

**MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY**

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

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

Applicant: Town of West Yellowstone

Permit Number: MTX000244 (Pending)

Facility Name: Town of West Yellowstone Wastewater Treatment Facility

Facility Location: NE, SW, SW Section 28
T13S, R5E, Gallatin County, MT
44.667910, -111.128242

Facility Address: Highway 20 West

Facility Contact: James Patterson

Receiving Water: Class I Ground Water

Number of Outfalls: One

Outfall/Type: 001 – Infiltration Percolation Cells – Domestic Wastewater

I. PERMIT STATUS

The following fact sheet outlines the basis for issuing a new MGWPCS wastewater discharge permit to the Town of West Yellowstone for the Town of West Yellowstone Wastewater Treatment 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 construction, operation, and maintenance of the wastewater treatment and disposal system.

A. Application Info

On October 13, 2017, The Department received an application for a new MGWPCS permit for the Town of West Yellowstone. The application was deemed complete and notification of completeness was mailed to the applicant December 1, 2017. Fees for the application were received March 13, 2017 (check # 51319).

B. Permit Changes

This is a new permit. The Town of West Yellowstone Wastewater Treatment Facility has been operating since 1965. Over its history of operation, this facility has been reviewed and approved by the appropriate State authority of the day. During the most recent upgrade in the 1990s (discussed below in Section II), DEQ completed a nondegradation review and determined that the source was not new or increased. This permit creates effluent load limits and defines a mixing zone for the facility. The limits are based on the current effluent discharge volumes and current effluent characteristics. The Town of West Yellowstone has conducted multiple ground water studies to gather quality information regarding the local hydrogeologic characteristics (see Hydro Solutions report, Attachment A). This permit establishes a source specific mixing zone based on the information provided by the applicant.

II.FACILITY INFORMATION

A. Facility Location

The facility is located on Highway 20, approximately one mile west of the Town of West Yellowstone.

B. Facility and Operations

The Town of West Yellowstone operates two fully aerated sewage lagoons that discharge into a polishing pond and then rotate the discharge through nine infiltration percolation ponds on the site. The current system was approved in 1994 for a daily design flow of 439,000 gallons per day and a maximum flow of 650,000 gallons per day. The present

system is the latest iteration of treatment upgrades for the Town’s waste water facility (see Hydro Solutions Hydrology Report, Section 2, Attachment A). The population served by this system varies seasonally with peak summer flows approaching 600,000 gallons per day and winter flows of 270,000 gallons per day.

Table 1

Collection, Treatment, and Disposal System Summary, West Yellowstone	
Outfall 001 - Domestic Wastewater/Sewerage	
Method of Disposal: Infiltration to ground water	
Disposal Structure: IP Cells (Outfall 001) NE, SW, SW Section 28, T13S, R5E, Gallatin County, MT Latitude: 44.667910° North; Longitude: -111.128242° West	
Contributing Sources of Wastewater: Standard Industrial Code(s) of contributing sources: 4050 (Sanitary Services), 5820 (Eating Place), 7011 (Hotel).	
Average Daily Design Flow (gpd): 439,000 (ft ³ /day): 58,685	Daily Maximum Design Flow (gpd): 650,000 (ft ³ /day): 86,892
Effluent Sampling Location: EFF-001: Effluent sampling done at discharge pipe into IP cells.	
Flow Monitoring Location: Located in the pump station prior to diversion box for Cell A or Cell B.	
Treatment: Primary treatment, Aerobic Sewage Treatment	

C. Effluent Monitoring Location

Effluent sampling is done at the end of pipe prior to discharge to the IP Cells. The system flow meter is in the pump station prior to the diversion box for Cell A or Cell B.

Sampling requirements are further discussed in Section V.

D. Effluent Characteristics

Pursuant to ARM 17.30.1023, DEQ requires the applicant disclose the quality of the effluent to be discharged such that the potential pollutants are identified, and the proposed discharge can be analyzed. The applicant provided effluent quality monitoring results for Outfall 001 as summarized within Appendix I.

E. Geology

Outfall 001 is located on Pleistocene obsidian sand deposits washed out of Yellowstone Park. Sand deposits in this area range between 80 and 100 feet in thickness running to the north west toward Hebgen Lake. See the attached Hydro Solutions Hydrology Report (Attachment A) for additional geologic descriptions of the site.

F. Hydrogeologic Characteristics

The aquifer in the vicinity of Outfall 001 lies in the obsidian sand layer that extends to the surface. The local aquifer is unconfined and is hydraulically connected to the down gradient Madison River and Hebgen Lake. Monitoring well MW1 and MW2 intersect the local aquifer approximately 30 feet below ground surface (see drill logs, Hydro Solutions Hydrology Report). Regional ground water flow is to the northwest. There are no water supply wells located down gradient of Outfall 001 for several miles. The area down gradient is primarily undeveloped State of Montana land.

G. Ground Water Monitoring Wells

There are eight monitoring wells at the site. Information regarding these monitoring wells has been summarized and listed in Appendix II (see Figure 4).

H. Ground Water Quality Characteristics

Seven downgradient monitoring wells exist ranging from 38 feet to 4,965 feet down gradient.

Ground water near the West Yellowstone Wastewater Facility is Class I ground water. Specific conductivity upgradient of the site averages 121 uS/cm, and total nitrogen averages 0.2 mg/L.

Ground water quality results are summarized in Appendix III.

III.MIXING ZONE

The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. DEQ will be authorizing a mixing zone within this permit. The applicant requested a source specific mixing zone for this facility. The source specific mixing zone rationale is further discussed in Appendix IV.

IV.PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

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

Table 2

Proposed Final Effluent Limits – Outfall 001, West Yellowstone, MTX000244		
Parameter	Units	Quarterly Average
Nitrogen, Total (as N)	lbs/day	314
Footnotes:		
Beneficial Uses: ARM 17.30.1006		

V.RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Effluent monitoring and ground water monitoring will be required as a condition of this permit. Monitoring requirements and respective rationale are summarized in Appendix VII.

VI.NONSIGNIFICANT DETERMINATION AND REASONABLE POTENTIAL ANALYSIS

DEQ has determined that the activity is not considered to be a new or increased source resulting in a change of existing water quality occurring on or after April 29, 1993 (ARM 17.30.702). DEQ is therefore not required to perform a significance determination (ARM 17.30.715). The applicable water quality standards for Class I ground water are summarized in Appendix V This permit includes monitoring, reporting, and corrective action requirements to establish, confirm, and maintain compliance with permit limitations.

VII. 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 {Date-close of PN}. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or at:

Water Protection Bureau
PO Box 200901
Helena, MT 59620

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

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

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

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000244), and include the following information: name, address, and phone number.

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

FIGURE 1 Vicinity Map

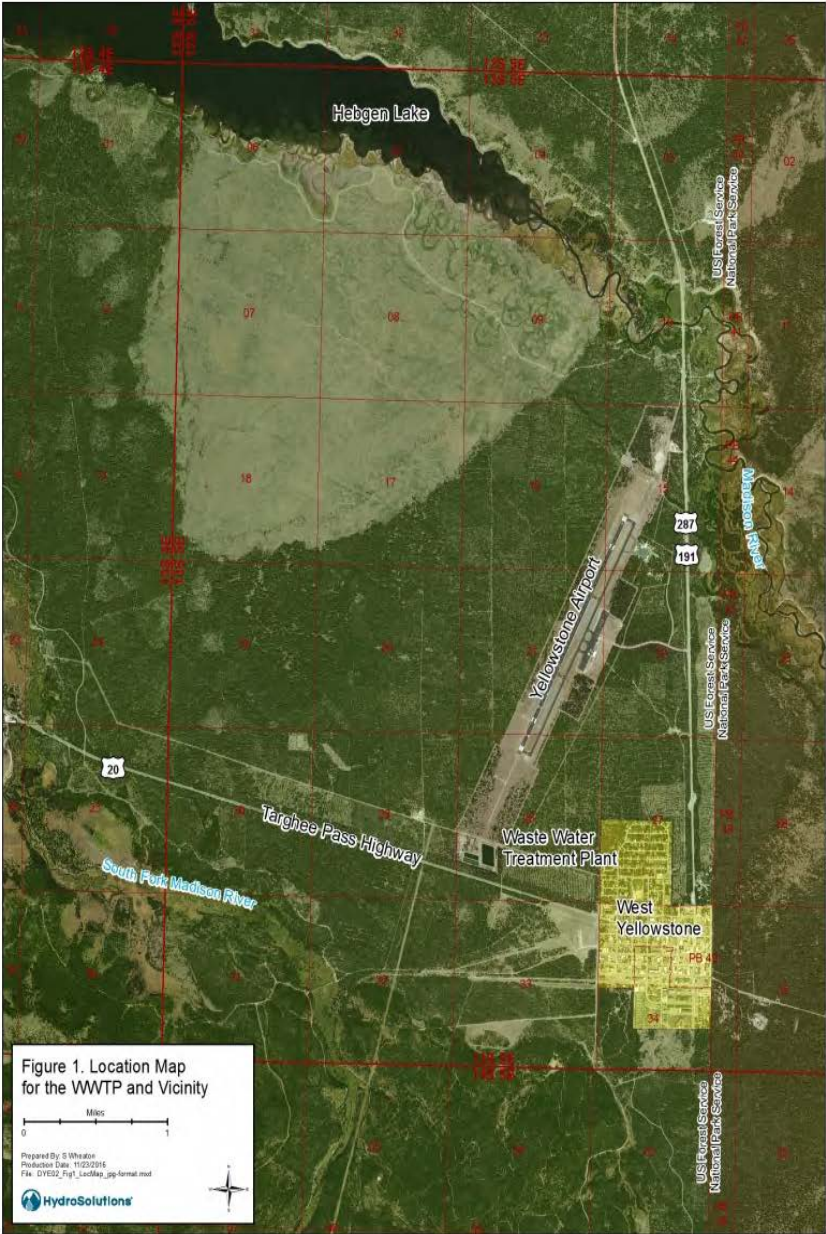


FIGURE 2a
Site Map

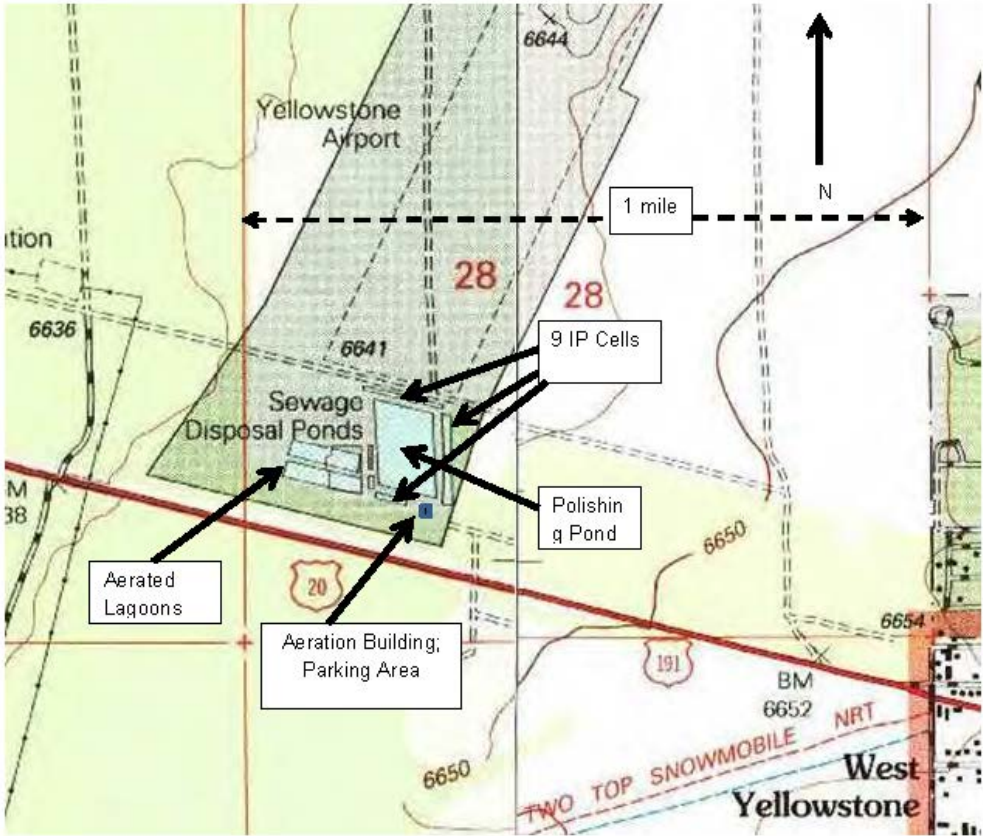


Figure 2b
Site Map



Figure 2. Existing Water Wells Map

FIGURE 3
Line Diagram

WEST YELLOWSTONE WASTEWATER TREATMENT PLANT
Line Diagram of Wastewater Flow

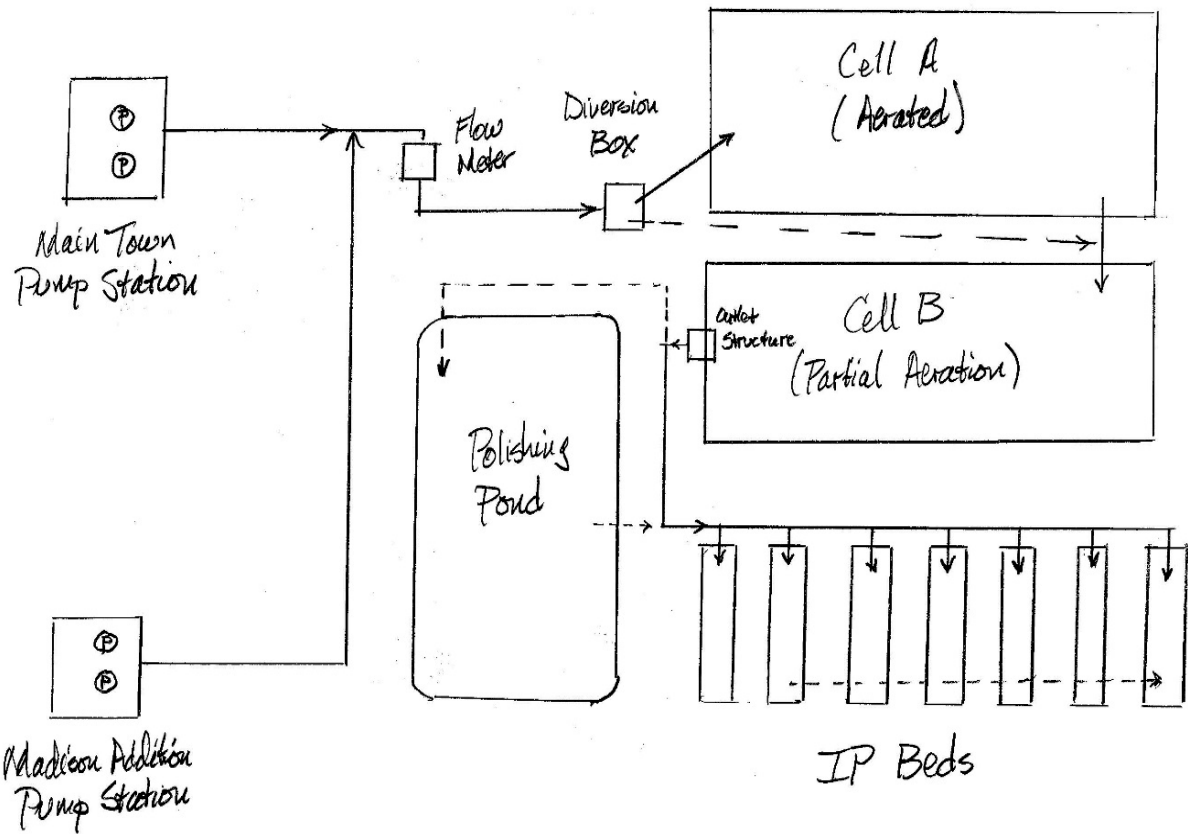


FIGURE 4a
 Monitoring Wells

Town of West Yellowstone MGWPCS Permit Application | Hydrology Report

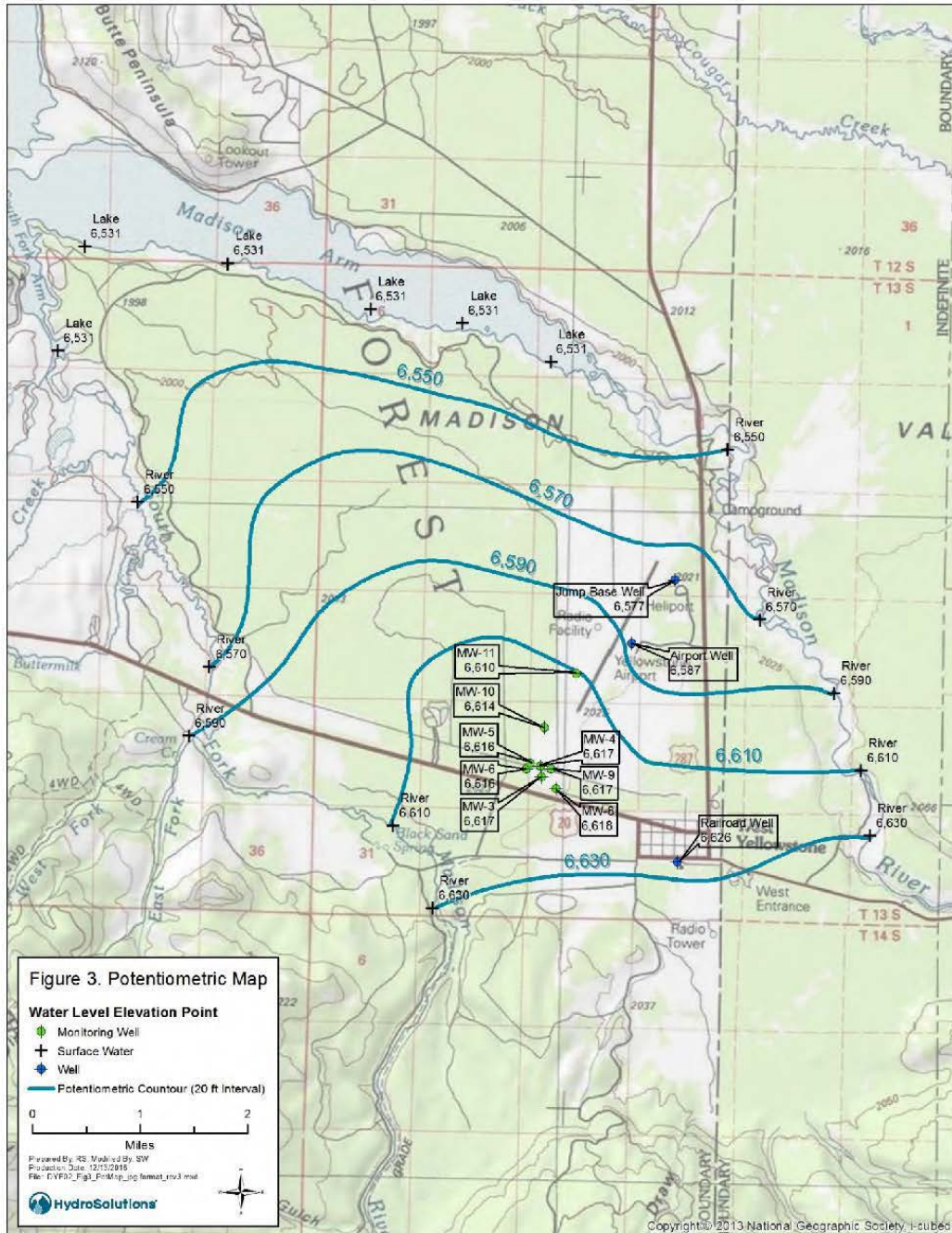


Figure 3. Potentiometric Map With Other Groundwater Users

Figure 4b
Monitoring Wells

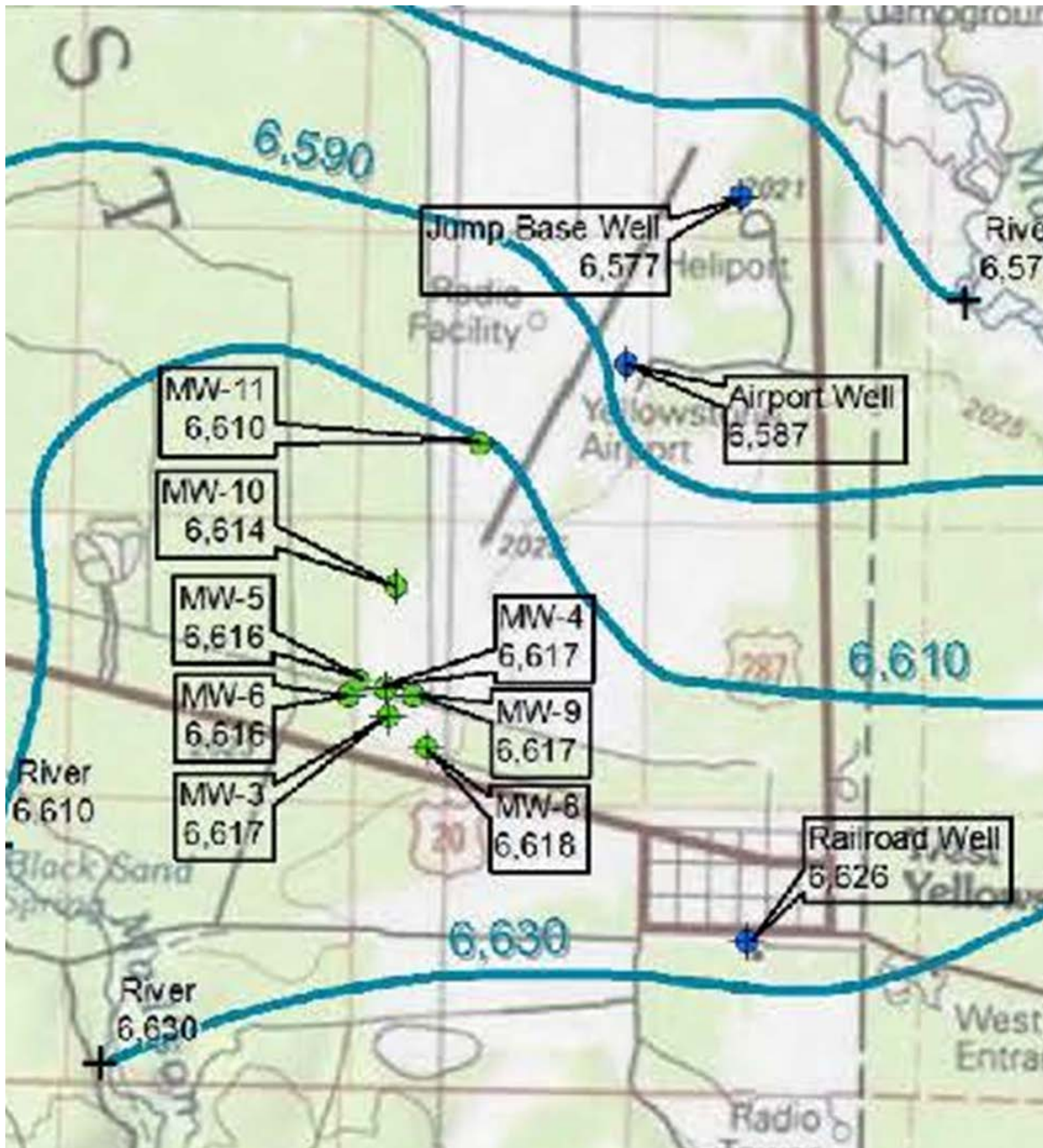


Figure 4c
Monitoring Wells



Figure 4d
Monitoring Wells



APPENDIX I – EFFLUENT AND INFLUENT QUALITY
Table 3

Effluent Quality – Outfall 001, Town of West Yellowstone Wastewater Treatment Facility						
Parameter ⁽¹⁾	Location	Units	Reported Average Value	Reported Maximum Value ⁽²⁾	# of Samples	Source of Data
Biochemical Oxygen Demand (BOD ₅)	EFF-001	mg/L	26	52	5	APP
	INF-001	mg/L	296	380	16	APP
Chloride (as Cl)	EFF-001	mg/L	43	43	16	APP
	INF-001	mg/L	42	55	16	APP
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	0.1	3.0	16	APP
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	38.5	49.0	17	APP
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	49	59	17	APP
Nitrogen, Total (as N)	INF-001	mg/L	55	89	16	APP
		lbs/day	201	326	16	APP
	EFF-001	mg/L	49.1	62.0	17	Calculated
		lbs/day	179.70	227.00	17	Calculated
Phosphorus, Total (as P)	EFF-001	mg/L	5.0	8.1	37	APP
		lbs/day	18.00	29.65	37	Calculated
Specific Conductivity	EFF-001	μS/cm	647	673	16	APP
	INF-001	μS/cm	614	733	16	APP
Total Dissolved Solids (TDS)	EFF-001	mg/L	226	309	36	APP
Total Suspended Solids (TSS)	EFF-001	mg/L	66	107	6	APP
	INF-001	mg/L	182	314	16	APP
Footnotes: APP = Application Form GW-2 and supplemental materials. EFF-001: Effluent sample site located at prior to discharge to Cell A INF-001: Influent sample μS/cm= Standard unit Period of Record:2014 through 2016. (1) Conventional and nonconventional pollutants only, table does not include all possible toxics. (2) Maximum value recorded of all quarterly reported Daily Maximum Values.						

APPENDIX II – MONITORING WELL SUMMARY
Table 4

Monitoring Well Summary
Monitoring Well: MW-3
MGWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: 190 feet west of IP cell Latitude: 44.66907° Longitude: -111.13014
Representation: side gradient next to outfall possibly in mounded area
Monitoring Well: MW-4
MBMG GWIC #: NR
Lithologic Log ID:NR
Status: Monitoring well
Location: 280 feet north of IP cell. Latitude: 44.6704° Longitude: -111.13091°
Representation: Ground water at the outfall
Monitoring Well: MW-5
MGWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: 720 feet west of IP cell. Latitude: 44.67081° Longitude: -111.13283°
Representation: Water quality in the vicinity of outfall 001
Monitoring Well: MW-6
MBMG GWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: 860 feet west of IP cell. Latitude: 44.66999° Longitude: -111.13357°
Representation: Possible side gradient ground water quality
Monitoring Well: MW-8
MGWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: Approximately 100 feet upgradient (south east) of outfall. Latitude: 44.66742° Longitude: -111.12790°
Representation: Possible upgradient ground water quality. Mounding may affect this monitoring site.
Monitoring Well: MW-9
MBMG GWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: Less than 38 feet down gradient (North) of IP cell. Latitude: 44.67010° Longitude: -111.12895°
Representation: Water quality at outfall 001.

Monitoring Well: MW-10
MGWIC #: NR
Lithologic Log ID: NR
Status: Monitoring Well
Location: 2,020 feet down gradient of IP cell.
Latitude: 44.67565° Longitude: -111.13039°
Representation: 2,020 feet down gradient
Monitoring Well: MW-11
MBMG GWIC #: NR
Lithologic Log ID: NR
Status: Monitoring well
Location: 4,965 feet down gradient of IP cell.
Latitude: 44.68299° Longitude: -111.12456°
Representation: Down gradient ground water quality.

APPENDIX III - GROUND WATER QUALITY MONITORING RESULTS
Table 5

Ground Water Monitoring Results: Town of West Yellowstone Wastewater Treatment Facility						
Monitor Source⁽¹⁾	Representation	Parameter	Units	Reported Average Value	# of Samples	Source of Data
IP Cell	Effluent	Nitrogen, Nitrate + Nitrite (as N)	mg/L	43.28	3	APP
		Chloride (as Cl)	mg/L	32.00		APP
MW-3	Shallow ground water, 190 feet west of IP cell, possibly mounded	Nitrogen, Nitrate + Nitrite (as N)	mg/L	31	3	APP
		Chloride (as Cl)	mg/L	29.33		APP
MW-4	Shallow ground water, 280 feet downgradient from IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	27.38	3	APP
		Chloride (as Cl)	mg/L	29.00		APP
MW-5	Shallow ground water, 720 feet west of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	12.81	3	APP
		Chloride (as Cl)	mg/L	17.00		APP
MW-6	Shallow ground water, 860 feet west of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	9.43	3	APP
		Chloride (as Cl)	mg/L	4.33		APP
MW-8	Shallow ground water, 100 feet upgradient of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	ND	3	APP
		Chloride (as Cl)	mg/L	2.00		APP
MW-9	Shallow ground water, 38 feet north (downgradient) of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	23.10	3	APP
		Chloride (as Cl)	mg/L	27.67		APP
MW-10	Shallow ground water, 2,020 feet north (downgradient) of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	7.53	3	APP
		Chloride (as Cl)	mg/L	25.00		APP
MW-11	Shallow ground water, 4,965 feet north (downgradient) of IP cell.	Nitrogen, Nitrate + Nitrite (as N)	mg/L	0.82	3	APP
		Chloride (as Cl)	mg/L	2.00		APP
Footnotes: APP = Application Form GW1 ND= Non-detect Period of Record: 2013 through 2014. (1) Refer to Fact Sheet, Monitoring Well Summary Table for the existing or proposed location of the monitoring wells.						

APPENDIX IV – MIXING ZONE RATIONALE

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

In making its mixing zone determination, DEQ considers the potential cumulative effects of additional existing discharges in the area (ARM 17.30.506(2)(f)). In addition, DEQ will analyze the assimilative capacity of the aquifer that is available for the proposed discharge. The derived effluent limitation (Section IV) will maintain the beneficial uses of all downgradient ground water.

This is a new permit and the applicant requested a 7,600-foot long source specific mixing zone. ARM 17.30.518 (2) states that “A source specific surface or ground water mixing zone will only be granted after the applicant demonstrates to the department that the requested mixing zone will comply with the requirements of ARM 17.30.506 and 17.30.507 and 75-5-303 MCA”. DEQ authorizes a source specific mixing zone using current effluent discharges at the West Yellowstone Wastewater Facility to establish effluent load limits.

A source specific mixing zone requires detailed site-specific ground water modeling of a potential mixing zone location. The authorization of the West Yellowstone source specific mixing zone is based on field data compiled in ground water studies conducted for the Town of West Yellowstone under the direction of the engineering firm The Dyer Group, LLC, in 2013 and 2017. The studies were conducted by the environmental consulting firm Hydro Solutions. The information contained in the application material meets all the requirements for the authorization of a source specific mixing zone as described in ARM 17.30.518.

ARM 17.30.517 requires the cross-sectional area (width x depth) for a mixing zone (A). For this mixing zone $A = 474,750 \text{ ft}^2$ (6,330 ft x 75 ft). This area is used to calculate the ground water available for mixing.

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

Q_{gw} = KIA Where:
 Q_{gw} = ground water flow volume (ft^3/day)
K = hydraulic conductivity (ft/day)
I = hydraulic gradient (ft/ft)

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

West Yellowstone Data:

Q_{gw} = KIA

QGW = 412,083 ft³/day

K = 217 ft/d

I = 0.004 ft/ft

A = 474,750 ft²

Projected particle tracks for the proposed source specific mixing zone at the West Yellowstone Wastewater Treatment Facility are illustrated in the Hydro Solutions 2017 Hydrology Report (Attachment A). The particle track modeling was used to define the boundaries of the mixing zone used in this fact sheet.

APPENDIX V - RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

A. Water Use Classification & Applicable Water Quality Standards

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

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

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

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

The applicable ground water standards are summarized in the Table 7 and will be used as the basis for developing effluent limitations in the permit.

Table 7

Applicable Ground Water Quality Standards.			
Parameter⁽¹⁾	Units	17.30.1006(1)(b)(i) Human Health Standards - Ground Water	17.30.1006(1)(b)(ii) Beneficial Uses - Ground Water
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	-
Nitrogen, Total (TN)	mg/L	-	10.0
Footnotes:			
These standards establish the maximum allowable changes in ground water quality and are the basis for limiting discharges to ground water, ARM 17.30.1005(1); Circular DEQ-7 (2012), Footnote 16.			
(1) The list only includes identified parameters of interest.			

B. Pollutants and Parameters of Interest (POI)

DEQ has identified POI's for the proposed discharge based on the following:

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

Each individual POI is further discussed below.

C. Development of Effluent Limits

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

1) Water Quality Based Effluent Limitations

a. Nitrogen

Application materials state that nitrogen is present in the wastewater stream (Section II.D.). To protect beneficial uses [ARM 17.30.1006(1)(b)(ii)], there shall be no increase

of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses. Therefore, no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. DEQ will establish the effluent limitations for nitrogen based on the projection that the entire nitrogen load in the wastewater stream may ultimately be converted to nitrate (USEPA, 2002a).

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

Equation 1:

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

Where:

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

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

Equation 2:

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

Where:

C_{eff}	=	effluent pollutant concentration
C_{std}	=	water quality standard concentration
C_{gw}	=	ambient receiving ground water concentration
D	=	dilution ratio (Q_{gw}/Q_{eff})

Solving for the effluent concentration

$$\frac{C_{eff} = 58.1 \text{ mg/L}}{10 + 4.912 (10.0 - 0.2) = 58.1}$$

Where:

C_{eff} = effluent concentration

C_{std} = 10.0 mg/L TN

C_{gw} = 0.2 mg/L

$D = 412,083 \text{ ft}^3/\text{day} / 83,892 \text{ ft}^3/\text{day} = 4.912$

i. Outfall 001

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

$$\begin{aligned} & 314 \text{ lbs/day} \\ & [(8.34 \times 10^{-6}) * 58.1 \text{ mg/L} * 650,000 \text{ gpd}] \\ & \text{as based on the following equation:} \end{aligned}$$

Equation 3:

$$L_{\text{lim}} = \text{CON} * C_{\text{eff}} * \text{DC}_{\text{eff}}$$

Where:

L_{lim} = effluent limitation-load

C_{eff} = allowable effluent concentration

DC_{eff} = design capacity of wastewater treatment system (gpd)

CON = conversion factor [8.34×10^{-6}]

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

The numeric effluent limitations are expressed as loads whenever possible since this type of limitation inherently regulates both the volume and the strength of the effluent as prescribed at 75-5-402(3), MCA. Load limits also ensure compliance with the ground water standards at the end of the mixing zone. The proposed final effluent limits are computed above, and are listed in Section IV.

Based on the description of the mixing zone above, site specific flow modeling of the existing effluent plume (Attachment I) and analysis presented in Section III and the Hydro Solutions 2017 Ground Water Study, DEQ has determined pursuant to ARM 17.30.505 and ARM 17.30.518 that a source specific mixing zone is applicable and will be authorized for the individual parameters for Outfall 001 listed in Appendix V.

APPENDIX VI – RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Effluent monitoring and ground water monitoring requirements will be required and made conditions of this permit.

A. Effluent Monitoring - Compliance

The permittee will be required to monitor and report monitoring results at a specified frequency in order to demonstrate compliance with the applicable effluent limitations. Effluent monitoring and reporting requirements are summarized in the table below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

B. Effluent Monitoring - Sampling Location

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). As discussed in Section II.C, the effluent sample location has been established at the discharge pipe entering the IP cells (EFF-001, see figure 3).

C. Discharge Monitoring

Flow measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant will be required to maintain and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow (Permit Part II.B.). The flow measuring device (FM-001) is located prior to discharge to Cell A (Figure 3). Flow monitoring and reporting requirements are summarized in Table 8.

Table 8

Effluent Monitoring and Reporting Requirements – Outfall 001, West Yellowstone						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾	Report Freq
Flow Rate, Effluent ⁽³⁾	FM-001	gpd	Continuous	Continuous	Quarterly Average	Quarterly
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N) ⁽⁴⁾	EFF-001	mg/L	Calculate	Monthly	Daily Maximum Quarterly Average	Quarterly
		lbs/day ⁽⁵⁾	Calculate		Quarterly Average ⁽⁶⁾	Quarterly
Total Phosphorus	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Biologic Oxygen Demand, BOD	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Total Dissolved Solids	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Total Suspended Solids	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Chloride	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Specific Conductivity	EFF-001	uS/cm	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly

Footnotes:

CFU = Colony Forming Units

EFF-001: located at effluent collection tank just prior to release of wastewater into the disposal pond.

FM-001: located prior to treatment (aerated cell A).

If no discharge occurs during the reporting period, “no discharge” shall be recorded on the effluent Discharge Monitoring Report (DMR) report forms.

Grab sample will represent concentration for a 24 hour period.

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

(1) See definitions in Part V of the permit.

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

(3) Requires recording device or totalizing meter, must record daily effluent volume.

(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

(5) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶].

(6) Quarterly Average Load calculation: lbs/day = quarterly average concentration (mg/L) x quarterly average flow (gpd) x [8.34 x 10⁻⁶]

D. Ground Water Quality Monitoring

Ground water monitoring will be required at monitoring wells MW8, MW10 and MW11. Ground water monitoring and reporting requirements are summarized in the Table 9. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter. Well logs for MW10 and MW11 are found in Attachment A.

Table 9.

Ground Water Monitoring and Reporting Requirements						
Parameter/Method	Monitor Location⁽¹⁾	Units	Sample Type⁽²⁾	Minimum Sampling Frequency⁽³⁾	Reporting Requirements⁽²⁾⁽⁴⁾	Reporting Frequency
Chloride (as Cl)	MW8, MW10, MW11	mg/L	Grab	1/Six Months	Semi-annual Average	Semi-annual
<i>Escherichia coli</i> Bacteria	MW8, MW10, MW11	CFU/100ml	Grab	1/Six Months	Semi-annual Average	Semi-annual
Nitrogen, Nitrate + Nitrite (as N)	MW8, MW10, MW11	mg/L	Grab	1/Six Months	Semi-annual Average	Semi-annual
Nitrogen, Total Ammonia (as N)	MW8, MW10, MW11	mg/L	Grab	1/Six Months	Semi-annual Average	Semi-annual
Nitrogen, Total Kjeldahl (TKN)(as N)	MW8, MW10, MW11	mg/L	Grab	1/Six Months	Semi-annual Average	Semi-annual
pH	MW8, MW10, MW11	s.u.	Grab or Instantaneous	1/Six Months	Semi-annual Average	Semi-annual
Specific Conductivity @ 25°C	MW8, MW10, MW11	µS/cm	Grab or Instantaneous	1/Six Months	Semi-annual Average	Semi-annual
Static Water Level (SWL) ⁽⁵⁾	MW8, MW10, MW11	ft-bmp	Instantaneous	1/Six Months	Semi-annual Average	Semi-annual
Temperature	MW8, MW10, MW11	°C	Grab or Instantaneous	1/Six Months	Semi-annual Average	Semi-annual

Footnotes:

CFU = Colony Forming Units

ft-bmp = feet below measuring point

s.u. = standard units

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

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

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

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

(1) Refer to Appendix II of the Fact Sheet for the existing location of the monitoring wells.

(2) See definitions in Part V of the permit.

(3) Sampling periods 01/01-06/30 and 07/01 to 12/31.

(4) Average for sampling period.

(5) Measuring point (point of reference) for SWL measurements shall be from top of casing and measured to within 1/100th of one foot.

APPENDIX VIII - REFERENCES CITED

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

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

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

Department of Environmental Quality, Water Quality Circulars:

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

Department of Environmental Quality. 2018 Administrative Record of Montana Ground Water Pollution Control System (MGWPCS) permit application and supplemental materials, Town of West Yellowstone Wastewater Treatment Facility, MTX000244.

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

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U.S. Geological Survey, Groundwater Basics, <http://water.usgs.gov/ogw/basics.html>, 2016.

Attachment A

Hydro Solutions Hydrology Report for Town of West Yellowstone
2007 and 2017

Prepared By: R. Morse, 3/13/18

Attachment I

Town of West Yellowstone
Hydro Solutions Hydrologic Report
2007 and 2017