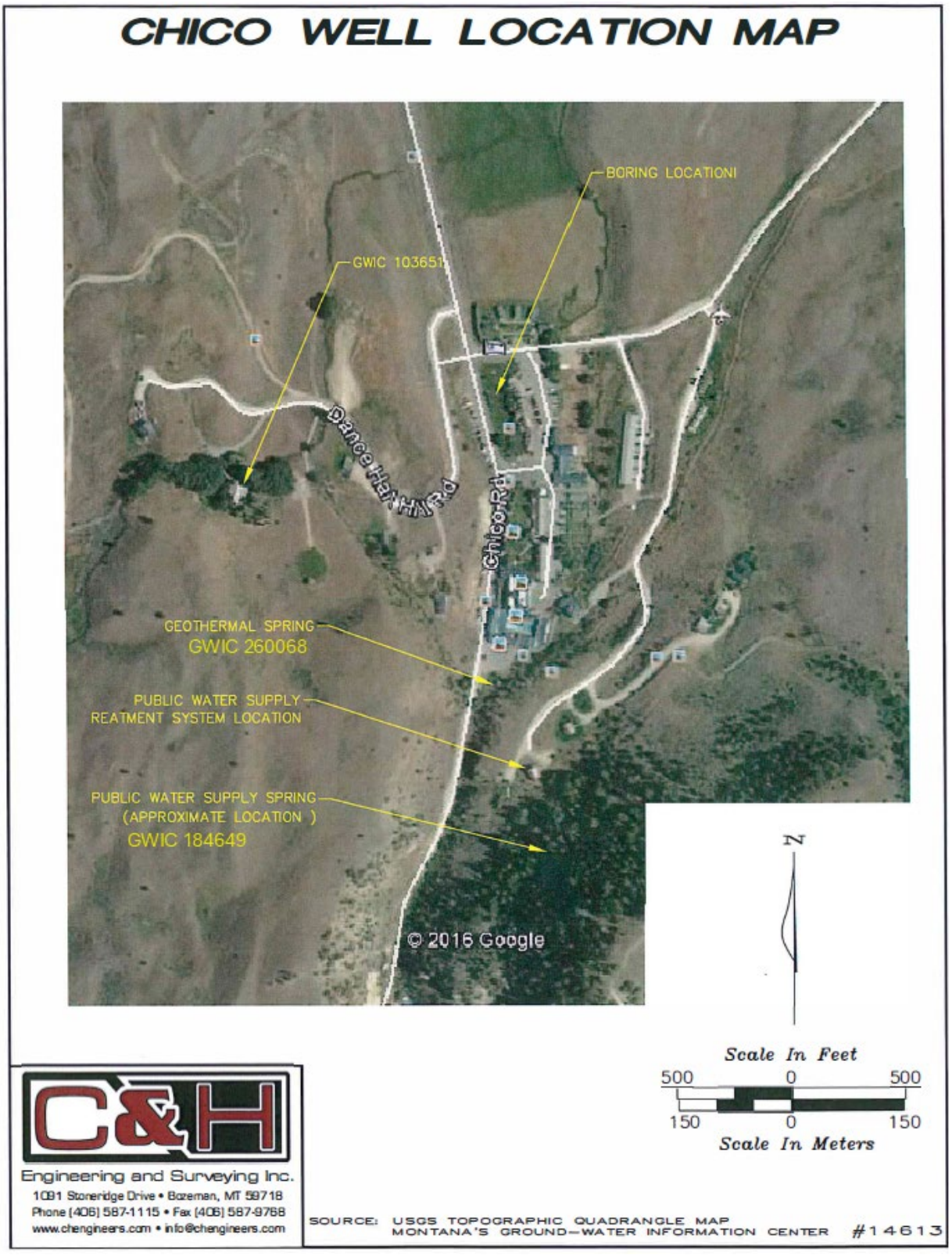

Figure 6: Monitoring Well Map

2.5 QUALITY INFORMATION

In 2021, The facility upgraded to a Level 2 wastewater treatment system that is capable of removing 60% of the raw wastewater nitrogen load. A summary of the effluent characteristics is provided in **Table 4**.

Table 4: Effluent Quality – Outfall 001

Parameter	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum(1) Value	# of Samples(2)	2017 Permit Limit(3)
Flow rate, Discharge	FM-001	gpd	5516	8081	16911	21	
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	4.1	8.7	38.1	15	
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	6.4	23.3	54.0	21	
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	11	29	61	21	
Nitrogen, Total (as N)	EFF-001	mg/L	17.2	33.2	61.0	22	
		lbs/day	1.1	1.9	4.5	22	5.1
Phosphorus, Total (as P)	EFF-001	mg/L	4.9	7.2	10.6	23	

Footnotes:
EFF-001: See **Table 1**
FM-001: See **Table 1**
Period of Record: 01/2020 through 10/2025.
(1) Maximum value recorded of all quarterly reported Daily Maximum Values.
(2) All samples provided via Digital Monitoring Reports (DMRs). Outliers removed.
(3) 2017 effluent limit: total nitrogen maximum daily load, 5.1 lb/day.

Water quality characteristics of the hot and cold springs were collected from one sampling event in 2016. The available water quality data is summarized in **Table 5**. Based on an average **322** microsiemens per centimeter (µS/cm) specific conductance, the receiving water is Class I ground water.

Table 5: Ambient Ground Water Characteristics

Location	GWIC ID	Date	TDS (mg/L)	Nitrate (mg/L)	Conductivity (µS/cm)
Cold Spring	184649	11/1/2016	275.31	<0.2	415.5
Hot Spring	260068	11/1/2016	109.94	0.28	228.8

Data sourced from GWIC. See **Appendix A** for data.

3.0 WATER QUALITY STANDARDS

Part of DEQ's mission is to protect, maintain, and improve the quality of state waters. Water quality standards provide the basis for limitations that protect state waters. These include maintenance of designated beneficial uses, specific water quality standards, and the State nondegradation policy. DEQ protects all designated uses of state water by basing effluent limitations on the most restrictive water quality standards intended to protect the most sensitive uses.

3.1 BENEFICIAL USES

The receiving state water is Class I ground water which is a high quality water of the state. The current and future beneficial uses of the aquifer must be protected. The beneficial uses and water quality standards necessary to protect those uses are listed below.

Beneficial uses:

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

Water quality standards are established to protect these beneficial uses. The applicable standards include the following:

- Ground water human health standards in DEQ 7;
- No increase in any parameter that renders receiving water harmful, detrimental, or injurious to the beneficial uses designated for Class I groundwater In ARM 17.30.1006; and,
- No increase of a parameter that causes violation of the nondegradation provisions in § 75-5-303, MCA.

DEQ protects all the assigned beneficial uses by protecting the most sensitive. The most restrictive standard will be used in formulating limitations (**Section 5.0**). The corresponding numeric and narrative standards are listed in **Table 6**.

Table 6: Water Quality Standards

Parameter[1]	Units	Ground Water Human Health Standards	Pollutant Category[2]	Nonsignificance Criteria[3]
Bacteria [*Escherichia coli*]	CFU/100mL	< 1	-	-
Nitrogen, Nitrate + Nitrite [as N]	mg/L	10.0	T	7.5
Nitrogen, Total (TN)[4]	mg/L	10.0	-	7.5
Phosphorus, Total Inorganic	-	-	H	Surface water breakthrough greater than 50 years[5]

Footnotes:

CFU = Colony Forming Unit
These standards establish the allowable changes in ground water quality and are the basis for limiting discharges to ground water.
(1) The list includes identified parameters of interest.
(2) Circular DEQ-7: Carcinogen (C), Harmful (H), and Toxic (T) parameter. Toxic pollutant with a Bioconcentrator (B) factor.
(3) Criteria indicates threshold for a significant activity that may lead to degradation. 7.5 mg/L total nitrogen is the nonsignificance criterion for Level 2 systems.
(4) DEQ conservatively assumes all forms of nitrogen will convert to nitrates within the aquifer. DEQ recognizes that other nitrogen forms may be harmful to the beneficial uses therefore will use Total Nitrogen for projecting impacts and in formulation of compliance efforts (limitations).
(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.

3.2 NONDEGRADATION

Montana's nondegradation policy is intended to preserve the existing condition of high-quality state waters. Any water with existing conditions better than the water quality standards must be maintained at that high quality. The nondegradation policy allows discharges to cause only nonsignificant changes in water quality.

Activities that cause a significant change in water quality may not be authorized without an authorization to degrade. See 75-5-303(3), MCA. The permittee has not requested nor received an authorization to degrade.

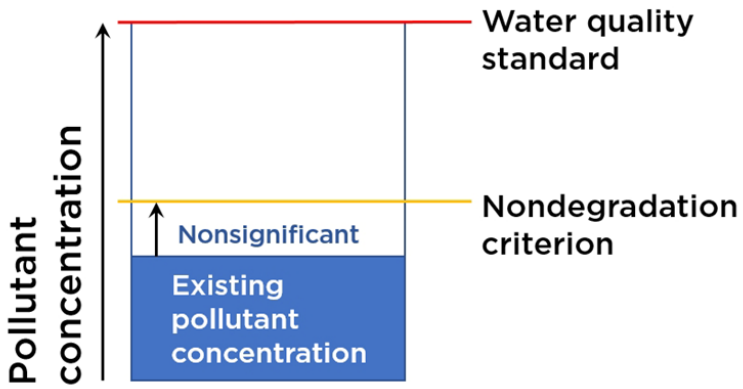

Figure 7: Nonsignificance schematic

3.3 SIGNIFICANCE DETERMINATION

DEQ performed a significance determination for the wastewater discharge in 1999, finding it to be nonsignificant (DEQ, 2026). The determination also established that the proposed discharge is a new or increased source (ARM 17.30.702) because it is an activity resulting in a change of existing water quality occurring on or after April 29, 1993. Discharges in compliance with the nonsignificance criteria established within this permit do not constitute a significant activity.

In 2021, the facility upgraded the wastewater treatment system from conventional treatment (50 mg/L design concentration for total nitrogen) to Level 2 treatment (24 mg/L design concentration for total nitrogen). The system average daily wastewater flow also increased from 11,370 gpd to 17,000 gpd. This upgrade therefore resulted in a net decrease in average daily total nitrogen loading from 4.7 lb/day to

3.4 lb/day. Based on this and the information provided in the permit renewal application, no new or increased pollutant loading is proposed, so the 1999 significance determination does not need to be updated.

Changes of nitrate as nitrogen in ground water are nonsignificant if the discharge will not cause degradation of surface water and the predicted concentration of nitrate as nitrogen at the boundary of the ground water mixing zone does not exceed 7.5 mg/L for Level 2 systems. See §§ 75-5-301(5)(c)(d), MCA, 75-5-317(2)(u), and ARM 17.30.715(1)(d). Using the nonsignificance criterion of 7.5 mg/L, DEQ will establish effluent limitations and long-term monitoring requirements for compliance at the end of the mixing zones (**Section 5.0**).

For phosphorus, a surface water breakthrough time of greater than 50 years is a nonsignificant change in water quality. See § 75-5-317(2)(u), and ARM 17.30.715(1)(e). The phosphorus criterion requires an analysis to determine a breakthrough time based on the adsorption capacity of the soil. Breakthrough occurs when the subsurface soils lose their capability to adsorb any more phosphorus, and it has a potential to reach surface water.

DEQ updated the phosphorus breakthrough analysis in 2016 to account for newly added drainfields. The 2016 breakthrough estimated that phosphorus discharged to ground water from Outfall 001 may reach surface water in 159 years (**Appendix B)**. The predicted phosphorus breakthrough is greater than 50 years and, therefore, is not significant.

These analyses show that the discharge activity authorized by the permit is not significant. The permittee is required to comply with the established permit effluent limitations on a long-term basis.

3.4 CUMULATIVE EFFECTS

DEQ considered the direct, secondary, and cumulative environmental impacts of the operation of the facility and found no significant adverse effects on water quality, the human environment, and the physical environment. The DEQ analysis included the cumulative impact from other past and present actions.

All major discharge permitting actions, including the current action and any future actions, will include any substantive information derived from public input relating to potential impacts on the human environment and on water quality. All future actions related to this current action will be addressed by DEQ through additional discharge permitting process procedures. Any actions that are outside the purview of the discharge permit may not be addressed by DEQ until the next permitting action takes place.

To protect beneficial uses, there shall be no increase of a pollutant to a level that renders the waters harmful, detrimental, or injurious. Therefore, no wastewaters may be discharged such that the wastewater either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard.

The allowable discharge will be derived from a mass-balance equation that determines the assimilative capacity of the receiving aquifer. This factors in the cumulative impacts of all existing upgradient discharges in the receiving aquifer.

Long-term monitoring and reporting, continual analysis and updates of permit conditions, and public notice and comment procedures is a benefit to having a system that is covered under a discharge permit.

4.0 MIXING ZONE

A mixing zone is an area of the receiving shallow ground water where the aquifer is able to assimilate wastewater pollutants. It is a specifically defined area of the receiving aquifer where water quality standards may be exceeded. The availability of dilution is based on the site-specific aquifer characteristics and the drainfield dimensions. The allowable level of dilution is limited by the permit to ensure that water quality standards are met at the end of the mixing zone.

The applicant requested a standard mixing zone for this combined discharge. 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 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 top contact of the ground water table. A map of the proposed mixing zone is provided in Figure 8.

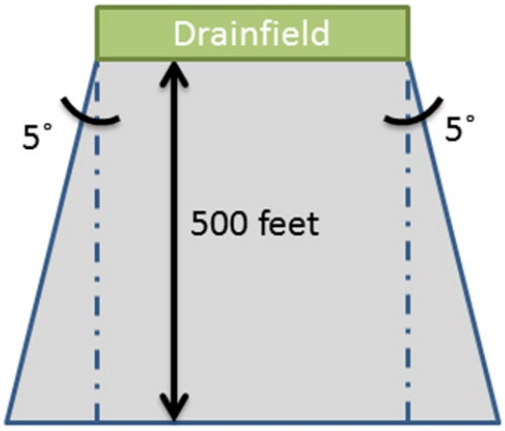

Figure 8: Mixing Zone Schematic

Information below provides details on how DEQ calculates the available dilution of the receiving aquifer. A summary is provided in **Table 7.**

Based on the dimensions of the mixing zone, and the hydrogeologic characteristics (**Section 2**), the volume of ground water (Q_{gw}) available to mix with the wastewater is calculated using Darcy's Equation:

$$Q_{gw} = KIA$$

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

Table 7: Hydrogeologic and Mixing Zone Information - Outfall 001

Parameter	Units	Value
Mixing Zone Type	-	Standard
Authorized Parameters	-	Total Nitrogen
Ambient Ground Water Concentrations, Nitrate + Nitrite	mg/L	0.24
Ground Water Flow Direction	azimuth/bearing	N50°W
Length of Mixing Zone	feet	500
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	340
Width of Mixing Zone at Down Gradient Boundary	feet	427.5
Cross Sectional Area of Mixing Zone (A)	ft^2	6412.5
Hydraulic Conductivity (K)	feet/day	54
Hydraulic Gradient (I)	ft/ft	0.0437
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	15,132

5.0 LIMITATIONS

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.

5.1 NITROGEN

To protect beneficial uses, there shall be no increase of a pollutant to a level that renders the waters harmful, detrimental, or injurious. Therefore, no wastewaters may be discharged such that the wastewater either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. DEQ will establish an effluent limitation for nitrogen within this permit. The limit will conservatively be based on the projection that the entire nitrogen load in the wastewater stream may ultimately be converted to nitrate.

The allowable discharge will be derived from a mass-balance equation which is a simple steady-state model that determines the assimilative capacity of the receiving aquifer. The equation factors in cumulative impacts of existing upgradient discharges in the receiving aquifer and any available dilution within the mixing zone. The mass-balance equation derived for ground water is as follows:

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

Where Q_{gw} = ground water available for mixing; C_{gw} = ambient receiving ground water concentration; Q_{eff} = design capacity of wastewater system; C_{eff} = effluent pollutant concentration; Q_{comb} =

combined ground water and effluent volume; and, C_{proj} = projected pollutant concentration (after available dilution).

The mass-balance equation has been arranged to calculate the maximum amount of nitrogen that can be added to the aquifer without causing or contributing to an exceedance of the water quality standard:

$$C_{limit} = C_{std} + \frac{Q_{gw}}{Q_{eff}}(C_{std} - C_{gw})$$

Where C_{limit} = concentration-based effluent limit; C_{std} = water quality standard concentration; Q_{gw} = ground water available for mixing; Q_{eff} = design capacity of wastewater system; and, C_{gw} = ambient receiving ground water concentration. See **Appendix C** for this calculation.

Numeric effluent limits are often expressed as loads which inherently regulates both volume and strength of the discharge. The load limit ensures compliance with the ground water standard at the end of the mixing zone.

$$L_{limit} = C_{limit} Q_{eff} f_{con}$$

Where L_{limit} = load-based effluent limit (lb/day); C_{limit} = concentration-based effluent limit (mg/L); Q_{eff} = design capacity of wastewater system (gpd); and, f_{con} = conversion factor of 8.34×10^{-6}.

With the facility's average design capacity of 17,000 gpd, the resulting concentration and load limits are:

C_{limit} = 55.8 mg/L
L_{limit} = **7.9 lbs/day**

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 impacts to the receiving water.

5.2 PHOSPHORUS

As discussed in **Section 3.3**, the phosphorus breakthrough analysis estimated the phosphorus breakthrough to occur in 159 years. Predicted phosphorus breakthrough within 50 years is considered significant. Therefore a limit has not been developed.

5.3 FINAL EFFLUENT LIMITS

The effluent limitations for this permit are summarized in **Table 8.**

Table 8: Effluent Limitations – Outfall 001

Parameter	Units	Quarterly Average
Nitrogen, Total [as N]	lbs/day	7.9

Quarterly load calculation: The quarterly average of all individual daily concentrations and the quarterly flow total must be used in the load calculations. Calculation rules are provided within the Wastewater Monitoring Tables.

6.0 MONITORING AND REPORTING

Long-term monitoring and reporting of wastewater will be established as a condition of the permit. Monitoring of the wastewater characteristics before and after treatment will help ensure operation, maintenance, and compliance with the permit limitations. Wastewater monitoring and reporting requirements are provided in **Table 9**.

Table 9: Effluent Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type(1)	Minimum Sample Frequency	Reporting Requirements(1)(2)	Report Frequency
Flow Rate, Effluent(3)	FM-001	gal/day	Contin-uous	Contin-uous	Quarterly Average(4)	Quarterly
	FM-001	gal/quarter	Contin-uous	Contin-uous	Quarterly Total	Quarterly
Nitrogen, Nitrite+Nitrate [as N]	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Ammonia [as N]	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)[as N]	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total [as N](5)	EFF-001	mg/L	Calculate	1/Quarter	Quarterly Average	Quarterly
		lbs/day(6)	Calculate	1/Quarter	Quarterly Average	Quarterly
Phosphorus, Total [as P]	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly

Footnotes:
EFF-001: Description provided in **Table 1** of the Fact Sheet document.
FM-001: Description provided in **Table 1** of the Fact Sheet document.
If no discharge occurs throughout the reporting period, "no discharge" shall be recorded on the wastewater Discharge Monitoring Report (DMR) report forms.
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above or within a deviation authorized by DEQ.
(1) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Quarterly Average: The average of all individual daily concentrations (mg/L) analyzed during the quarterly reporting period.
(3) Requires recording device and/or totalizing meter. Equipment must be capable of recording daily, quarterly, and annual effluent volumes.
(4) Quarterly Average Flows: Determine total flows (gal/quarter) that occurred during the quarterly reporting period. Divide total flow by the number of calendar days in the Quarterly reporting period to get a unit of daily flow (gal/day).
(5) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

(6) Quarterly Load Calculation. Determine concentration (mg/L): Use the average of all individual daily concentrations (mg/L) analyzed during the quarterly reporting period. Determine totalized quarterly flows (gal/quarter): Total flow that occurred during the quarterly reporting period. Convert to a daily flow average (gal/day): Divide the total quarterly flow (gal/quarter) by the total calendar days (days) of the quarterly reporting period. Calculate quarterly load (lbs/day): Concentration (mg/L) x Flows (gal/day) x [$8.34x10^{-6}$].

Ground water monitoring will provide DEQ with ongoing information on the current and future health of the aquifer. Ground water monitoring and reporting requirements are provided in **Table 10**. The permittee must develop and implement a Ground Water Monitoring, Analysis, and Reporting Operational Manual. This manual is further discussed in **Section 7.0**.

For the duration of the permit, the permittee must sample the Chico cold spring (GWIC ID: 184649, **Table 3**) at least once annually and submit the results to the Department. The sample must be taken from the water treatment plant influent spigot, prior to filtration and treatment. The spring must be analyzed by methods consistent with 40 CFR 136. This data will be used to estimate the ambient water quality of the aquifer and develop effluent limits in the next permitting cycle.

Table 10: Ground Water Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location(1)	Units	Sample Type(1)	Minimum Sampling Frequency	Reporting(2) Requirements	Report Frequency
Chloride [as Cl]	Cold spring	mg/L	Grab	Annually	Annual Average	Annually
Nitrogen, Nitrite+Nitrate [as N]	Cold spring	mg/L	Grab	Annually	Annual Average	Annually
Nitrogen, Total Ammonia [as N]	Cold spring	mg/L	Grab	Annually	Annual Average	Annually
Nitrogen, Total Kjeldahl (TKN)[as N]	Cold spring	mg/L	Grab	Annually	Annual Average	Annually
Nitrogen, Total [as N](3)	Cold spring	mg/L	Calculate	Annually	Annual Average	Annually
Specific Conductivity @ 25°C	Cold spring	µS/cm	Grab or Instant-aneous	Annually	Annual Average	Annually
Temperature	Cold spring	°C	Instant-aneous	Annually	Annual Average	Annually

Footnotes:
Monitoring for the cold spring commences upon the permit effective date.
A description of the monitoring location can be found in **Table 3** of the Fact Sheet document.
The sample must be taken from the water treatment plant influent spigot, prior to filtration and treatment.
At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.
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 the monitoring location.
(1) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Annual Average: The average of all individual daily concentrations (mg/L) analyzed during the annual reporting period.
(3) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

Reporting must be completed in use of Discharge Monitoring Reports (DMRs). The permittee or operator will file DMRs electronically through the online NetDMR program. Information and contacts for this program can be found here: https://deq.mt.gov/water/assistance.

7.0 SPECIAL CONDITIONS

7.1 GROUND WATER MONITORING, ANALYSIS, AND REPORTING OPERATIONAL MANUAL

The permittee shall use Best Management Practices (BMPs) in developing SOPs (Standard Operating Procedures) for sampling, analyzing, and reporting ground water characteristics. The manual must establish consistent identification, monitoring, sampling, calculating, recording, and reporting of the monitoring location. DEQ recommends using the Montana Bureau of Mines and Geology Open-File Report 746 titled Standard Procedures and Guidelines for Field Activities (MBMG, 2021) as a reference in developing a site-specific operational manual.

The completion and submittal date of the manual is listed in **Section 8.0**. The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the manual, sampling records, and calibration records at the facility at all times. Ground water monitoring requirements are discussed in **Section 6.0**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

8.0 COMPLIANCE SCHEDULE

The action listed in **Table 11** must be completed on or before the scheduled completion date. A report documenting each action must be received by DEQ on or before the scheduled reporting date. Unless otherwise stated, completion of all actions or deliverables must be reported to DEQ in accordance with Part II and Part IV.G of the permit.

Table 11: Compliance Schedule

Action	Frequency	Completion Date of Action	Reporting Due Date
Develop and implement a **Ground Water Monitoring, Analysis, and Reporting Operational Manual.**	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.

9.0 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 **April 15, 2026**. 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 (MTX000105), 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.

10.0 REFERENCES

FR § 136. 2011. Guidelines Establishing Test Procedures for the Analysis of Pollutants.

Administrative Rules of Montana, Title 17, Chapter 30, Water Quality:
Subchapter 2 - Water Quality Permit Fees.
Subchapter 5 – Mixing Zones in Surface and Ground Water.
Subchapter 7 – Nondegradation of Water Quality.
Subchapter 10 – Montana Ground Water Pollution Control System.
Subchapter 13 – Montana Pollutant Discharge Elimination System.

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Department of Environmental Quality, 2026. Administrative record for Chico Hot Springs, permit MTX000105.

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

Driscoll, F.G. 1986. Groundwater and Wells 2nd Edition. Johnson Division. St. Paul, Minnesota.

Edinberg, Sara C., 2024, Hydrogeologic framework of the upper Yellowstone River Valley, Park County, Montana: Montana Bureau of Mines and Geology Montana Ground-Water Assessment Atlas 9-01, 19 p., 1 sheet, scale 1:100,000.

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

Lopez, D.A., and Reiten, J.C., 2003. Preliminary geologic map of Paradise valley, south-central Montana: Montana Bureau of Mines and Geology Open-File Report 480, 22 p., 1 sheet, scale 1:50,000.

Montana Bureau of Mines and Geology, Ground-Water Information Center, GWIC state well database, Online at: http://mbmggwic.mtech.edu.

Montana Bureau of Mines and Geology, 2021. Standard Procedures and Guidelines for Field Activities, Open-File Report 746, p.96. Online at: http://www.mbmg.mtech.edu/mbmgcat/catmain.asp

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

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

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

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

U.S. Environmental Protection Agency, 2009. Unified Guidance: Statistical Analysis of Ground Water Data. EPA-530/R-09-007. Office of Resource Conservation and Recovery, Washington, DC.

APPENDIX A AMBIENT WATER QUALITY DATA

APPENDIX B PHOSPHORUS BREAKTHROUGH

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME:	Chico Hot Springs
COUNTY:	Park County
Permit #:	MTX000105
NOTES:	Variables used are based on conservative measurements.
	Design Capacity =11,370 gpd (1,520 ft³/day).
	Modified to reflect the drainfield replacement.
	Multiple drainfield zones result in a total area of 15,912 ft².
	Actual effluent characteristic for total phosphorous used, 5.74 mg/L
	The analysis does not credit the sorption of phosphorous by the soil underlying the old drainfield (2009).

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	340	ft
L	Length of Primary Drainfield's Long Axis	15912	ft
W	Width of Primary Drainfield's Short Axis	1	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	6	ft
D	Distance from Drainfield to Surface Water	4200	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	0.5	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	1	
CONSTANTS			
Pl	Phosphorous Load per proposed wastewater treatment system	199	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#I)	199	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	9547200	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	148575000	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	31624	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	159	years

BY: Chris Boe
DATE: August 18, 2016

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 C EFFLUENT LIMIT CALCULATIONS

MASS BALANCE EQUATION ALLOWABLE DISCHARGE CONCENTRATION DETERMINATION		
C2 = [C3(Q1+Q2)-C1Q1] / Q2		
C1	Ambient ground water (background) concentration (mg/L)	0.24
C2	**Allowable discharge concentration (mg/L)**	**55.84**
C3	Ground water concentration limit for pollutant (from Circular WQB-7) at the end of the mixing zone.	7.50
Q1	Ground water volume (ft3/day)	15132
Q2	Average flow of discharge (design capacity of system in ft3/day)	2273
The volume of ground water that will mix with the discharge (Q1) is estimated using Darcy's equation: Q1=K I A		
Q1	**Ground water flow volume (ft3/day)**	**15132**
K	hydraulic conductivity (ft/day)	54
I	hydraulic gradient (ft/ft)	0.0437
A	cross-sectional area (ft2) of flow at the down-gradient boundary of a standard 500-foot mixing zone.	6412.5
Outfall 001 - Chico Hot Springs, February 2026		