MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Fact Sheet

Permittee:	City of Columbia Falls
Permit No.:	MT0020036
Receiving Water:	Flathead River
Facility Information:	
Name	City of Columbia Falls Wastewater Treatment Plant
Location	600 Veterans Drive Columbia Falls, MT Township 30N, Range 20W, Section 19 Flathead County
Facility Contact:	Grady Jenkins Public Works Director 130 6th Street West Room A Columbia Falls, MT 59912
Fee Information:	
Type	Minor Publicly Owned Treatment Works
Type of Outfall	001 – Facility Discharge

I. Permit Status

This is a renewal of Montana Pollutant Discharge Elimination System (MPDES) permit MT0020036. The 2010-issued permit became effective May 1, 2010 and expired April 30, 2015. The Montana Department of Environmental Quality (DEQ) received an application and fees from the City of Columbia Falls (Columbia Falls) for renewal of MT0020036 on October 23, 2014. DEQ deemed the application complete, and the 2010-issued permit was administratively extended in a letter dated October 28, 2014.

II. Facility Information

A. Facility Description

The permittee operates a biological nutrient removal (BNR) wastewater treatment plant (WWTP) comprised of a traveling micro screen and grit collection in the headworks building, an equalization (EQ) basin, a BNR basin consisting of three cells, two final clarifiers, and ultraviolet (UV) disinfection. Influent and effluent are measured by a Parshall flume and ultrasonic flow meter. The facility has been modified over time with expansions completed in 1983, 1987, 2000, and 2010. The 2015 average daily design flow is 0.51 million gallons per day (mgd) and the 2015 maximum month design flow is 0.63 mgd. In 2014, the total population served was 5,480 (MPDES Renewal Application, 2014). The collection system is separate from the storm water collection system and has nine lift stations. Inflow and infiltration was estimated at 0.04 mgd in the wettest weather conditions, such as rain with snowmelt.

Upgrades in 2010 included equalization pumps, a bioreactor, an expanded aeration system, a UV disinfection system, and a standby generator (O&M Manual HDR, Inc., 2011). Raw wastewater is directed from a pretreatment building to an EQ basin if needed to provide a constant flow rate through the plant. Wastewater stored in the EQ basin is then pumped to a 757,300 gallon bioreactor, where the BNR process occurs. The A2O process, which includes an anaerobic, anoxic, and aerobic zone, is the specific method used for BNR. The anaerobic zone is crucial in biological phosphorous removal and the anoxic zone supports denitrification of high-nitrate mixed-liquor suspended solids. The A2O process also reduces biological oxygen demand (BOD) and removes ammonia via nitrification. To create adequate conditions for biological phosphorus removal, return activated sludge (RAS) is recycled through the anaerobic zone. To achieve necessary sludge age in the bioreactor, RAS flow is controlled by pumping. Waste activated sludge is pumped from the secondary clarifiers and mixed-liquor recycle is pumped from the aerobic zone to the anoxic zone. Effluent is disinfected through a UV system with an associated nine inch Parshall flume measuring effluent flow. **Table 1** summarizes the current WWTP design details.

Discharge is continuous to the Flathead River at Outfall 001. Effluent samples are taken in the UV building just prior to the final effluent channel. After UV treatment, the effluent travels approximately 250 feet before leaving the discharge pipe. The discharge is passive and bank-hugging and enters the river directly only during times of peak flow; usually May through mid-June (personal communication with WWTP personnel January 27, 2017). For the remainder of the year, treated effluent flows across and infiltrates river cobble and sediment for approximately 50 feet before entering the river.

Table 1: Current Design Criteria Summary	
Facility Description: BNR A2O process with biological and chemical phosphorus removal, UV disinfection, and continuous discharge to Flathead River.	
Original Construction Date: 1969	Upgrade Date(s): 1983, 1987, 2000, and 2010[(1)]
Current Population: 5,480 (2014)[(2)]	
Design Flow, Average (mgd): 0.51[(1)(4)]	Design Flow, Maximum Month (mgd): 0.63[(1)]
Design 5-Day Biochemical Oxygen Demand (BOD5) Removal (%): 85[(1)(3)]	Design Total Suspended Solids (TSS) Removal (%): 85[(1)(3)]
Collection System Combined [ ] Separate [X]	Estimated I/I: 40,000 gallons per day (gpd)[(2)]
Sanitary Sewer Overflow (SSO) Events (Y/N): N since 2010	Bypass Events (Y/N): Y, 2010 periodically for upgrade construction
Disinfection (Y/N): Y	Disinfection Type: UV[(1)]
Sludge Storage: aerobic digester[(1)]	
Footnotes: (1) HDR Engineering, Inc. Operations and Maintenance Manual, 2011 (2) 2014 application Form 2A (3) Or 10 mg/L, whichever is lower (4) HDR Engineering, Inc. Biological Treatment Pre-design Memo, 2008	

Columbia Falls was previously covered by EPA Region VIII Permit Number MTG650000, *General Permit for Facilities/Operations that Generate, Treat, and/or Use/Dispose of Sewage Sludge by Means of Land Application, Landfill, and Surface Disposal Under the National Pollutant Discharge Elimination System*. However, EPA did not renew the Biosolids General Permit, opting for direct enforceability of the rule. The use or disposal of biosolids generated by the Columbia Falls WWTP is required to meet the applicable requirements of 40 Code of Federal Regulations (CFR) Part 503 *Standards of the Use or Disposal of Sewage Sludge*.

B. Effluent Characteristics

A summary of effluent quality from facility Discharge Monitoring Reports (DMR) is given in **Table 2**. The Period of Record (POR) is January 2011 through November 2016. There were six exceedances of effluent limitations in this POR; one for total nitrogen (TN) lb/day 30 day average, three for total phosphorus (TP) mg/L 30 day average, and two for *E. coli* 7 day average.

Table 2: DMR Effluent Characteristics[1] – January 2011 through November 2016

Parameter	Location	Units	2010 Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Records
Flow, 30-Day Average[1]	Effluent	mgd	[2]	0.338	0.623	0.426	71
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	Influent	mg/L	[2]	181	510	335	71
	Effluent	mg/L	25/40[3]	ND (< 2.0)	8.8	3.4	71
	Effluent	% removal	85	97.7	100	98.9	71
	Effluent	lb/day	115/183[3]	ND (< 2.00)	16.2	12.1	71
Total Suspended Solids (TSS)	Influent	mg/L	[2]	194	387	304	71
	Effluent	mg/L	30/45[3]	1.6	37	5.4	71
	Effluent	% removal	85	95.7	99.7	98.2	71
	Effluent	lb/day	138/206[3]	7.6	163	44.5	71
Escherichia coli Bacteria[4][5][7]	Effluent	cfu/100 mL	126/252[3]	1.86	411	25.7	39
Escherichia coli Bacteria[4][6][7]	Effluent	cfu/ 100 mL	630/1260[3]	0.15	608	29	26
pH	Effluent	s.u.	6.0-9.0	6.14	7.75	6.9	142
Temperature	Effluent	ºC	[2]	6.9	25.1	14.7	71
Total Ammonia as N	Effluent	mg/L	30.7/40.9[3]	0.05	13.2	0.56	71
Total Kjeldahl Nitrogen	Effluent	mg/L	[2]	1.16	7.9	2.2	71
Nitrate + Nitrite as N	Effluent	mg/L	[2]	2.79	9.49	5.14	71
Total Nitrogen as N[8]	Effluent	mg/L	[2]	2.89	21.3	7.31	71
	Effluent	lb/day	37.1/63.5[3]	13.3	62.7	28.5	71
Total Phosphorus as P	Effluent	mg/L	1.0	0.05	8.13	0.36	71
		lb/day	4.6	0.20	4.2	1.44	18
Dissolved Oxygen	Effluent	mg/L	[2]	3.23	6.6	4.36	71
Oil and Grease	Effluent	mg/L	10	ND (<1.0)	1.0	ND (<1.0)	71
Total Dissolved Solids	Effluent	mg/L	[2]	646	1023	760	23

Table 2: DMR Effluent Characteristics [(1)] – January 2011 through November 2016

Parameter	Location	Units	2010 Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Records
Aluminum, Dissolved	Effluent	µg/L	(2)	ND (<30)	130	35	67
Antimony, total recoverable	Effluent	µg/L	(2)	0.5	0.5	ND (<3)(9)	6
Arsenic, total	Effluent	µg/L	(2)	ND (<0.001)	ND (<3)	ND (<1)(9)	6
Beryllium, total recoverable	Effluent	µg/L	(2)	ND (<0.0006)	ND (<1)	ND (<1)(9)	6
Cadmium, total	Effluent	µg/L	(2)	ND (<0.08)	0.12	0.06	6
Chromium, total	Effluent	µg/L	(2)	ND (<0.001)	ND (<1)	ND (<1)(9)	6
Copper, total	Effluent	µg/L	(2)	5.0	15	8.6	6
Lead, total	Effluent	µg/L	(2)	0.6	1.5	0.9	6
Mercury, total	Effluent	µg/L	(2)	ND (<0.00001)	ND (<0.01)	ND (<0.01)(9)	6
Selenium, total	Effluent	µg/L	(2)	ND (<0.001)	ND (<1)	ND (<1)(9)	6
Thallium, total recoverable	Effluent	µg/L	(2)	ND (<0.001)	ND (<1)	ND (<1)(9)	6
Zinc, total	Effluent	µg/L	(2)	76	94	88	6
Hardness, total as $CaCO_3$	Effluent	µg/L	(2)	234	278	258	6

Footnotes: NA = Not Available, ND = Not Detected, Data reported as ND is assumed to be the reporting limit.

(1) Statistical values based on individual values reported on DMRs when available. Average or maximum reported values used when no others available.
(2) No limit in 2010 permit, monitoring requirement only.
(3) Limit shown as 30-day average/7-day average.
(4) Geometric average.
(5) Sample period is April 1 to October 31.
(6) Sample period is November 1 through March 31.
(7) POR = July, 2011 through November, 2016.
(8) Calculated as the sum of Nitrite + Nitrate as N and TKN concentrations.
(9) Median is used in place of average

C. Compliance History

DEQ performed three MPDES compliance inspections between 2009 and 2016 (March 9, 2009, February 27, 2013, and December 9, 2015). The 2009 inspection took place prior to the 2010 upgrades.

Items of noncompliance documented in the 2009 compliance inspection were:

- Failures to sign benchsheets for TSS analysis.
- Failure to provide control charts for QA/QC for BOD_5, TSS, and phosphorus analysis.

- Failure to achieve flow monitoring within 10% accuracy at low flows.

The effluent flow meter and flume were replaced in 2010 upgrades to address flow monitoring violations. Several numeric limit exceedances (one for total nitrogen, three for total phosphorus, and one for *E. coli*) were documented for the period March 9, 2009 through February 27, 2013, and explained as a result of transition after facility upgrades.

Items of noncompliance documented in the 2013 compliance inspection were:

- Failure to complete $cBOD_5$ analysis according to 40 CFR Part 136 methodology.
- Failure to meet a compliance schedule.

DEQ acknowledged that Columbia Falls met the Special Conditions schedule in a letter dated May 30, 2013.

Items of noncompliance documented in the 2015 compliance inspection were:

- Failure to complete $cBOD_5$ analysis according to 40 CFR Part 136 methodology.
- Failure to meet a compliance schedule.

One numeric limit exceedance for *E. coli* was documented for the period February 27, 2013 through December 9, 2015, and explained as a result of a UV system electrical issue.

III. Technology-Based Effluent Limits

A. Proposed Technology-Based Effluent Limits

Federal regulations (40 Code of Federal Regulations (CFR) 133) define minimum requirements for secondary treatment, or the equivalent, for publicly operated treatment works (POTWs). Secondary treatment is defined in terms of effluent quality as measured by pH, 5-Day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), and percent removal of BOD_5 and TSS. The parameter carbonaceous BOD_5 ($cBOD_5$) can be substituted for BOD_5.

The proposed technology-based effluent limits (TBELs) in the 2010-issued permit were based on NSS for pH, $cBOD_5$, and TSS with 85 percent removal required for $cBOD_5$ and TSS. The NSS limits will be continued in this permit renewal (see **Table 3**).

Effluent limits must be expressed in terms of mass (mass/time), except for certain conditions, such as pH or temperature. For municipal treatment plants, mass-based limits are calculated using the average daily design flow for the facility.

The mass-based limits are calculated as follows:

Load (lbs/day) = Design Flow (mgd) x Concentration (mg/L) x 8.34 (lb·L)/(mg·gal)

$cBOD_5$ mass-based limits:
Average Weekly = 0.51 mgd x 40 mg/L x 8.34 (lb·L)/(mg·gal) = 170 lb/day
Average Monthly = 0.51 mgd x 25 mg/L x 8.34 (lb·L)/(mg·gal) = 106 lb/day

TSS mass-based limits:
Average Weekly = 0.51 mgd x 45 mg/L x 8.34 (lb·L)/(mg·gal) = 191 lb/day
Average Monthly = 0.51 mgd x 30 mg/L x 8.34 (lb·L)/(mg·gal) = 128 lb/day

Table 3: Columbia Falls WWTP Outfall 001 Proposed TBELs

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Rationale
5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	25	40	40 CFR 133.102(a)
	lb/day	106	170	
	% removal	85(1)	NA	
Total Suspended Solids (TSS)	mg/L	30	45	40 CFR 133.102(b)
	lb/day	128	191	
	% removal	85(1)	NA	
pH	s.u.	6.0-9.0 (instantaneous)		40 CFR 133.102(c)

Footnotes:

(1) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same time during the same period (85% removal).

B. Nondegradation

Nondegradation load allocations calculated in the 2010-issued permit cycle are presented in **Table 4** for $cBOD_5$ and TSS in the effluent. These values define baseline allocated loads for the WWTP and any increases above these amounts are subject to the provisions of Montana's Nondegradation Policy 75-5-303, Montana Code Annotated (MCA) and ARM 17.30.705, *et seq*.

Actual discharge loads from self-monitoring data were calculated by DEQ and are compared to the nondegradation loads in **Table 4**. The permit does not authorize a new or increased discharge, and therefore is not subject to Montana's Nondegradation Policy.

Table 4: Calculated Nondegradation Allocated and Actual Annual Loads

Parameter	Allocated Load (lb/day)	Actual 30-Day Average Loads (lb/day)					
		2011	2012	2013	2014	2015	2016 (Jan 1 to Nov 31)
$cBOD_5$	115	14.6	14.4	10.1	13.0	11.7	7.1
TSS	138	21.5	19.1	18.2	18.2	15.7	23.7

Loading limits for the technology-based parameters of concern will be set at the more stringent values of nondegradation allocations or mass-based loading limits, 106 lb/day $cBOD_5$ and 128 lb/day TSS, and will apply to the effluent.

IV. Water Quality-based Effluent Limits

A. Scope and Authority

Permits are required to include water quality-based effluent limits (WQBELs) when TBELs are not adequate to protect state water quality standards (40 CFR 122.44 and ARM 17.30.1344). Montana water quality standards require that no wastes may be discharged that can reasonably be expected to violate any state water quality standards (ARM 17.30.637(2)). Montana water quality standards also define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses (ARM 17.30.601, *et seq*.).

B. Receiving Water

Wastewater is discharged from Outfall 001 to the Flathead River. The discharge pipe runs under the side channel to the far side of an island where effluent empties onto a gravel shore into the main channel, slightly southeast of the WWTP. During peak flows, usually in May through mid-June, the discharge pipe is submerged. Discharges flow over river cobble before entering the river flow for the remainder of the year.

The receiving water is classified as B-1 according to Montana Water Use Classifications. Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. This segment of the river is considered an outstanding fisheries (Montana Fish, Wildlife, and Parks, 2017) supporting salmonids and other fish in early life stages. The Flathead River in the vicinity of the discharge is considered high quality water pursuant to Montana's Nondegradation Policy. Degradation of high quality water is not allowed unless authorized by DEQ under 75-5-303(3), MCA.

The Flathead River is located within the U.S. Geological Survey (USGS) Hydrological Unit Code 17010208 - Flathead Lake; Montana stream assessment unit identification number MT76O001_010. There are no impairments identified, or completed total maximum daily loads (TMDLs) for this assessment unit, therefore this segment of the Flathead River is not included on the current 303(d) or 305(b) list. A 2001 nutrient TMDL document was developed for Flathead Lake, but does not include completed allocations for the drainage basin.

In the 2001 TMDL document, *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana,* DEQ set water quality goals/endpoints for Flathead Lake with an overall 25 percent reduction in long term nitrogen and phosphorus loads to Flathead Lake. This TMDL aimed to address the need to achieve further reductions in nutrients to attain and maintain water quality goals in Flathead Lake. There is a desire to move forward with controls in the areas of the basin where there is confidence that nutrients need to be controlled, such as developed urban and agricultural areas. The 25% reduction in nutrient loads is the first phase of a phased allocation approach. Phase II is currently being developed. DEQ recognizes the additional efforts and investments made by the city of Columbia Falls to reduce nutrient loading in the Flathead Basin prior to the development of base numeric

criteria and Phase II of the Flathead Lake TMDL phased allocation approach. The WWTP reduce total nitrogen loading by an estimated 43% from 1985 to 2016.

Except for TN and TP, the critical upstream flow value is the 7-day low flow average expected to occur every 10 years (7Q10). The USGS establishes receiving water low flows accessible at the StreamStats database (USGS, 2017). Stream flow data are collected at USGS gauging station 12363000, Flathead River at Columbia Falls, MT, which is located 200 feet downstream of the county road bridge at Columbia Falls and is approximately 1.4 miles upstream of the facility outfall. The 7Q10 value for the receiving water is 1,288 cubic feet per second (cfs), equivalent to 832 mgd.

Ambient Water Quality Data

Ambient water quality data for the Flathead River above the outfall location are limited. Available data have been obtained from USGS gauging station 12363000 and upstream monitoring by Columbia Falls Aluminum Company at sample locations CFAC RIV1 and CFAC RIVM. **Table 5** provides a summary of the ambient water quality data used in assessing Reasonable Potential (RP) to exceed the water quality standards in Flathead River, and to develop any necessary effluent limits designed to protect these standards.

The most conservative numeric value, the limit under which the sample concentration was not quantified, was used for nondetect records. All three upstream samples were reported nondetect for ammonia below the reporting limit of 0.05 mg/L. DEQ will assume the ammonia concentration of these samples and the 75th percentile is 0.05 mg/L. Six upstream samples were reported as nondetect for TP below the reporting limit of 0.010 mg/L. DEQ will assume the TP concentration of these samples is 0.010 mg/L. All three upstream samples were reported as nondetect for TN below the reporting limit of 0.50 mg/L. DEQ will assume the TN concentration of these samples and the 75th percentile is 0.50 mg/L.

Table 5. Flathead River Water Quality Data for January 2011 – November 2016

Parameter	Units	75th Percentile(1)	Number of Samples	Monitoring Data Source
pH	s.u.	8.2	23	USGS-12363000
Temperature	°C	15.2	30	USGS-12363000
Dissolved Oxygen	mg/L	11.4	18	USGS-12363000
Ammonia, total as N	mg/L	< 0.05(2)	3(3)	CFAC RIV1
Nitrate + Nitrite as N	mg/L	0.07	23	USGS 12363000
Total Nitrogen (TN), year round	mg/L	< 0.50(4)	3	CFAC RIV1
Total Phosphorus (TP), year round	mg/L	0.012	23	USGS-12363000
Aluminum, total dissolved	µg/L	0.035	5	CFAC RIVM

Footnote:
(1) 75th percentile determined using rank calculated as $x = p(N+1)$, where x=rank, p=percent rank, N=sample size
(2) All sample results for ammonia analysis were nondetect below the reporting limit of 0.050 mg/L for the POR. Therefore, 0.050 mg/L is used as a conservative value in place of nondetect.
(3) Samples collected June, 2015 through June, 2016.
(4) All sample results for TN analysis were nondetect below the reporting limit of 0.50 mg/L for the POR. Therefore, 0.50 mg/L is used as a conservative value in place of nondetect.

C. Applicable Water Quality Standards

Discharges to surface waters classified B-1 are subject to the specific water quality standards of ARM 17.30.623, Department Circulars DEQ-7 (Numeric Water Quality Standards) and DEQ-12A (Base Numeric Nutrient Standards), and the general provisions of ARM 17.30.635 through 637. In addition to these standards, dischargers are subject to ARM 17.30 Subchapter 5 (Mixing Zones) and Subchapter 7 (Nondegradation).

D. Mixing Zone

A mixing zone is an area where effluent mixes with the receiving water and certain water quality standards may be exceeded. Mixing zones must have the smallest practicable size, a minimum practicable effect on water uses, and definable boundaries. DEQ will determine the appropriateness of a mixing zone and will grant a mixing zone, deny the mixing zone, or grant an alternative or modified mixing zone. Rules governing the granting of mixing zones are found in Montana Code Annotated (MCA) 75-5-301 and in ARM 17.30.501 *et seq*.

Mixing zones allowed under a permit issued prior to April 29, 1993, will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses. Mixing zones are granted on a parameter-by-parameter basis. No mixing zone will be granted that will impair beneficial uses. Chronic aquatic life, acute aquatic life, and human health standards may not be exceeded outside of the mixing zone. Facilities that discharge a mean annual flow of less than 1 mgd to a stream segment with a dilution ratio of greater than 100:1 qualify for a standard mixing zone with 100% of the 7Q10 for chronic aquatic life and human health conditions. Applying the smallest practicable mixing zone size,

only 25% dilution will be allowed for chronic aquatic life conditions. Additionally, the 2010-issued permit fact sheet acknowledges that discharge may be bank-hugging, asserting dilution with 100% of the 7Q10 may not be appropriate for toxic pollutants. A standard mixing zone with 100% and 25% dilution addresses only human health and chronic aquatic life standards. Acute standards for aquatic life may not be exceeded in the mixing zone, unless DEQ finds that allowing minimal dilution will not threaten or impair existing beneficial uses.

The WWTP discharge flow is less than 1 mgd (0.51 mgd) and the 7Q10 value is 832 mgd, therefore the dilution ratio is 1,631:1 (calculated as 7Q10 : average daily design flow of the facility). DEQ granted the following dilution with this renewal:

- The entire 7Q10 value is used to calculate RP for nitrate plus nitrite based on the human health standard.
- 25% of the 7Q10 (208 mgd) is used to calculate RP for aluminum based on the chronic aquatic life standard, using the smallest practicable mixing zone.
- In the absence of a source specific mixing zone study, an alternative mixing zone, as defined by DEQ, may be granted. The flow used to calculate RP and develop limits for total ammonia as N will be established as 1% of the 7Q10 (8.32 mgd) for acute conditions and 10% of the 7Q10 (83.2 mgd) for chronic conditions.

A standard mixing zone must not extend downstream more than one-half the mixing width distance or extend downstream more than 10 times the stream width. A standard mixing zone is defined by the more restrictive of these two values. Mixing zones must be the smallest practicable size; have minimal effects on uses; and have definable boundaries. The data to establish the one-half mixing width distance value are lacking. Stream width at low flow was approximated as 450 feet at the outfall location; therefore the length of the chronic and human health mixing zones will be set at 4,500 feet, equivalent to 10 times the stream width. The dimensions of the acute mixing zone will be 10% of that, or 450 feet long and 45 feet wide.

E. Basis for Water Quality-Based Effluent Limits

MPDES permit limits must control all pollutants which will cause, or have RP to cause or contribute to an excursion above any state water quality standard, including narrative criteria. Parameters typically present in municipal wastewater that may cause or contribute to a violation of water quality standards include: conventional pollutants such as biological material (as measured by $cBOD_5$), TSS, pH, oil & grease, and pathogenic bacteria, and non-conventional pollutants such as nitrate + nitrite, nutrients, total ammonia, and metals.

DEQ uses a mass balance equation (see *Equation 1* and *Equation 2*) to determine RP and develop WQBELs, based on *EPA's Technical Support Document for Water Quality-based Toxics Control, March 1991* (TSD), EPA/505/2-90-001.

$$C_r = \frac{C_d Q_d + C_s Q_s}{Q_d + Q_s} \qquad \textit{(Equation 1)}$$

Given:

C_r = the resulting receiving water concentration
Q_d = critical discharge rate (POTW average daily design flow)
Q_s = instream flow available for dilution (critical low flow x available % for dilution)
C_d = critical effluent pollutant concentration (maximum discharge concentration x TSD multiplier)
C_s = critical upstream ambient pollutant concentration (75^{th} percentile concentration)

RP for the WWTP discharge to cause exceedances of water quality standards for Flathead River is evaluated using *Equation 1*, and presented in **Attachment A**. The critical effluent concentration (C_d) is obtained following the method recommended by the EPA's TSD. A multiplier is determined using TSD methods, based on the dataset statistics.

WQBELs must be developed for any parameter for which there is RP to cause or contribute to exceedances of instream numeric or narrative water quality standards. To establish WQBELs for an existing discharger DEQ first calculates wasteload allocations (WLAs). As shown in *Equation 2*, the mass-balance equation can be arranged to calculate the WLA (C_{WLA}) so that the discharge does not cause or contribute to an exceedance of the applicable water quality standard under critical conditions.

$$C_{WLA} = \frac{Q_r C_r + Q_s C_s}{Q_d} \qquad \textit{(Equation 2)}$$

Given:

C_{WLA} = calculated wasteload allocation necessary to achieve instream water quality standard
Q_d = critical discharge rate (POTW average daily design flow)
$Q_r = Q_d + Q_s$
C_r = water quality standard
Q_s = instream flow available for dilution (critical low flow x available % for dilution)
C_s = critical upstream ambient pollutant concentration (75^{th} percentile concentration)

The WLAs are then translated into average monthly limitations (AMLs) and maximum daily limitations (MDLs) using TSD multipliers. Calculations are presented in **Attachment B**.

The following subsections discuss the basis for the RP and WQBELs in this permit.

1. Conventional Pollutants

BOD_5, TSS, and pH: These parameters are typical effluent quality indicators for municipal wastewater treatment facilities and are regulated as TBELs (see section III of this Fact Sheet). The permit renewal will maintain $cBOD_5$ and TSS TBELs based on NSS. The WWTP provides significant reduction in biological material through secondary treatment. No additional WQBELs will be required for these parameters.

Oil and Grease (O&G): Montana regulations require state waters be free from substances attributable to municipal discharges that will result in concentrations of oil and grease at or in excess of 10 mg/L. The standard of <10 mg/L was applied to discharges from Outfall 001 in the 2010-issued permit, with monthly effluent monitoring for O&G.

Reasonable potential for the WWTP discharge to cause exceedances of the oil and grease water quality standards for Flathead River were evaluated using the following values in *Equation 1*, and presented in **Attachment A**.

Given:
Q_d = 0.51 mgd average daily design flow
Q_s = 0 mgd (7Q10 x available chronic dilution of 0%)
C_d = 0.9 mg/L (maximum observed (1.0 mg/L) x TSD multiplier (0.93))
C_s = 0 mg/L
Calculated Result:
C_r = 0.9 mg/L oil and grease

Using the above calculated critical effluent concentration (C_d) and receiving water concentration (C_s), average daily design flow (Q_d) and low flow rate based on 0% of the 7Q10 (Q_s) in *Equation 1*, the resulting downstream pollutant concentration (C_r) is calculated as 0.9 mg/L. C_r is less than the water quality standard, therefore DEQ finds that the WWTP does not have RP to exceed the oil and grease standard and no effluent limit is required (see **Attachment A**).

Escherichia coli (*E. coli*) **Bacteria:** Pathogens are known municipal wastewater contaminants. The average monthly and average weekly *E. coli* limits will be maintained at the standards in the 2010-issued permit. The State has promulgated *E. coli* standards to protect the beneficial uses of receiving waters from pathogens. The standards for B-1 classified waters from [ARM 17.30.623(2)(a)] are:

> April 1 through October 31 of each year – the geometric mean number of *E. coli* must not exceed 126 cfu per 100 mL and 10% of the total samples may not exceed 252 cfu per 100 mL during any 30-day period; and
>
> November 1 through March 31 of each year – the geometric mean number of *E. coli* must not exceed 630 cfu per 100 mL and 10% of the total samples may not exceed 1,260 cfu per 100 mL during any 30-day period.

These standards will be included in the proposed permit average monthly and average weekly limits (Part IV of this Fact Sheet).

2. Non-conventional Pollutants

Total Residual Chlorine (TRC): The 2010-issued permit established TRC limits of 0.29 mg/L MDL and 0.23 mg/L AML. Limits for TRC have been removed in this permit renewal

because chlorine is no longer used for disinfection, since the WWTP upgraded to a UV system.

Total Ammonia as N: Circular DEQ-7 includes ammonia aquatic life standards based on pH and temperature of the receiving stream, the presence or absence of salmonid fish species, and the presence or absence of fish in early life stages. DEQ reviewed upstream data in order to evaluate the ambient year round pH and temperature of the river (see **Table 6**). Flathead River in the vicinity of the Columbia Falls WWTP discharge is classified as B-1 water, which is suitable for growth and propagation of salmonid fishes.

Table 6 summarizes the development of the ammonia water quality standards for Flathead River in this area:

Table 6: Total Ammonia-Nitrogen Water Quality Standards for Flathead River

Condition	Period	Salmonids Present	Early Life Stages	Ambient Conditions		Water Quality Standard (mg/L)(3)
				pH(1) (s.u.)	Temperature(2) (°C)	
Acute Criterion	Annual	Yes	NA	8.2	NA	3.83
Chronic Criterion	Annual	NA	Yes	8.2	15.2	1.64

Footnotes: NA = Not Applicable
(1) Based on the 75th percentile of pH data (n=23, January 2011 - November 2016).
(2) Based on the 75th percentile of temperature data (n=41, January, 2011 – November, 2016).
(3) Acute and chronic aquatic life standards based on Department Circular DEQ-7 (August, 2012)

Reasonable potential for the WWTP discharge to cause exceedances of the ammonia water quality standards for Flathead River were evaluated using the following values in *Equation 1*, and presented in **Attachment A**.

Given:
Q_d = 0.51 mgd average daily design flow
$Q_{s\ acute}$ = 8.32 mgd (7Q10 x available chronic dilution of 1%)
$Q_{s\ chronic}$ = 83.2 mgd (7Q10 x available chronic dilution of 10%)
C_d = 12 mg/L (maximum observed (13.2 mg/L) x TSD multiplier (0.90))
C_s = 0.05 mg/L (75% percentile of upstream data)
Calculated Result:
$C_{r\ acute}$ = 0.73 mg/L ammonia
$C_{r\ chronic}$ = 0.12 mg/L ammonia

Using the above calculated critical effluent concentration (C_d) and receiving water concentration (C_s), average daily design flow (Q_d) and low flow rate based on 10% and 1% of the 7Q10 (Q_s) in *Equation 1*, the resulting downstream pollutant concentration (C_r) is calculated as 0.73 mg/L for acute conditions and 0.12 mg/L for chronic conditions. $C_{r\ acute}$ and $C_{r\ chronic}$ are less than the chronic and acute ammonia standards developed in **Table 6**,

therefore DEQ finds that the WWTP does not have RP to exceed the ammonia standards and no effluent limit is required (see **Attachment A**).

Dissolved Oxygen (DO): Freshwater aquatic life standards are characterized by the fishery (cold- or warm-water) and by the presence or absence of fish early life stages. Standards are further defined based on a time frame and required DO levels. B-1 waterbody classification states the receiving waters are cold-water fisheries. DO standards, as minima, for B-1 waters are given in **Table 7**.

Table 7: B-1 Water Classification Dissolved Oxygen Standards.

Dissolved Oxygen (DO)	30-Day Mean (mg/L)	7-Day Mean (mg/L)	7-Day Mean Minimum[(1)] (mg/L)	1-Day Minimum[(1)] (mg/L)
Early Life Stages[(2)(3)]	N/A	9.5(6.5)	N/A	8.0(5.0)
Other Life Stages	6.5	N/A	5.0	4.0

Footnotes N/A = Not Applicable
(1) All minima should be considered as instantaneous concentrations to be achieved at all times.
(2) These are water column concentrations recommended to achieve the required inter-gravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column, the figures in parentheses apply.
(3) Includes all embryonic and larval stages and all juvenile forms of fish to 30 days following hatching.

The 2010-issued permit introduced DO monitoring for the purpose of assessing RP. DO is a dynamic parameter that is influenced by the physical and biochemical condition of the effluent, and therefore should be measured as close to discharge into the receiving water as possible. In this case, DO was measured almost 300 feet from the point of effluent discharge. The difference between sample location and discharge location likely renders the DO samples unrepresentative. cBOD limits are protective of DO water quality criteria in the receiving water. Columbia Falls WWTP average $cBOD_5$ concentration was 3.4 mg/L with an average of 98.9% removal during the POR. Low effluent $cBOD_5$ concentrations minimize impact of effluent on DO in the Flathead River. Therefore, RP analysis will not be conducted for DO and the DO effluent monitoring requirement will be removed (see Part VI of this fact sheet).

Nitrate plus Nitrite (N+N): Nitrate and nitrite are toxic components of total nitrogen, which is a common constituent of municipal wastewater. The applicable water quality standard for N+N is the human health standard (HHS), 10 mg/L. WQBELs for N+N were not established in the 2010-issued permit, but monthly monitoring was required.

Reasonable potential for the WWTP discharge to cause exceedances of the N+N water quality standards for Flathead River were evaluated using the following values in *Equation 1*, and presented in **Attachment A**.

Given:

Q_d = 0.51 mgd average daily design flow
Q_s = 832 mgd (7Q10 x available chronic dilution of 100%)
C_d = 9.3 mg/L (maximum observed (9.5 mg/L) x TSD multiplier (0.98))
C_s = 0.07 mg/L (75% percentile of upstream data)

Calculated Result:

C_r = 0.08 mg/L N+N

Using the above calculated critical effluent concentration (C_d) and receiving water concentration (C_s), average daily design flow (Q_d) and low flow rate based on 100% of the 7Q10 (Q_s) in *Equation 1*, the resulting downstream pollutant concentration (C_r) is calculated as 0.08 mg/L. C_r is less than the HHS, therefore DEQ finds that the WWTP does not have RP to exceed the N+N standard and no effluent limit is required (see **Attachment A**).

Total Nitrogen and Total Phosphorus: Currently there are no numeric water quality standards for TN and TP in the Flathead River, therefore a numeric RP assessment is not required. Also, the receiving water has not been assessed for impairment for nutrients. The actual nutrient loads discharged by Columbia Falls WWTP are presented in **Table 8**.

Table 8: Effluent Nutrient Load

Parameter	Units	2011	2012	2013	2014	2015	2016 (Jan 1 to Nov 31)
Total Nitrogen as N, year round	lb/day	35.1	23.7	25.2	27.8	22.0	22.1
Total Phosphorus as P, year round	lb/day	2.17(1)	1.46	1.06	0.87	0.99	1.08

Footnotes:
(1) Samples collected July through December only.

The 2001 Flathead Lake nutrients TMDL document identified nitrogen and phosphorus as pollutants of concern for the Flathead Lake specifically, but the geographic scope of the Water Quality Restoration Plan includes the entire Flathead Basin. The restoration strategy identified the need for nutrient load reductions from the Flathead River valley north of Flathead Lake. Each of the sub-watersheds to Flathead Lake are delineated as DEQ TMDL Planning Areas. Phase II of the Flathead TMDL, specifically for TN and TP, is slated for development in the future. This document will address TN and TP loads attributable to the municipal point sources.

In the 2010-issued permit, effluent TN and TP final load limitations were established to serve as interim wasteload allocations for the POTW and apply at the end of the pipe. No mixing zone was granted for TN and TP. The load allocations may undergo complete revision as part of the Flathead Lake TMDL Phase II development. Future increases or reductions may result as part of the pending basin-wide TMDL.

Total Nitrogen: DEQ established TN limits in the 2010-issued permit based on the current performance of the POTW. The 63.5 lb/day TN average weekly limit (AWL) and 37.1 lb/day TN average monthly limit (AML), year round, will be maintained in this permit cycle.

Total Phosphorus: The 2010-issued permit maintained limits for TP at 1.0 mg/L year round, set in response to the *Strategy for Limiting Phosphorus in Flathead Lake* (Department of Environmental and Health Sciences Water Quality Bureau April 27, 1984). This TP limit will

be continued with this permit cycle. The TP load will be maintained at the mass-based expression of the 1.0 mg/L concentration limit (4.6 lb/day AML) so no significance determination is necessary for this pollutant.

3. Toxic Pollutants

Aluminum: Columbia Falls WWTP utilizes alum in the phosphorus removal process. When alum is in use, dissolved aluminum concentrations in the effluent may be of concern in regard to compliance with the dissolved aluminum water quality standards in Circular DEQ-7. WQBELs for aluminum were not established in the 2010-issued permit, but monthly monitoring was required. The acute aquatic life standard for dissolved aluminum is 750 µg/L and the chronic aquatic life standard is 87 µg/L.

Reasonable potential for the WWTP discharge to cause exceedances of the aluminum water quality standards for Flathead River were evaluated using the following values in *Equation 1*, and presented in **Attachment A**.

Given:

Q_d = 0.51 mgd average daily design flow
$Q_{s\ acute}$ = 0 mgd (7Q10 x available acute dilution of 0%)
$Q_{s\ chronic}$ = 208 mgd (7Q10 x available chronic dilution of 25%)
C_d = 125 µg/L (maximum observed (0.130 mg/L) x TSD multiplier (0.96))
C_s = 35 µg/L (75% percentile of upstream data)

Calculated Result:

$C_{r\ acute}$ = 125 µg/L aluminum, dissolved
$C_{r\ chronic}$ = 35 µg/L aluminum, dissolved

Using the above calculated critical effluent concentration (C_d) and receiving water concentration (C_s), average daily design flow (Q_d) and low flow rate based on 25% and 0% of the 7Q10 (Q_s) in *Equation 1*, the resulting downstream pollutant concentration (C_r) is calculated as 125 µg/L for acute conditions and 35 µg/L for chronic conditions. $C_{r\ acute}$ and $C_{rchronic}$ are less than the acute and chronic aluminum water quality standards. Therefore, DEQ finds that the WWTP does not have RP to exceed the aluminum standards and no effluent limit is required (see **Attachment A**).

Total Recoverable Metals: During the POR, the permittee has reported annual total recoverable metals data for the effluent including: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, selenium, thallium, and zinc. Ambient data were not available to assess RP for any metals.

The effluent data for antimony, arsenic, beryllium, chromium, mercury, selenium, and thallium show discharge concentrations less than the respective lowest water quality standards at the end of pipe. No limits will be developed and monitoring will no longer be required for these metals.

No ambient hardness data were available to establish accurate water quality standards for metals with hardness-based standards: cadmium, copper, lead, and zinc. Water quality standards presented in **Table 9** were estimated according to Circular DEQ-7 using the most conservative hardness concentration of 25 mg/L, and effluent data for these four metals at the end of pipe exceeds estimated water quality standards.

Effluent monitoring will be maintained and ambient monitoring will be required for cadmium, copper, lead, and zinc as well as hardness (see Part VI of this fact sheet) to provide adequate data to establish accurate water quality standards and provide adequate ambient data to asses RP.

Table 9: Hardness-based Metals Water Quality Standards(1)

Metal	Maximum observed (µg/L)(2)	Acute WQ standard (µg/L)	Chronic WQ standard (µg/L)
Cadmium	0.12	0.52	0.10
Copper	15	4	3
Lead	1.5	10	1
Zinc	94	37	37

Footnotes N/A = Not Applicable
(1) Hardness-based metals water quality standards are calculated using a minimum hardness of 25 mg/L.
(2) POR = January, 2011 through November, 2016

Whole Effluent Toxicity (WET): The proposed facility is a small POTW discharging less than 1.0 mgd. There are no identified industrial contributions as listed in 40 CFR 122 Appendix A, and the facility will not receive discharge from significant industrial users subject to pretreatment requirements. WET testing is not required.

Table 10: Outfall 001 Proposed WQBELs[(1)]

Parameter	Units	Average Monthly Limitation[(1)]	Average Weekly Limitation[(1)]	Maximum Daily Limitation
Escherichia coli (E. coli) Bacteria, April- October	cfu/100 mL	126[(2)]	252	--
Escherichia coli (E. coli) Bacteria, November - March	cfu/100 mL	630[(2)]	1,260	--
Total Nitrogen[(3)]	lb/day	37.1	63.5	--
Total Phosphorus as P[(3)]	mg/L	1.0	--	--
	lb/day	4.6	--	--

Footnotes: cfu = colony forming unit.
(1) See Definition section at end of permit for explanation of terms.
(2) Report Geometric Mean if more than one sample is collected in the reporting period.
(3) Effective year round

V. Final Effluent Limits

Effluent limitations or conditions in reissued permits must be at least as stringent as those in the existing permit, with certain exceptions. Federal regulations require permits to contain the more stringent TBEL or WQBEL limitation applicable to an individual pollutant. DEQ considered the proposed permit limits to ensure that they were as stringent as previous limits, or met the anti-backsliding requirements.

Beginning on the effective date and lasting through the term of the permit, the discharge from Outfall 001 shall, at a minimum, meet the effluent limits presented in **Table 11**:

There shall be no discharge of floating solids or visible foam in other than trace amounts. There shall be no discharge which causes visible oil sheen in the receiving stream [ARM 17.30.637(1)(b)].

Table 11: Proposed Final Effluent Limits

Parameter	Units	Effluent Limitations[1]			
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Instantaneous Maximum Limit
5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	25	40	--	--
	lbs/day	106	170	--	--
	% removal	85	--	--	--
Total Suspended Solids (TSS)	mg/L	30	45	--	--
	lbs/day	128	191	--	--
	% removal	85	--	--	--
pH[2]	s.u.	--	--	--	6.0 – 9.0
Escherichia coli (E. coli) Bacteria –summer [3][5]	cfu/100ml	126	252	--	--
Escherichia coli (E. coli) Bacteria –winter[4][5]	cfu/100ml	630	1,260	--	--
Total Nitrogen as N	lb/day	37.1	63.5	--	--
Total Phosphorus as P	mg/L	1.0	--	--	--
	lb/day	4.6	--	--	--

Footnotes: cfu = colony forming unit.
(1) See definitions in the permit.
(2) Effluent pH shall remain between 6.0 and 9.0 (instantaneous minima and maxima). For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.
(3) This limit applies from April 1 through October 31.
(4) This limit applies from November 1 through March 31.
(5) The geometric mean of the samples taken for the sample period (monthly or weekly) may not exceed these values.

VI. Monitoring Requirements

Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136 and the analysis must meet any Required Reporting Values (RRVs) listed in Circular DEQ-7 unless otherwise specified.

Monitoring location for influent is at the grit chamber, prior to the influent Parshall flume, sampled by a flow-paced sampler. Monitoring location for effluent is prior to the final effluent channel, sampled by a flow-paced sampler. Monitoring of the effluent must be representative of the volume and nature of the discharge. Effluent and influent monitoring requirements are presented in **Table 12**.

Influent and effluent monitoring results must be reported within a Discharge Monitoring Report (DMR). Monitoring results must be submitted electronically (NetDMR web-based application) no later than the 28th day of the month following the end of the monitoring

period. If no discharge into Flathead River is observed during the reporting period, "no discharge" shall be reported on the Net DMRs.

A. Influent/Effluent Monitoring

Many monitoring requirements applied in the 2010-issued permit are maintained. Effluent monitoring of TRC is removed because a UV disinfection system has replaced chlorine treatment.

During the POR, cadmium, copper, lead, and zinc were all detected at concentrations above nondetect at levels that would exceed estimated water quality standards calculated with the most conservative harness value of 25 mg/L. Therefore, effluent monitoring will be maintained for cadmium, copper, lead, and zinc and ambient monitoring will be required for hardness, cadmium, copper, lead, and zinc to provide adequate data to establish accurate water quality standards and provide adequate ambient data to asses RP.

Monitoring will no longer be required for antimony, arsenic, beryllium, cadmium, chromium, lead, mercury, selenium, and thallium, for which all monitoring results were less than 10% of the water quality standard during the POR.

Table 12: Outfall 001 Monitoring and Reporting Requirements

Parameter	Units	Sample Location	Minimum Sample Frequency	Sample Type[1]	Reporting Requirements	Required Reporting Value
Flow	mgd	Effluent	Continuous	Instantaneous	Daily Maximum Monthly Average	NA
5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	Influent	Monthly	Composite	Monthly Average	NA
	mg/L	Effluent	Weekly	Composite	Weekly Maximum Average Monthly Average	
	lb/day	NA	Weekly	Calculated	Weekly Maximum Average Monthly Average	
$cBOD_5$ Percent Removal[2]	%	NA	Monthly	Calculated	Monthly Minimum	
Total Suspended Solids (TSS)	mg/L	Influent	Monthly	Composite	Monthly Average	NA
	mg/L	Effluent	Weekly	Composite	Weekly Maximum Average Monthly Average	
	lb/day	Effluent	Weekly	Calculated	Weekly Maximum Average Monthly Average	
TSS Percent Removal[2]	%	Effluent	Monthly	Calculated	Monthly Minimum	
pH	s.u.	Effluent	Daily	Instantaneous	Monthly Maximum Monthly Minimum	NA
Temperature	°C	Effluent	Daily	Instantaneous	Daily Maximum	NA

Table 12: Outfall 001 Monitoring and Reporting Requirements

Parameter	Units	Sample Location	Minimum Sample Frequency	Sample Type[1]	Reporting Requirements	Required Reporting Value
					Monthly Average	
Escherichia coli (E. coli) Bacteria[3]	cfu/ 100 ml	Effluent	Weekly	Grab	Weekly Average Monthly Average	NA
Oil and Grease	mg/L	Effluent	Semiannual	Grab	Daily Maximum	NA
Ammonia, total as N	mg/L	Effluent	Monthly	Composite	Daily Maximum Monthly Average	0.070
Nitrate + Nitrite, as N	mg/L	Effluent	Weekly	Composite	Monthly Average	0.05
Total Kjeldahl Nitrogen, as N	mg/L	Effluent	Weekly	Composite	Monthly Average	0.225
Total Nitrogen as N[4]	mg/L	Effluent	Monthly	Calculated	Monthly Average	NA
	lb/day	Effluent	Monthly	Calculated	Monthly Average	
Total Phosphorus as P	mg/L	Effluent	Weekly	Calculated/ Composite	Monthly Average	0.01
	lb/day	Effluent	Monthly	Calculated	Monthly Average	NA
Aluminum, dissolved	µg/L	Effluent	Monthly	Composite	Daily Maximum Monthly Average	9
Cadmium, total recoverable[5]	µg/L	Effluent	Annual	Composite	Daily Maximum Monthly Average	0.08
Copper, total recoverable[5]	µg/L	Effluent	Annual	Composite	Daily Maximum Monthly Average	3
Lead, total recoverable[5]	µg/L	Effluent	Annual	Composite	Daily Maximum Monthly Average	0.5
Zinc, total recoverable[5]	µg/L	Effluent	Annual	Composite	Daily Maximum Monthly Average	10

Footnotes: NA = Not applicable. cfu = colony forming unit.
(1) See Definition section at end of permit for explanation of terms.
(2) Percent (%) removal shall be calculated using the monthly average values.
(3) Report Geometric Mean if more than one sample is collected in the reporting period.
(4) The total nitrogen concentration calculated as the sum of total Kjeldahl nitrogen plus nitrate + nitrite.
(5) Metals, except for aluminum, shall be analyzed as total recoverable; use EPA method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.

B. Instream Monitoring

Instream monitoring will be required, beginning year two (2018) and lasting through year five (2021) of the permit cycle, in the proposed permit as found in **Table 13**. Monitoring must take place at a consistent location upstream and outside the influence of Outfall 001 with the sample type, frequency, and RRVs as identified below. Ambient monitoring will be required for cadmium, copper, lead, and zinc as well as hardness to provide adequate data to establish accurate water quality standards and provide adequate ambient data to asses RP during the next permit cycle.

Instream monitoring results must be reported within a DMR. Monitoring results must be submitted electronically (NetDMR web-based application) no later than the 28th day of the month following the end of the monitoring period. Even in the case that there is no effluent discharge and no effluent monitoring, ambient instream monitoring is still required to be conducted and reported.

Table 13. Flathead River Ambient Monitoring and Reporting Requirements(1)

Location	Parameter	Units	Sample Frequency	Sample Type(2)	Required Reporting Value(3)
Flathead River: Upstream of discharge at Outfall 001 and downstream of any tributary or irrigation return flow.	Cadmium, total recoverable	µg/L	Annual	Grab	0.03
	Copper, total recoverable	µg/L	Annual	Grab	2
	Lead, total recoverable	µg/L	Annual	Grab	0.3
	Zinc, total recoverable	µg/L	Annual	Grab	8
	Hardness	mg/L	Annual	Grab	10

Footnote: NA = Not applicable.
(1) Ambient water quality monitoring is required beginning the second year of the permit cycle (2018).
(2) See Definition section at end of permit for explanation of terms.
(3) See Circular DEQ-7 or DEQ-12A for more information on RRVs. Analysis must achieve these, or lower, reporting limits.

VII. Public Participation

a. Public Notice

In accordance with ARM 17.30.1372, DEQ issued Public Notice No. MT-17-05 dated March 27, 2017. The public notice states that a tentative decision has been made to issue an MPDES permit to the Permittee and that a draft permit, fact sheet and environmental assessment (EA) have been prepared. Public comments are invited any time prior to the close of the business on April 25, 2017. Comments may be directed to:

Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620

or

DEQWPBPublicComments@mt.gov

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 and issue a final decision within sixty days of the close of the public comment period or as soon as possible thereafter.

All persons, including the applicant, who believe any condition of a draft permit is inappropriate or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under ARM 17.30.1372.

b. Notification of Interested Parties

Copies of the public notice were mailed to the discharger, state and federal agencies and interested persons who have expressed an interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this permit. In addition to mailing the public notice, a copy of the notice and applicable draft permit, fact sheet and EA were posted on DEQ’s website for 30 days.

Any person interested in being placed on the mailing list for information regarding this MPDES permit should contact DEQ, reference this facility, and provide a name, address, and email address.

c. Public Hearing

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 (ARM 17.30.1373).

d. Permit Appeal

After the close of the public comment period DEQ will issue a final permit decision. A final permit decision means a final decision to issue, deny, modify, revoke and reissue, or, terminate a permit. A permit decision is effective 30 days after the date of issuance unless a later date is specified in the decision, a stay is granted pursuant to ARM 17.30.1379, or the applicant files an appeal pursuant to 75-5-403, MCA.

The Applicant may file an appeal within 30 days of DEQ's action to the following address:

Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
PO Box 200901
Helena, Montana 59620-0901

e. Additional Information

Requests for additional information or questions regarding this permit should be directed to the Water Protection Bureau at 406-444-3080.

VIII. Information Sources

Administrative Rules of Montana Title 17 Chapter 30 - Water Quality
Sub-Chapter 5 - *Mixing Zones in Surface and Ground Water*
Sub-Chapter 6 - *Montana Surface Water Quality Standards and Procedures*
Sub-Chapter 7- *Nondegradation of Water Quality*.
Sub-Chapter 10 - *Montana Ground Water Pollution Control System*
Sub-Chapter 12 - *Montana Pollutant Discharge Elimination System (MPDES) Standards*,
Sub-Chapter 13 - *Montana Pollutant Discharge Elimination System (MPDES) Permits*

Montana Code Annotated (MCA), Title 75-5-101 *et seq*., "Montana Water Quality Act"

Montana Department of Health and Environmental Services, Water Quality Bureau. 1984. *Strategy for Limiting Phosphorus in Flathead Lake* (April 1984)

Montana DEQ. 2001. *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana* (December 2001).

Montana DEQ. 2012. Circular DEQ-7, *Montana Numeric Water Quality Standards* (October 2012).

Montana Department of Fish Wildlife and Parks. 2001. *Spawning Times of Montana Fishes* (March 2001).

Montana Pollutant Discharge Elimination System (MPDES) Permit Number MT0020036

a. Administrative Record

b. Renewal Application Forms DEQ-1 and EPA Form 2A, 2014

US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.

US Code of Federal Regulations, 40 CFR Part 503 – *Standards for the Use or Disposal of Sewage Sludge.*

US EPA. 1991. *Technical Support Document for Water Quality-Based Toxics Control,* EPA/505/2-30-001 (March 1991)

HDR Engineering, Inc. 2008. *City of Columbia Falls WWTP Upgrade and Expansion Project Section 3. Biological Treatment Pre-design Memo* (October 2008)

HDR Engineering, Inc. 2011. *Columbia Falls Wastewater Treatment Plant Improvements Project Operations and Maintenance Manual* (May 2011)

US Geological Survey. Montana StreamStats version 3, https://water.usgs.gov/osw/streamstats/montana.html (accessed 2017)

Montana Fish, Wildlife, and Parks. MFISH: Montana Fisheries Information System, http://fwp.mt.gov/fishing/mFish/ (accessed 2017)

CWAIC: Clean Water Act Information Center, Department of Environmental Quality, (http://deq.mt.gov/Water/WQPB/cwaic (accessed 2017)

Fact Sheet prepared: March 2017 by Emilie Erich Hoffman

Attachment A: Columbia Falls WWTP Reasonable Potential Analysis (February 2017)

			Oil and Grease	Ammonia (Chronic)	Ammonia (Acute)	N+N (HHS)		Aluminum, total dissolved (Chronic)	Aluminum, total dissolved (Acute)
Flow									
critical stream flow	7Q10	mgd	832	832	832	832	mgd	832	832
% of critical stream flow for dilution			0%	10%	1%	100%		25%	0%
Q_s	instream flow available for dilution Q_s = (critical stream flow for dilution)*(% of critical stream flow provided)	**mgd**	**0.00**	**83.20**	**8.32**	**832**	**mgd**	**208**	**0.00**
Q_d	critical effluent flow (avg. daily design flow)	**mgd**	**0.51**	**0.51**	**0.51**	**0.51**	**mgd**	**0.51**	**0.51**
Q_r	downstream flow (Q_s + Q_d)	mgd	0.51	83.71	8.83	832.51		208.51	0.51
Concentrations									
C_{max}	maximum effluent concentration for POR (from application or DMR data)	mg/L	**1**	**13.2**	**13.2**	**9.5**	µg/L	**130**	**130**
n	number of samples in effluent data set		71	71	71	71		67	67
CV	0.6 if n < 10 calculated as $\sigma_{effluent}/\mu_{effluent}$ if n ≥ 10		1.0	1.68	1.68	0.28		0.74	0.74
P_n	%tile for n samples at 95% confidence level		0.96	0.96	0.96	0.96		0.96	0.96
Z_{Pn}	Z-score for P_n		1.74	1.74	1.74	1.74		1.71	1.71
TSD	calculated TSD multiplier (should be close to Table 3-2 value)		0.93	0.90	0.90	0.98		0.96	0.96
C_d	critical effluent concentration - 95%tile (=max. effluent concentration * TSD multiplier)	**mg/L**	**0.9**	**12**	**12**	**9.3**	**µg/L**	**125**	**125**
C_s	critical instream concentration (75%tile if n<=30, 95% UCL if n>30)	**mg/L**	**0.00**	**0.05**	**0.05**	**0.07**	**µg/L**	**35**	**35**
C_r	**resulting or downstream pollutant concentration** $C_r = (C_dQ_d + C_sQ_s)/(Q_d+Q_s)$	**mg/L**	**0.9**	**0.12**	**0.73**	**0.08**	**µg/L**	**35**	**125**
WQS	**water quality standard**	**mg/L**	**10**	**1.64**	**3.83**	**10**	**µg/L**	**87**	**750**
Reasonable Potential			**no**	**no**	**no**	**no**		**no**	**no**

Attachment B: Columbia Falls WWTP Flow Schematic Diagram (2011)